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THE AGRICULTURAL INNOVATION PROJECT (AIP)

VALUE CHAIN SHORTLISTING THE AGRICULTURAL INNOVATION PROJECT



PREPARED BY: ENROOT CONSULTANCY

This study is conducted by **GIZ Egypt**, on behalf of the German Government through the Agriculture Innovation Project (AIP) and in cooperation with the Ministry of Agriculture and Land Reclamation It has been prepared by Enroot Consultancy in 2020.

About the Agricultural Innovation Project

The Egyptian-German Agricultural Innovation Project (AIP) is a bilateral technical cooperation program implemented by Gesellschaft für Internationale Zusammenarbeit (GIZ) with the primary aim of increasing the income of small-holder farmers in Egypt using agricultural innovation and agribusiness promotion. In line with that, the project focuses on supporting value chains of high-value using a market-oriented approach.

For more information about the project: <https://www.giz.de/en/worldwide/92509.html>

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Project Background

Egypt's agriculture sector is one of the country's most valuable economic assets, accounting for 11.23 percent of the country's GDP in 2018. (GDP). It supplies 18% of total employment opportunities in the country and 45 percent of employment for women.¹ Furthermore, 55 percent of employment in Upper Egypt is agriculture related.

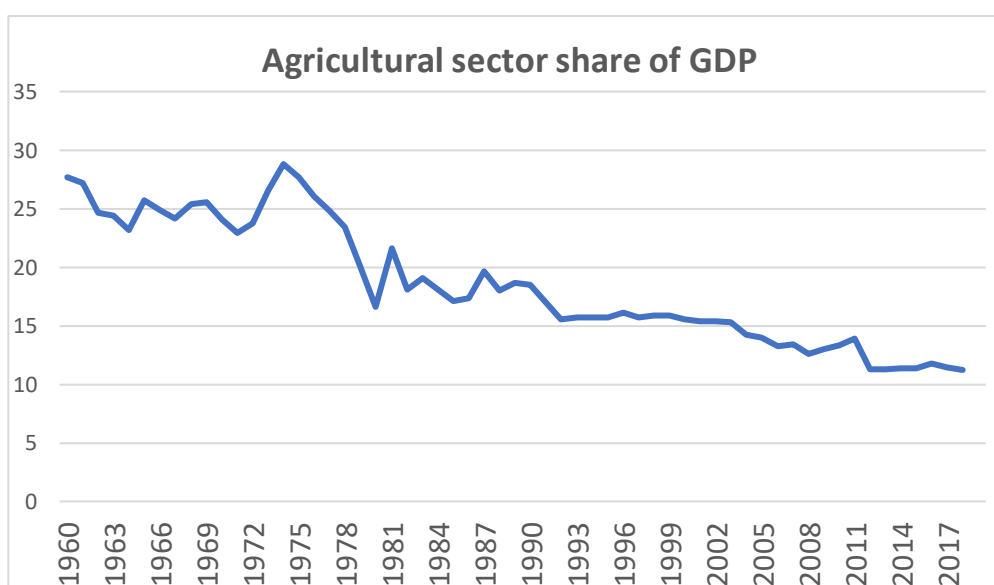


Figure 1: Agriculture Sector Share of GDP

However, agricultural production remains highly limited by land fragmentation. The division of land upon small holder farms of 1-3 feddans, prevents economies of scale, which increases production costs and complicates the introduction of innovative and efficient tools for farming, harvesting, post-harvesting, and marketing. Furthermore, prevailing farming practices constrain productivity and profit.

Upper Egypt's agriculture is dominated by traditional field crops, but there are concentrations of horticultural crops (fruits and vegetables), medicinal and aromatic plants, and palm dates in several governorates. Increased revenue for local producers, who are mostly small-scale farmers, will result from the development of the latter crops/subsectors, adding to the overall local economic development.

In line with this, GIZ launched the Agricultural Innovation Project (AIP) with the goal of increasing small-scale agriculture income and promoting agribusiness in Upper Egypt through

¹ http://www.theglocaleconomy.com/Egypt/share_of_agriculture/

technological innovation, with a focus on sustainability, marketing consolidation, and sales channel diversification. The project is particularly concerned with agricultural cycle innovation (farming, harvesting, post-harvesting, processing, and marketing), as it would boost farmer yield and income while also contributing to the sustainability of food, agriculture, and health systems.

Conducting a detailed value chain analysis is a necessary preliminary step for project implementation in order to understand the ecosystem around these value chains, the capability of market actors, and to identify potential risks and opportunities. Enroot consulting has, accordingly, carried out the "Value Chain (VC) Prioritization and Analysis" assignment in order to select three value chains (VCs) that will be the project's focus.

Objective & Methodology

The purpose of this report is to present the Value Chain Longlist and the Value Chain Shortlist, based upon which three VCs were identified as the focus of the AIP project.

The methodology used to prioritise the VCs consisted of six steps illustrated in the below figure.

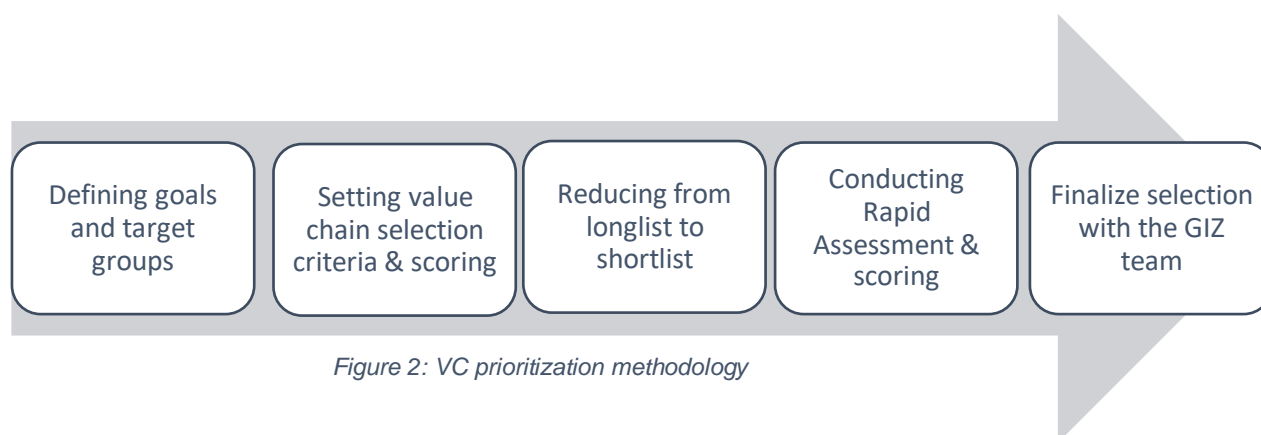


Figure 2: VC prioritization methodology

Define goals and target groups

The project's main target beneficiaries are smallholder farmers, with a specific focus on supporting women in agriculture. Most of those farmers are members of farmer organisations and associations. In the context of this project, smallholder farmers are owners of three Feddans or less.

THE PROJECT'S MAIN OBJECTIVES

- 1) Enhancing market access of smallholder farmers, with a focus on boosting VC competitiveness, increasing demand, digital transformation, business model innovation and access to finance.
- 2) Strengthening institutional support, with a focus on management & organizational development, marketing and sales innovation, organic certificate compliance, and product and process innovation support.
- 3) Introducing innovation for better productivity & sustainability, with a focus on VC innovation, value addition scaling opportunities and capacities, knowledge management and sharing, digital transformation, and organic and other global certificate compliance longlist identification.

Setting Value Chain Selection Criteria & Scoring

LOGLIST SELECTION CRITERIA

All horticulture value chains in Upper Egypt, in addition to medicinal and aromatic plants and oil seeds, were included in the longlist. A total of 29 crops were, accordingly, identified and longlisted. The GIZ team also added the sugar beets value chain to the longlist.

SHORTLIST SELECTION CRITERIA

According to the project's objectives and target beneficiaries, exclusion criteria were set to identify the value chains that will be chosen from the longlist for shortlisting. The exclusion criteria included:

1. The Level of contribution to the local economy: If the total Production Share of Upper Egypt (UE) is below 10% or production value is below EGP 100 million
2. High water footprint.
3. Intensive capital requirement for value addition or lack of value addition.
4. Unattainable economy of scale for small farmers.
5. Full maturity of Value Chains (i.e., inability to stimulate change).

Three pre-set criteria were also used to select the shortlist of value chains, these were:

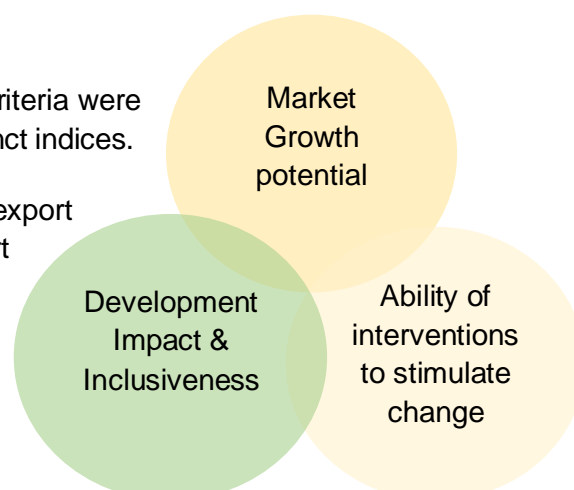
- 1- Market Growth Potential
- 2- Development impact and inclusiveness
- 3- Ability of interventions to stimulate change

Each primary criterion has a set of 4-5 sub-criteria that are used to evaluate it, with each sub-criteria having distinct indices that are analysed to quantify (in the case of quantitative) or evaluate (in the case of qualitative) the extent to which the VC meets the sub-criteria.

1. Market Growth Prospects

Under the market growth potential, a set of four sub-criteria were identified, and each of them was evaluated using distinct indices.

a) Market growth potential in both domestic and export markets: evaluated by Egypt's share of the export market as determined by its rank, as well as total local consumption to examine local demand. Both are quantitative indicators derived from the UNCOMTRADE trade data set and the CAPMAS agriculture production, consumption, and trade bulletin.



b) Value addition: assessed by the number of different product lines that may be created from the crop, as well as the multiplier of these crops, i.e., how much monetary gain would result from a value-added activity versus selling the crop raw/fresh. Whether organic farming exists for the value chain under study was also taken into consideration.

c) Potential and identified opportunities for out-grower schemes and market linkages: assessed solely by the prevalence of contract farming.

d) Comparative and Competitive Advantage: measured by comparing Egypt's average crop productivity to that of nations with similar environmental eco-systems and agricultural production contexts. These countries were chosen based on consultations with experts in the field. Furthermore, whether Egypt has a particular trade (export) window and whether it has certain distinct product qualities was also evaluated.

2. Impact on development and inclusion

Under this criterion, a set of five sub-criteria were identified:

a) Small Farmers: the concentration of agriculture among small farmers was assessed by looking at average cultivation areas.

b) Women Participation: measured by the percentage of female labour participation in VC operations, including pre- and post-harvest.

c) Inclusion of MSMEs: measured by the prevalence of post-harvest activities among small processing facilities.

d) Employment: measured by assessing the number of full-time jobs required for each tonne of production or feddan cultivation.

e) Sustainability: assessed by the crop's water efficiency, which is determined by the amount of water required for the cultivation of 1 feddan over the entire cultivation cycle, and the crop's climatic resilience, i.e., whether it can endure extreme temperature increases or drops.

3. The ability of interventions to stimulate change

Under this criterion, four sub-criteria were examined.

a) The ability of market players to accept solutions: measured by the presence of effective assistance schemes, particularly in the private sector, extension advisors, and consultants; in addition to the prominence of farmer organisations, associations, and cooperatives (technical capacity)

b) Innovation Feasibility and Capacity: assessed in terms of whether productivity gains can be made through innovation by introducing best practises in fertilisation and pesticide management. This, in turn, is assessed by (1) potential to increase yield (2) potential to add

value (3) potential to reduce/manage waste (4) potential to reduce cost of production or processing (across the different value chain activities). Also, the preparedness of processors and manufacturers for innovation is taken into consideration.

c) Enabling Environment: tested against the existence of national export standards via GOEIC coding, as well as conformity with international standards such as worldwide GAP, BRC, and Fair Trade.

d) Competitiveness and Synergies with Development Partners: evaluated in relation to the existence of other development initiatives that compete with or complement the GIZ project.

WEIGHTS

The three main criteria were assigned equal weights. However, several sub-criteria were assigned double the weight, these are:

- Value addition.
- Potential and identified opportunities for out-grower schemes and market linkages.
- Women participation.
- Sustainability and Environmental impact.
- Innovation Feasibility & Capacity.

SCORING

Each VC was evaluated against each criterion and a score from 1 to 5 was assigned, such that 1 is the lowest and 5 is the highest. The below table shows the scoring system.

Sub-category	Measurement Scale
1.a) Market growth potential in domestic and export markets	The higher the market share or the local demand, the higher the score.
1.b) Value addition	The more the VC has the capacity for value-addition and the higher the monetary value of the value addition, , the higher the score.
1.c) Potential and identified opportunities for out-grower schemes and market linkages	The more contract farming, the higher the score.
1.d) Comparative and Competitive Advantage	The higher the productivity and quality, the higher the score.

2.a) Small Farmers	The smaller the average cultivation area, the higher the score.
2.b) Women	The higher the share of women labour, the higher the score.
2.c) MSMEs	The higher the number or percentage of MSMEs, the higher the score.
2.d) Employment intensity	The more jobs needed per Ton or Feddan, the higher the score.
2.e) Sustainability	The more sustainable (i.e., the higher water efficiency and the higher climate resilience) the higher the score.
3.a) Capacity of market players to adopt solutions	The more there are private sector players or farmers associations providing technical capacity, the higher the score.
3.b) Innovation Feasibility & Capacity	The more the agriculture management challenges can be addressed by innovation interventions, the higher the scores.
3.c) Enabling Environment	The more national standards are available, and the more local producers are abiding by international standards, the higher the score.
3.d) Competitiveness & Synergies with development partners	The more there are complementary initiatives, the higher the score. The more there are competing initiatives, the lower the score.

Table 1: Scoring Scale Illustration

Annex 1 shows the evaluation grid including the main-criteria, sub-criteria, indices used, and the weights assigned.

The VC Longlist

The project's focus is on horticulture sectors, which includes vegetables and fruits, in addition to medicinal and aromatic plants and oil seeds. Accordingly, all crops in these sectors in Upper Egypt were mapped and included in the longlist. A total of 29 crops were identified and the GIZ project team recommended also including sugar beets in the initial analysis given its strategic importance. The four exclusion criteria were then used to identify 10 crops for inclusion in the shortlist.

The below table shows the 30 mapped crops, their total production in UE and its value, in addition to their total production in Egypt and its value. The table also shows whether the crop has been selected for the shortlist.

Crop	UE production in tons	UE value in 1000 EGP	Egypt production in tons	Egypt production value in 1000EGP	UE share in Egypt Production	Status
Cucumber	74,441	160,551	393,432	848,538	19%	Included
Sesame	11,192	182,062	36,224	589,263	31%	Included
Pepper	91,267	183,432	761,000	1,529,486	12%	Included
Garlic	199,348	592,092	289,766	860,646	69%	Included
Pomegranate	256,444	643,123	762,852	1,913,118	34%	Included

Sugar beets	2,316,324	1,354,643	10,861,000	6,351,779	21%	Included
Palm dates	494,662	1,608,514	1,542,111	5,014,550	32%	Included
Onion	930,713	1,693,428	2,951,730	5,370,660	32%	Included
Tomatoes	1,350,753	2,308,046	6,729,004	11,497,919	20%	Included
MAP	479,986	4,610,730	518,050	4,976,372	93%	Included
Mango	111,231	492,111	1,066,404	4,718,010	10%	<p>Excluded due to the low share of UE in production, in addition to its limited value addition (only juices and low-quality dried mangos).</p> <p>In terms of exports, Egypt exports the local varieties to Arab countries. Different varieties that are globally demanded are exported to European markets; however, these are cultivated in UE in very small areas in Fayoum, Aswan and Minya.</p>
Soybeans	34,097	192,887	36,388	205,847	94%	<p>Excluded because value addition is capital intensive. In addition, it requires high water consumption (5000 cubic meters per feddan per cycle of 5 months). Moreover, the quality of the Soybeans crop is reliant on being rain fed, which the UE environment does not allow for. Also, its</p>

production cost compared to other countries is very high

Bananas	359,871	1,832,723	1,365,554	6,954,387	26%	Excluded due to its high-water footprint (18,000 cubic meters per feddan all year long). In addition, a law has been issued recently that bans/limits the cultivation of bananas.
Potatoes	1,294,647	2,633,822	4,841,040	9,848,583	27%	Excluded due to the almost full maturity of the value chain
Grapes	331,592	1,363,573	1,734,424	7,132,299	19%	Excluded because small farmers (less than 3 feddans) cultivating the crop do not have the potential for economies of scale. Moreover, the value addition is limited to raisins, which is not appealing to farmers given the high price of fresh grapes (7-8 EGP per KG). Also, 25% of grape cultivation is done with seeds, and these cannot be used for making raisins.
Green onion	3,201	20,110	6,265	39,360	51%	Excluded because 1) UE's production is less than 100 million EGP, 2) Absence of value addition since it is traded Fresh, 3) limited export potential.
Pumpkin	3,133	4,114	3,419	4,490	92%	Excluded because 1) UE's production value is less than 100 million EGP, 2) Production

						is concentrated mainly in Qena only, 3) it has a limited potential for value addition.
						However, there is opportunity for Public Private Partnership (PPP)
Sweet potatoes	5,996	7,326	355,298	434,116	2%	Excluded because 1) UE's production share is less than 10%, 2) UE's production value is less than 100 million EGP, 3) Egypt's exports of sweet potatoes is from the Delta produce only. UE's production competes with the Spain produce, which is higher in quality 4) value addition is limited and requires intensive capital (frozen sweet potatoes are not locally demanded; they are globally demanded but require high capital investment). There is potential for PPP as well as market linkages with factories in 6 th of October and 10 th of Ramadan. It is worth noting that any investment in sweet potatoes in UE will not provide expected ROI before 3-5 years.
Root vegetables	22,440	22,251	302,587	300,033	7%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) value is less than EGP 100 million.
Sunflower	4,665	24,799	20,117	106,943	23%	Excluded because 1) UE's production value is less than 100 million EGP, 2) the quantity

of total production in Egypt is relatively small, 3) The quality of the produce is low, making it unsuitable for value-added activities like seed and oil extracts. 4) High return value adding activities (e.g., the oil industry) are capital intensive, 5) Cultivated by small farmers not as a main crop, but at the peripheries of their land, 6) small farmers cultivating the crop have a low potential for economy of scale 7) there are limited sunflower cultivation areas in Egypt.

Figs	8,856	31,936	194,202	700,319	5%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) UE production value is less than EGP 100 million, 3) UE has a low comparative advantage compared to North Delta, given the low shelf-life of its cultivated varieties.
Squash	20,443	42,713	462,654	966,662	4%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) UE's production value is less than EGP 100 million, 3) Its produce has a low Shelf-life 4) there is no value addition, 5) prevalence of land diseases and insecticides (Nematode, white fly)
Guava	15,422	44,511	337,828	975,036	5%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2)

						UE's production value is less than EGP 100 million, 3) the cultivated varieties in UE are of low value.
Green beans	12,865	59,617	175,898	815,126	7%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) UE's production value is less than EGP 100 million, 3) Value addition is only limited to freezing (Capital intensive) and drying (low return), 4) high specifications prevents exporting, 5) According to CAPMAS, no dry beans are cultivated in UE, 6) contract farming in this sector is unpopular because of previously unfulfilled contracts, 7) pricing mechanisms are absent (no stock market), 8) the cost of transportation is high and unless the export market is experiencing a shortage in supply, increasing the price enough to cover transportation cost, farmers have no incentive to export.
Cabbage	53,685	71,492	485,739	646,859	11%	Excluded as 1) UE production value is less than 100 million EGP and 2) Limited/Absence of value-added activities.
Onion pickling	13,488	2,623	134,000	26,059	10%	Excluded because 1) UE's production value is less than 100 million EGP, 2) the quantity of total production in Egypt is relatively

small, 3) the crop is only cultivated for the purpose of pickling onions.

Mandarin	122,456	232,355	935,536	1,775,139	13%	Excluded because 1) there is no value addition, 2) the comparative advantage of UE is lower than Delta and 3) the return on mandarin cultivation requires 5 years.
Egg plant	113,274	249,259	1,376,303	3,028,546	8%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) value addition is limited and needs processing activities.
Oranges	158,618	291,034	3,147,545	5,775,142	5%	Excluded because 1) UE's production share is less than 10% of Egypt's production, 2) value addition is limited to Juices and Pectin, which require high capital and 3) Delta has a comparative advantage compared to UE.
Peanuts	90,891	1,048,272	243,296	2,806,002	37%	Excluded because 1) small farmers cultivating the crop have a low potential for economies of scale 2) value addition is capital intensive (e.g., in the production of oil and butter).
Sour lime	83,126	466,955	362,714	2,037,523	23%	Excluded because UE has a low comparative advantage.

						However, it has the value addition of pickling, and its extracts are used for industrial purposes.
Okra	5,009	143,595	54,000	302,672	47%	Excluded because there is low return on value-adding as the crop is sold for a high price in its early production stage (12-13 EGP per kilo). By mid-season, it becomes unprofitable for the farmer, as the price falls to 3-5 EGP per kilo and, therefore, gets purchased by factories for processing as frozen vegetables. Also, the value-adding process is capital intensive.
Lentil	183	1,629	2,381	28,528	6%	Excluded because Egypt is a net importer of Lentil. In addition, its production is only concentrated in UE's Assiut.
Broad beans	19,236	160,187	170,456	1,419,470	11%	Excluded because Egypt is a net importer of broad beans

Table 2: The Annual Production of the Project's Longlisted Crops.

Based on the exclusion criteria detailed in the above table, the 10 products selected for the shortlist were cucumber, sesame, pepper, garlic, pomegranate, sugar beets, palm dates, onion, tomatoes and Medicinal and Aromatic Plants (MAPs).

It is worth noting that some of the excluded products, as well as the included ones, hold potential for PPP. These products include oil crops (soybeans, sesame, sunflower), palm dates, sugar beet, sweet potatoes, green beans, and pomegranate.

The VC Shortlist

Onions

Egypt is among the top global producers of onions. In 2019, Egypt ranked the 7th globally with a total production of 1,903,000 tonnes.² Egypt produces different types of onions including fully grown onions, green seeds, and pickling onions. The rapid assessment focused on the fully grown variety, given its significant share in production and contribution to the local economy. The fully grown onions will be referred to as onions in this study. Almost 1/3 of onion cultivation in Egypt is found in UE. The below table shows the distribution of onion cultivation in upper Egypt, the quantities produced, and their value in EGP.

Governorate	Land in Feddans	Quantity in tons	Value of Production in 1000 EGP
Beni Sueif	13,717	182,080	331,294
Fayoum	11,039	164,552	299,402
Minya	10,399	131,428	239,133
Assiut	4,240	70,929	129,055
Sohag	14,382	267,960	487,552
Qena	2,186	34,627	63,004
Aswan	1,625	27,011	49,146
Luxor	617	10,203	18,564
New Valley	2,836	41,923	76,279

Table 3: The Cultivation Area and Production of Onion in UE. Source: (CAPMAS)

Year	Egypt export in tons	World exports (tons)	Egypt's share	Local Production (tons)	Local Consumption (tons)
2013	329,736	8,030,823	4.1%	2,084	1,485
2014	416,697	8,180,679	5.1%	2,717	2,350
2015	591,553	8,059,009	7.3%	3,095	2,544
2016	457,328	8,673,153	5.3%	2,459	2,019

² <https://www.freshplaza.com/article/2828/Worlds-top-8-onion-producing-countries/>

2017	452,412	9,045,545	5.0%	2,965	2,401
2018	445,990	7,864,638	5.7%	2,872	2,472

Table 4: Egypt's Exports and Production 2014-2018. Source (UNCOMTRADE and CAPMAS)

The onion value chain is composed of six steps: 1) Cultivation; 2) Agricultural Production (irrigation, fertilization, pest control and crop management); 3) Harvesting and Curing; 4) Storage; 5) Processing (peeling, cutting, drying, sorting and grading, packing) and 6) For packing and packaging 7) selling in local and wholesale markets or cold store and shipping (in case of exports).

The below table presents how the onion VC was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	4	0.22	It has a stable market growth that is linked with population growth. Its share in the global exports is consistent, at an average of 5%.
	1.b) Value addition	3	0.33	There are different product lines including dried onion, onion powder, onion pickles and onion oil. However, they require large investments. The multiplier for dried onion value addition is 2.5.
	1.c) Potential and identified opportunities for out-grower schemes and market linkages	4	0.44	Contract farming is prevalent and include exporters, traders, and manufacturers.
	1.d) Comparative and competitive advantage	4	0.22	Egypt ranks 7th in world production and its productivity is higher than India (2nd in world production), with Egypt's yield making 16 tons per feddan compared to 7 tons per feddan. However, Egypt's productivity is less than the US, which makes 30 tons per feddan (Source: FAOSTAT). In addition, the Egyptian produce has a distinct flavour. It also has good potential for trade.
Development Impact & Inclusiveness	2.a) Small Farmers	5	0.24	Onion in UE is mainly cultivated by small holders with land ownership varying between 0.5 to 3 feddans.
	2.b) Women	5	0.48	Women labour is involved in the cultivation/planting, pruning, and harvesting of the crop.

	2.c) MSMEs	3	0.14	Pre-processing and preparation workshops (4 in Beni-Suef and 3 in Minya), in addition to different informal preparation units.
	2.d) Employment intensity	5	0.24	The cultivation of 2 feddan requires an average of 80-110 man-days. The production of 1 ton requires about 3-4 full-time workers. Pre-processing requires 4 trained full-time workers per ton and 8 untrained fulltime workers. Processing requires 8-10 trained full time workers per 1 ton.
	2.e) Sustainability	4	0.38	Onion is a crop that is resilient to high temperature. Water consumption = 4000 cubic meters per feddan over five months, in high productivity. . • Winter: 3511 M3/feddan • Summer: 4798 M3/feddan • Nili: 3817 M3/feddan
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	2	0.13	There are no onion clusters, cooperatives, organizations (The available organizations include all farmers and are not limited to onion farmers) There are 2 types of active market players: • Pesticides/Input supply companies and • Big firms for processing onions (a small % of the production). These firms only provide technical assistance to the farmers who buy the seeds and supplies from them. Trader groups in Minya, Beni Suef and Fayoum decide on the price of onions (i.e., Dalga, Kandil and Dalas). However, they work with all crops, not only onions. The maturity of the onion market in Minya and Beni Suef is 70% and in Sohag it is less.

				Therefore, there are very limited interventions and there is potential for more.
	3.b) Innovation Feasibility & Capacity	3	0.40	Onion cultivation in UE needs further improvement in activities related to sorting, water irrigation and pesticide application, among others. These interventions would effectively improve field yield, crop quality and the product's overall market reputation. Greater mechanization of harvesting and post-harvesting activities is required and would have a positive impact. Experts in the field propose introducing semi-mechanized methods, as these would be sufficient. Post-harvesting activities that require mechanization include storing, sorting (فرز), and packaging. These post-harvest activities are especially required for dry onions.
	3.c) Enabling Environment	3	0.20	Green onions follow two production standards, the global GAP and quality standards set by supermarkets (i.e., TESCO). While there is potential for exporting onions, the level of compliance with international standards remains unsatisfactory due to some serious defects in quality (i.e., the mildew) and that hinder exporting. This has a more serious impact on exports than the use of pesticides.

	3.d) Competitiveness or synergies with development partners.	3	0.20	<p>All existing projects focus on providing technical support to farmers, not on innovation.</p> <ul style="list-style-type: none"> • IFAD • FAO • UNIDO- introduced new varieties and developed the market. • HAYAT: Project interventions in Sohag were directed towards exporting and sorting activities, which proved more effective than other projects in terms of economic impact. • IRAS: GIZ can build on what IRAS did on the ground by learning from their mistakes. They also did not work on the drying and processing of onions. Additionally, they work with only a limited number of farmer associations because of problems they have related to security clearances. • FAS • AMAL • PRIME • CARE <p>Although all these projects were implemented to support onion farmers in UE, GIZ's AIP project can still be complementary. The sector still requires interventions for innovation.</p>
Total			3.63	

Table 5: Onion VC Scoring.

Garlic

Garlic is considered one of Egypt's strategic export crops. In 2019, Egypt's exports increased by 20 million tons and ranked 3rd globally.

Almost 70% of garlic cultivation is in Upper Egyptian governorates. The below table shows its production distribution in UE.

Governorate	Land in Feddans	Quantity in tons	Value of Production in 1000 EGP
Beni Sueif	11,657	125,682	373,293
Fayoum	1,863	13,719	40,747
Minya	4,057	35,907	106,649
Assiut	822	9,081	26,972
Sohag	379	5,137	15,258
Qena	357	3,498	10,390
Aswan	392	4,372	12,985
Luxor	237	1,952	5,798
New Valley	0	0	-

Table 6: The Garlic Cultivation Area and Production in UE. Source: (CAPMAS)

Egypt is an important exporter of green garlic, serving markets within proximity (Europe and Asia), which is one of the reasons its average export price is among the highest. Green garlic is more expensive than dry garlic. The below table shows the combined exports of green and dry garlic for the past 5 years.

Year	Egypt Quantity (tons)	Egypt Value in USD	Rank	Local consumption (tons)
2015	5,864,605	7,199,444	13	271,000
2016	14,670,272	15,351,971	12	288,000
2017	23,039,967	27,226,247	8	258,000
2018	16,139,111	12,704,180	12	274,000
2019	36,395,350	28,468,508	3	342,000

Table 7: Garlic Production and Exports Value 2014-2015 (Source: UNCOMTRADE and CAPMAS)

The garlic value chain includes a number of steps, which differ slightly depending on how it will be traded, whether fresh (i.e. green) or dry, these include: 1) Cultivation, 2) Agricultural Management (the application of fertilizers and pesticides in addition to irrigation), 3) Harvest, 4) Preparation (in the case of green garlic)/ Curing (in the case of dry garlic), 5) Sorting,

Grading and Packaging, 6) Storage (in case of processing), 7)Drying/Pickling/Paste manufacturing and 8) Export or Distribution in the local market.

The table below explains how the Garlic VC was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	5	0.28	In 2019, Egypt ranked 3 rd globally in garlic exporting. In 2018, Egypt started exporting to new markets, including Brazil and Thailand, and maintained, in addition, a stable growth in the local market.
	1.b) Value addition	3	0.33	There are many products that require value adding including, garlic powder, garlic paste, garlic pickles and garlic oil (food, cosmetics and medicinal) The multiplier of dried garlic is 1.25.
	1.c) Potential and identified opportunities for out-grower schemes and market linkages	3	0.33	There are garlic exporters and traders that use contract farming, but this is not very common. Egypt has a limited cultivation area of garlic.
	1.d) Comparative and Competitive Advantage	3	0.17	High quality and distinct flavour. Egypt also has a unique time window for producing fresh garlic, in the end of January and early February.
Development Impact & Inclusiveness	2.a) Small Farmers	5	0.24	Garlic in UE is mainly cultivated by small holders, with land ownership varying between 0.5 to 3 feddans.
	2.b) Women	5	0.48	Women labour is involved in the cultivation/planting, pruning, and harvesting stages.
	2.c) MSMEs	4	0.19	MSMEs are prevalent in the preparation and packaging units. Processing, on the other hand, is done by medium scale factories.
	2.d) Employment intensity	4	0.19	Employment intensity is 100 man-days per feddan. 1 feddan produces 15 tons. $100/15 = 6.7$ It, therefore, requires 6-7 full man-days per ton.
	2.e) Sustainability	4	0.38	It is resilient to high temperature. Water consumption = 3600 cubic meters per feddan, which is a relatively very low water consumption over 4 months.

Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	1	0.07	Only a few private sector actors provide technical, financial, and innovative support to Garlic farmers.
	3.b) Innovation Feasibility & Capacity	3	0.40	Beni Suef and Minya will highly benefit from more innovation-based interventions (addressing problems like field diseases in old lands— such as white rot). Processing activities have been improving in the sector. However, further mechanization is still required. The problem is not in the species of crops used or in the sorting of crops, but that the workers require better training.
	3.c) Enabling Environment	3	0.20	Garlic has no export code. However, given the volume of exports and their global contribution, it is safe to assume that garlic products are highly compliant with international standards.
	3.d) Competitiveness or synergies with development partners	5	0.33	IFAD/ PRIME: provide technical assistance, access to market and access to finance.
Total			3.59	

Table 8: Garlic VC Scoring.

Tomatoes

Egypt is among the world's top 10 producers of tomatoes, ranking the 6th in 2018, with a total production of 6.6 million tons. Tomatoes are cultivated in Egypt all year long and are mainly cultivated in UE during winter. UE contributes to 20% of Egypt's total production. The below table shows the distribution of production and cultivation in UE's governorates.

Governorate	Land	Quantity in tons	Value of Production in 1000 EGP
Beni Suef	15,026	267,226	457,108.00
Fayoum	10,422	147,703	252,656.00
Minya	17,482	311,866	533,467.00
Assiut	7,508	109,892	187,978.00
Sohag	12,300	262,270	448,630.00
Qena	3,072	61,308	104,871.00
Aswan	1,113	9,403	16,084.00
Luxor	8,749	178,157	304,749.00
New Valley	373	2,928	5,185.00
Total UE	76,045	1,350,753	2,310,728

Table 9: Tomato Cultivation and Production Value in UE.

Egypt also contributes to a share of global exports. However, its productivity is considerably low. The tomato crop suffers persistent losses that amount to 30% of the total. The below table shows the export trends and the quantities consumed locally.

Year	Egypt export (tons)	Trade Value (US\$)	Egypt's rank	Local Consumption (tons)
2014	92,630	70,936,458		8,221
2015	91,465	72,486,808	14	7,669
2016	109,707	67,586,337	16	7,231
2017	59,965	32,202,001	22	6,653
2018	108,638	41,518,422	20	6,687
2019	161,671	48,959,958	13	

Table 10: Tomato Production and Exports 2014-2015 (Source: UNCOMTRADE and CAPMAS)

The table below explains how the score was assigned to the tomato VC.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Market growth potential both domestic and export markets	4	0.22	Egypt is among the world top producers and has been consistently increasing its market share over the past 4 years. In addition, the local market is constantly growing. However, Egypt suffers from a 30% loss rate (the highest in the world).
	1.b) Value addition	5	0.56	Tomato paste, tomato juice, tomato powder, and sun-dried tomato. The multiplier for sun-dried tomato (bulk) is 2 and is 6 for tomato paste.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	3	0.33	Some manufacturers and exporters such as Heinz, 7 skies, fine foods, P&J use contract farming.
	1.d) Comparative and Competitive Advantage	2	0.11	Egypt's tomato production extends all year round, giving it an advantage during the winter months. Egypt's production is lower than that of Mexico and Morocco. Egypt produces 18 tons/acre, Mexico produces 22.5 tons/acre and Morocco. 39 tons/acre. In addition, Egypt's exporting suffers from the wrong use of pesticides. Moreover, the varieties planted in Egypt are not highly demanded by the global market.
Development Impact and Inclusiveness	2.a) Small Farmers	4	0.19	60-70% of Tomatoes are cultivated by small farmers with 3-5 feddans. The size of farmers cultivating tomatoes: <ul style="list-style-type: none"> • 65-75% of farmers cultivate on less than 5 acres. (Small) • 20-30% of farmers cultivate on 5 - 50 acres. (Medium Sized) • 5% cultivate on more than 50 acres. (Large)
	2.b) Women	4	0.38	60% of harvesting activities and 80-90% of drying activities and packaging are conducted by women labour.

	2.c) MSMEs	2	0.10	The drying of tomatoes is mainly conducted by small processing units. However, other types of processing, like the making of tomato sauce, is conducted by larger entities.
	2.d) Employment intensity	5	0.24	<ul style="list-style-type: none"> • 120 man-days per feddan. • 1 feddan produces 18-20 tons. • 20/20= 6 man-days per ton.
	2.e) Sustainability	2	0.19	<p>Not climate resilient: This is one of the most sensitive crops to the impact of increasing temperature, like many vegetable crops. Tomato productivity will fall by 14% if the temperature increases by 2 degrees Celsius. Water consumption of the crop will increase by 4.2-5.7% in comparison. The drop in productivity will reach 51% if the temperature rises by 3.5 degrees Celsius.</p> <p>In Upper Egypt, climate change has had an impact on water productivity, increasing water consumption by 4.2%- (Source: Egypt's National Strategy for Adaptation to Climate Change and Disaster Risk Reduction).</p> <p>Tomatoes have a relatively high-water consumption (6000-7000 cubic meters per feddan) over 6 months (in open cultivation) and 9 (in green houses).</p> <p>The water footprint ranges from 37 to 131 m³ of water/ton, with an average of 61 m³/ton.</p>
Feasibility of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	2	0.13	Companies that provide farmers with seeds also provides them with technical assistance during the cultivation period (as a way to be able to better market their products and maintain a good market reputation).
	3.b) Innovation Feasibility & Capacity	4	0.53	<p>Processing activities are not working at their full capacity – except for those drying tomatoes. However, they are controlled by market dynamics (low demand).</p> <p>The market is ready for innovation</p>

	3.c) Enabling Environment	2	0.13	<p>Not coded.</p> <p>Not widely exported because it does not comply with market requirements. However, processed tomatoes are exported.</p>
	3.d) Competitiveness or synergies with development partners	1	0.07	<ul style="list-style-type: none"> • UNIDO: is planning to implement a project named “Inclusive and Sustainable Development of the Tomato Value Chain in Egypt”. The new project is planned to take place over 2-3 years. The project will focus on technical support provision for value addition and has a component on innovation. This project may be of competition to the AIP project, considering that the fund assigned for it is relatively big and would be covering all levels of the tomato value chain. It is, therefore, high risk. • SALASEL: latest project implemented • IRAS- only technical support • USAID- very limited in Beni Suef and Esna • UNIDO/HAYATT attempted drying in Edwa before, but it was not successful because of the environmental conditions. • Upper Egypt for Investment Company (Public -Private company) established one of the biggest tomato paste factories in Egypt with a daily capacity of 1000 tons • UNIDO/GTI carried out an intervention called “Vertical Cultivation in Tomatoes” to improve the productivity of fresh tomatoes from 30 to 60 tons and increase the availability of tomatoes for the export market. • UNIDO/ HAYATT introduced green houses and their results were positive, but currently lacks technical assistance. • USAID/HIENZ carried out a project together, promoting contract farming to guarantee the supply of good quality tomatoes for processing and improving the supply chain to reduce the cost of production and increase the yield and quality. • Agritech (Private investment company): implemented an intervention in

				tomato mechanization to improve the efficiency of tomato processing and reduce the cost of production.
Total			3.18	

Table 11: Tomato VC Scoring.

Pepper

In this study, pepper refers to chili pepper and green pepper. Pepper is one of the important horticulture crops in Egypt, ranking 8th among the world's top 10 producers. UE contributes to the national production by 12 %.

Governorate	Land	Quantity in tons	Value of Production in 1000 EGP
Beni Suef	4,887	27,722	55,717
Fayoum	1,733	8,693	17,472
Minya	2,904	21,228	42,665
Assiut	618	4,380	8,803
Sohag	1,325	10,512	21,127
Qena	1,341	10,205	20,510
Aswan	814	5,738	11,532
Luxor	465	2,215	4,452
New Valley	153	574	1,154
Total UE	14,240	91,267	183,432

Table 12: Pepper Cultivation and Production Value in UE.

Pepper production suffers from significant crop loss due to poor post-harvest handling. It is mainly locally consumed. Given its importance to the Egyptian cuisine, the quantity consumed by the local population increases over the years.

Year	Export Quantity in tons	Export Value in USD	Rank	Local Consumption in tons
2015	6,249	2,971,863	41	557,000
2016	17,603	7,506,606	30	585,000
2017	4,057	5,006,759	36	632,000
2018	4,581	4,420,724	38	651,000
2019	9,494	1,046,906	33	

Table 13: Egypt's Pepper Exports and Local Consumption.

The below table explains how pepper was assigned a score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	2	0.11	Stable local market, yet there is limited potential for exporting because of low quality, (Egypt is not included in the top 30 globally in terms of quality).
	1.b) Value addition	4	0.44	Pickles, Chili, Paprika and Extracts.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	3	0.33	Contract farming is only used for the varieties that are used in pickling.
	1.d) Comparative and Competitive Advantage	3	0.17	Due to favourable weather conditions, the production is of high quality and can be cultivated in a wide range of variations.
Development Impact and Inclusiveness	2.a) Small Farmers	5	0.24	Mostly cultivated by smallholders with land ownership of 0.5 to 1.5 feddans.
	2.b) Women	5	0.48	High women labour engagement in planting, harvesting and post-harvesting as well as in pickling, in case of small and micro enterprises.
	2.c) MSMEs	4	0.19	Engagement of small processing units in pickling and drying activities.
	2.d) Employment intensity	5	0.24	130 man-days per feddan 1 feddan produces 6 tons of pepper 1 ton = 21.7 man-days
	2.e) Sustainability	4	0.38	Some types of pepper are climate resilient but not all. Water consumption is 5000 cubic meters per feddan over 6 months.
Feasibility of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	4	0.27	<ul style="list-style-type: none"> • Olam • Bgezwan • Tayebat (officially platform) - on chili pepper and jalapeno. These are all big companies that provide technical assistance to the farmers buying their seeds. The pepper market is more mature compared to other crops.

	3.b) Innovation Feasibility & Capacity	3	0.40	Interventions are needed in irrigation activities and pesticide application (more needed in irrigation).
	3.c) Enabling Environment	1	0.07	Not coded. International standards only exist for coloured pepper because it's the only type of pepper that complies to international standards. However, coloured peppers are not cultivated in Upper Egypt.
	3.d) Lessons learners and synergies	5	0.33	<ul style="list-style-type: none"> • IFAD • PRIME - Dolma pepper of Qena farmers (project is very limited)
Total			3.65	

Table 14: Pepper VC Scoring.

Cucumber

Cucumber is a cash crop for small farmers. It is locally consumed, and Egypt is also a net exporter of cucumbers. There are two types of cucumber cultivation, open field, and greenhouse. The below table shows the distribution of cucumber cultivation, including greenhouse cultivation, in UE. Upper Egypt contributes to 19% of total national production. In 2018, Egypt ranked the 15th worldwide in terms of production quantity.

Governorate	Land in Feddan	Quantity in Tons	Value of Production in 1000 EGP
Beni Suef	276	4,501	10,379
Fayoum	1,142	5,507	13,257
Minya	4,987	52,875	121,925
Assiut	320	2,138	4,930
Sohag	284	3,377	7,787
Qena	278	2426	5,594
Aswan	95	802	1,849
Luxor	304	2,019	4,732
New Valley	185	796	2,636
Total	7,871	74,441	173,089

Table 15: Cucumber Cultivation and Production Value in UE.

Like Pepper, cucumber is mainly cultivated for local consumption purposes and is mainly consumed fresh. A small portion of the cucumber produce is used by the pickling industry. The below table shows Egypt's local consumption and export quantities.

Year	Export Quantity in tons	Export Value in USD	Local Consumption in tons
2014	4,008	1,433,994	646,000
2015	1,633	1,547,455	634,000
2016	1,898	1,637,671	613,000
2017	0	935,361	519,000
2018	24,329	528,180	512,000
2019	6,027	256,747	-

Table 16: Cucumber Exports and Local Consumption.

The below table shows how cucumber was assigned a score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	1	0.06	Most of the production is directed towards local consumption. In a span of three years, Egypt has been able to fulfil its domestic demand. However, total production declined over the past five years from 646K tons to 515K tons. Exports are minimal, with 1,898 tons in 2016, 2,113 in 2017 and 24,329 in 2018. It is highly costly to meet the standards of the export market.
	1.b) Value addition	1	0.11	The main cucumber industry with value addition is the pickling industry. This industry, however, requires only specific varieties that have a higher cultivation cost, especially because it is labour intensive.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	1	0.11	There are no contract farming schemes in the cucumber VC.
	1.d) Comparative and Competitive Advantage	1	0.06	Egypt's cucumber has minimal/no competitive advantage at all.
Development impact & Inclusiveness	2.a) Small Farmers	5	0.24	Smallholder farmers working with greenhouse cultivation are holders of 1-5 feddans. Those working with open cultivation have lands that start from 0.5 up to 3 feddans.
	2.b) Women	4	0.38	60-70% of harvesting activities are conducted by women, the percentage of women labour in the harvesting activities can reach 90%, especially in greenhouses. Women labour is also highly present in pickling activities.
	2.c) MSMEs	2	0.10	Processing activities in the cucumber VC are very limited (pickling)

	2.d) Employment intensity	4	0.19	40 man-days/feddan for open field. For green houses, each 4000 meters square requires 2 full time jobs over the year.
	2.e) Sustainability	1	0.10	It is climate resilient. Cucumbers are frost-sensitive, they require higher temperatures compared to most of the other vegetables. Cucumbers can be grown in any location where there is sunshine and water supply. However, it performs best in rich humid soil. It has a high water consumption. The major component of cucumbers is water and, therefore, requires a constant supply of water. Water availability, or lack of, impacts the taste of cucumbers (its bitterness) and, therefore, its quality.
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	3	0.20	Private sector is only involved in cucumber greenhouse cultivation. Farmers of greenhouses pay consultants to provide them with technical assistance. There are no cooperatives of greenhouse holders. In Assiut and Beni Suef, there are leaders that work as focal points between farmers and the private sector.
	3.b) Innovation Feasibility & Capacity	3	0.40	There is potential for productivity improvement with innovation, especially with greenhouse atmosphere control and climate sensitivity.
	3.c) Enabling Environment	1	0.07	Exports are low and mainly target Arab countries, where compliance standards are not high. Cucumber is not a coded export.
	3.d) Competitiveness & Synergies with development partners	3	0.20	HAYAT 1: has worked on cultivation in green houses. IFAD: PRIME Project. ILO: completed their work recently on greenhouses in Minya, which focused on cucumbers.
Total			2.20	

Table 17: Cucumber VC Scoring.

Palm Dates

Egypt is considered the largest producer of dates in the world. In 2018, the total cultivated area of dates in Egypt was 121,536 Feddans, of 2,698,648 Feddans worldwide, producing about 1.5 million tons of the total world production of 8.5 million tons. (Source: FAOSTAT) Date production in Egypt can be found in all governorates. There are many types and varieties:

- **Fresh dates:** in the Nile Delta and along the Cairo-Alexandria desert road
- **Semi-dried dates:** in Giza, Siwa and the New valley
- **Dry dates:** in Upper Egypt, mainly in Luxor and Aswan

The Egyptian government recently announced the establishment of the national council for dates, and a national project was launched with a plan to cultivate high-value varieties of 5,000,000 palm date trees. This was an initiative intended to draw national attention to this underutilized resource in Egypt and to bring more investments to boost its development. In addition, Egypt holds an annual festival of dates, which was held in Siwa in its first year and in the New Valley in its second year.

The dates value chain includes six steps: 1) Cultivation of the date palm trees; 2) Canopy and crop management; 3) Harvesting; 4) Storing; 5) Packing/Value adding and packaging (of products such as date paste, date syrup, date molasses) and 6) Distribution.

UE contributes to Egypt's date production by 30%. The below table presents the distribution production of palm dates in Upper Egypt.

Governorate	Land	Quantity in tons	Production Value in 1000 EGP
Beni Suef	57	25,482	82,861
Fayoum	1,153	97,626	317,455
Minya	530	50,080	162,847
Assiut	400	42,587	138,482
Sohag	751	37,471	121,846
Qena	938	8,621	28,033
Aswan	25,063	110,183	358,287
Luxor	604	12,565	40,858

New Valley	20,420	110,047	357,845
Total UE	49,916	494,662	1,608,514

Table 18: Table 17: Dates Production in UE.

Given the strategic importance of the dates sector and how it has been the focus of government and development partners, Egypt's market share of exports has improved. The below table illustrates Egypt's exports in quantity, value, and global rank, between 2014 and 2018.

Year	Quantity	Value	Rank
2014	39,304	47,319,186	7
2015	25,994	32,853,941	7
2016	40,497	41,386,717	7
2017	38,048	33,345,523	8
2018	50,776	50,005,958	4

Table 19: Egypt's Palm Dates Exports.

The following table explains how the palm dates VC has been assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	4	0.22	Egypt is a world top producer of dates. However, its share in global exports is less than 3% despite the growing global demand.
	1.b) Value addition	5	0.56	Agwa, dried dates, sugar, syrup, coffee, vinegar, palm handicrafts.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	1	0.11	There is no contract farming.
	1.d) Comparative and Competitive Advantage	3	0.17	Egyptian Palm date varieties have higher productivity compared to other North African countries. However, its quality is compromised by poor post-harvest handling. In addition, Egypt has a price advantage. There are two types of dates in UE, dried and Semi-dried. The dried dates are concentrated in southern Upper Egypt, and the semi-dried is concentrated in northern UE and the Oasis. The semi-dried dates of UE's north is the type exported.
Development impact & Inclusiveness	2.a) Small Farmers	5	0.24	The majority of palm dates are owned by smallholder farmers, some of which own 5 to 10 palm trees (if not less). The ownership is highly fragmented, and the average farm size is less than one feddan. Typically, these smallholder farmers implement poor agricultural and field drying practices, that result in a relatively poor quality of product and high losses.

				There are only a few large-scale growers who achieved vertical integration in the value chain and were able to export via local exporters.
	2.b) Women	4	0.38	Women do not participate in the cultivation and harvesting of dates. However, they take part in sorting, processing, and packaging (70% of these activities are conducted by women). In addition, women also produce handicrafts using palm leaves.
	2.c) MSMEs	3	0.14	Grading, packing and other post-harvest activities are lacking from this VC, due to high pre-harvest and post-harvest losses. Meanwhile, 90% of existing processing activities are conducted by medium sized entities.
	2.d) Employment intensity	2	0.10	1 full time job per feddan 2 full time jobs per ton for processing
	2.e) Sustainability	5	0.48	Palm dates can be expected to maintain a dominant place in Egyptian agriculture because of its excellent adaptation to the harsh climate conditions of the country. Egypt cultivates three types of palm dates (soft, semi-dry and dry). Palm dates consume a lot of water only in the beginning of the agriculture cycle. Each feddan requires 10,000 meters cube of moderate water quality (with a salinity range of 2000 ppm to 10000 ppm) for 12 months to yield highest productivity and quality.
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	2	0.13	There is an absence of a private sector organizational structure, in terms of specialized associations, cooperatives, and shareholding companies. Additionally, due to financial constraints, the farmers are often forced to sell their produce in advance to collectors and traders. Traders are very active in the market (in Minya, Fayoum and Beni Suef).

				<p>They either rent the palm trees or provide periodic technical support to trimmers.</p> <p>Most important trader associations include Al-Rif Almasry (governmental), HEIA organization (NGO) and Meristem (private sector).</p>
	3.b) Innovation Feasibility & Capacity	3	0.40	<p>There is a need for innovation to improve variety, since:</p> <ul style="list-style-type: none"> • The crop produce does not comply with international standards and internationally demanded varieties. • There is a lack of dedicated research organizations that can develop varieties that best meet the needs of the global market. • Most work done by agricultural research organizations does not reach the farmers because extension services are weak and coordination between the different entities is absent. • Advanced agricultural practices are lacking, and innovation is especially needed in harvesting practices and storage. • Processing activities applied to dates and palm leaves (for making handicrafts) need innovative interventions. • Palm weevil and different fruit bugs cause a lot of waste. Innovative interventions could improve the quality and reputation of date products.
	3.c) Enabling Environment	1	0.07	<p>Not coded.</p> <p>In Upper Egypt, there are no drying facilities, packinghouses, storage facilities or factories certified against international standards or against quality or food safety management system standards (e.g., Global GAP, ISO 22000, BRC, HACCP etc.).</p> <p>The product suffers from weak marketing. No institutional support is available for marketing on an international level and individual exporters are not large enough to run international marketing campaigns to promote</p>

				a brand name. Moreover, due to the absence of basic infrastructure, large orders cannot be met.
	3.d) Competitiveness & Synergies with development partners	1	0.07	<ul style="list-style-type: none"> • IRAS in Aswan and Qena (USAID project) • AMAL project The government is focused on the support of the palm dates sector • HEYA – provides consultancies to farmers (trimmers).
Total			3.06	

Table 20: Palm Dates VC Scoring.

Medicinal and Aromatic Plants

Egypt is characterized by an abundant production of Medicinal and Aromatic Plants (MAPs). They are exported worldwide and are considered one of the most important agricultural subsectors that can be relied upon to increase the volume of Egyptian exports, especially with the growing global demand. The production of MAPs in Egypt is mainly concentrated in four governorates, these are Fayoum, Beni Suef, Minya, and Assiut. Almost 93% of MAPs cultivation and processing is concentrated in Upper Egypt. The below table shows the distribution of land cultivating MAPs as well as the quantities they produce and their value in Upper Egypt.

Governorate	Land	Quantity in tons	Value of Production in 1000 EGP
Beni Suef	16,058	238,485	2,290,879
Fayoum	23,048	102,132	981,077
Minya	15,408	24,638	236,672
Assiut	8,599	80,242	770,802
Sohag	0	0	0
Qena	1,273	1,764	16,945
Aswan	10,369	27,755	266,614
Luxor	6,196	2,630	25,264
New Valley	1,151	2,340	22,478

Table 21: MAPs Cultivation and Production in UE (Source: CAPMAS)

The Egyptian MAPs value chain has a rich variety. Egypt cultivates Coriander, Cumin, Caraway, Chamomile, Marjoram, Fennel, Peppermint and Hibiscus. Egypt is among the top exporters of Fennel and the 3rd global producer, after Mexico and Argentina, of Chamomile, contributing with 14,000 tons in 2018. The below table shows Egypt's production and exports of MAPs between 2014 and 2018.

Year	Quantity produced in 1000 tons	Exports in million USD
2014	105	
2015	196	230
2016	164	231
2017	141	115
2018	133	188.6

Table 22: MAPs Production and Exports 2014-2018 (Source: CAPMAS)

The MAPs VC involves eight steps: 1) Cultivation; 2) Agricultural production (fertilization, irrigation, pest management), 3) Harvesting, 4) Pre-Processing (drying, distillation, thresher),

5) Sorting, 6) Grading, 7) Packaging and 8) Exporting or distributing in the local market. The key actors of the value chain are input suppliers, extension service departments, producers, intermediate traders, pre-processors, processors, and exporters.

The below table explains how the MAPs VC was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	3	0.17	There has been a consistent decrease in the quantity produced over the past four years, from 196,000 tons in 2015 to 133,000 tons in 2018. In addition, the value of exports drastically declined between 2015 and 2017, mainly because the products were not meeting the quality standards related to the usage of pesticides and herbicides.
	1.b) Value addition	5	0.56	Tea bags, oils, extracts, food supplements, standard extracts (medical purposes) and medical supplements. Also, organic farming is prevalent.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	4	0.44	Contract farming is used, more often with organic farms like SEKEM, Royal, Giza seeds and Spice Kingdom.
	1.d) Comparative and Competitive Advantage	4	0.22	Egypt has an advantage in high land productivity and quality (due to favourable weather conditions). However, there is no price advantage.
Development impact & Inclusiveness	2.a) Small Farmers	5	0.24	Small farmers of 0.25 feddan to 5 feddans.
	2.b) Women	4	0.38	Labour working in the MAPs agriculture is 60% female. There is no women participation in the harvest or post-harvest activities.
	2.c) MSMEs	4	0.19	50% of processing activities are undertaken by small units.
	2.d) Employment intensity	5	0.24	70% of the cost of producing MAPs crops are labour costs. It is labour intensive.
	2.e) Sustainability	4	0.38	Different variations require different quantities and qualities of water. MAPs crops generally have a moderate level of water consumption.

Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	2	0.13	<p>There are no active farmer associations.</p> <p>There are a limited number of companies that sell seeds to farmers, and they also provide them with technical assistance to control the quality of the cultivated crops. Example of these companies include:</p> <ul style="list-style-type: none"> • SEKEM • Spice Kingdom • Giza
	3.b) Innovation Feasibility & Capacity	5	0.67	<p>Requires a lot of intervention to comply to EU standards (main importer). Interventions should be directed towards:</p> <ul style="list-style-type: none"> • Sorting of seeds (development of seeds) • Harvesting and post harvesting practices (plastic residues, microbes) • Handling of crop • Irrigation source • Fertilization (fertilizer abstracts) • Transportation of crop (often transported in plastic bags, which cause plastic residues that are carcinogenic) • Dioxin contamination of crop fields located next to zones that burn waste.
	3.c) Enabling Environment	2	0.13	<p>MAP crops are not coded for exports. However, there are standards that go beyond these codes. The European Union has its standardized quality requirements and clients/importers have their own standards that are sometimes more rigorous than those of the EU.</p> <p>Egypt does not fully comply to these standards, which leaves a room for further improvement.</p>
	3.d) Competitiveness or synergies with development partners	3	0.20	<p>IRAS</p> <p>FAS</p> <p>AMAL (USAID) – this one ended</p> <p>PRIME (in Qena) – still being implemented</p> <p>Small projects were being implemented by companies such as SEKEM and North</p>

			and South. All these projects mainly worked on technical assistance and access to market
Total		3.95	

Table 23: Maps VC Scoring.

Sesame

Sesame is one of the heavily consumed oil crops in Egypt, due to its usage in the industry of Tahini, Halwa and Oil. Egypt is a net importer of sesame, particularly because of the crop's high production cost given Egypt's ecosystem. The below table shows the quantities of Egypt's imports and exports and their values between 2014 and 2018.

Year	Total Production in tons	Import Quantity in tons	Import Values in 1000 EGP	Export Quantity in tons	Export Values in 1000 EGP
2014	33,000	33,463	361,346	8,989	122,246
2015	39,000	11,803	115,118	7,493	95,045
2016	50,000	27,095	359,922	13,092	161,394
2017	40,000	45,623	741,217	20,908	264,048
2018	36,000	19,458	1378561	14,969	301,464

Table 24: Egypt's Production, Exports, and Imports of sesame (Source: CAPMAS)

UE contributes to the total production of sesame by 31%. The below table provides the distribution of sesame cultivation in UE.

Governorate	Land	Quantity in Tons	Production Value in 1000 EGP
Beni Suef	3,785	1,994	32,437
Fayoum	3,137	1,844	29,997
Minya	4,828	3,089	50,249
Assiut	1,090	651	10,590
Sohag	2,582	1,588	25,832
Qena	641	356	5,791
Aswan	2,743	1,388	22,579
Luxor	647	240	3,904
New Valley	129	42	683
Total	19,582	11,192	182,063

Table 25: Sesame Cultivation and Production in UE

The table below explains how sesame was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Growth potential in domestic and export markets	2	0.11	There is no consistent increase in export. In 2015, exports suffered a significant decrease.
	1.b) Value addition	3	0.33	Oil, sweets (Halwet elmoled), Tahini and Halwa tahini and food supplements are value adding products of sesame. Non-food uses of sesame oil include the making of ingredients used for cosmetics and insecticides.
	1.c) Potential and identified opportunities for outgrower schemes and market linkages	1	0.11	There is no contract farming.
	1.d) Comparative and Competitive Advantage	2	0.11	Despite Egypt's high productivity (1364 kg/ha) compared to, for example, India (439 kg/ha) and Sudan (288 kg/ha) (and quality, Egypt does not have a price advantage.
Development impact & Inclusiveness	2.a) Small Farmers	5	0.24	100% of production is done by smallholder farmers with an average of 0.5 to 5 feddans.
	2.b) Women	1	0.10	Women represent 10% of farming labour.
	2.c) MSMEs	4	0.19	Tahini, Halawa and sweet producers are small and medium processors.
	2.d) Employment intensity	1	0.05	40 full-time employees per feddan 1 feddan produces 1/2 ton (400-600 Kg)
	2.e) Sustainability	3	0.29	Not climate resilient. Very low water consumption of 2700 to 3000 m ³ in summer season.

Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	1	0.07	Very limited.
	3.b) Innovation Feasibility & Capacity	4	0.53	All types of interventions are needed.
	3.c) Enabling Environment	1	0.07	Not coded.
	3.d) Competitiveness & Synergies with development partners	5	0.33	No projects.
Total			2.52	

Table 26: Sesame VC Scoring.

Pomegranate

In Egypt, pomegranate is a fruit crop that is mainly produced for exporting. It can also be fully utilized by different value-adding activities, resulting in 0% losses. The top producers of pomegranate around the globe are India and Iran, while the top exporters are Turkey and the US. Egyptian pomegranate exports are mainly directed to Arab countries (75%) and to Europe (15%). The below table shows Egypt's pomegranate production and exports value.

Year	Exports in Million USD	Domestic Production in tons
2014	\$65.35	132,000
2015	\$95.52	220,000
2016	\$112.77	269,000
2017	\$93.94	381,000
2018	\$69.94	630,000

Table 27: Egypt Pomegranate Production and Exports 2014-2018 (Source: CAPMAS & GOEIC)

UE contributes by almost 1/3 of the national production. The majority of pomegranate production in UE is concentrated in Assiut, where there are pomegranate clusters in the villages of Manfalout and Badary. The below table shows the distribution of pomegranate production in UE.

Governorate	Land in Feddans	Quantity in tons	Production Value in 1000 EGP
Beni Suef	555	4,343	5,445,795
Fayoum	13	55	68,965
Minya	221	2,118	2,655,812
Assiut	8,539	118,085	148,069,703
Sohag	106	766	960,506
Qena	58	223	279,625
Aswan	108	229	287,148
Luxor	77	167	209,405
New Valley	653	2,236	2,803,775
Total	10,330	128,222	160,780,738

Table 28: Pomegranate Annual Cultivation and Production in UE

The following table explains how pomegranate was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market Growth Potential	1.a) Market growth potential in domestic and export markets	2	0.11	There has been a decline in Egypt's value of exports, this is mainly because of the challenges it faces with regards to regulations on pesticides and colouring. There has been, however, an increase in production over the last 3 years (it almost doubled).
	1.b) Value addition	4	0.44	Fresh pearls, juice, syrup, oil and fodder. Pigments and pectin are produced by large scale producers. The multiplier of fresh pearls reaches 5
	1.c) Potential and identified opportunities for out-grower schemes and market linkages	1	0.11	No contract farming
	1.d) Comparative and Competitive Advantage	3	0.17	Egypt has an advantage in the months of August and September when there is low availability in the global market.
Development impact and inclusiveness	2.a) Small Farmers	3	0.14	The average crop area ranges between 1 to 5 feddans.
	2.b) Women	3	0.29	The labour working in pomegranate harvesting is 30% female and 75% female in post-harvest activities.
	2.c) MSMEs	4	0.19	In Upper Egypt the scale of processing units and packaging facilities are small and medium.
	2.d) Employment intensity	5	0.24	Cultivation requires 3-4 full-time jobs per ton and for processing it requires 8 per ton.
	2.e) Sustainability	4	0.38	It is climate resilient, with a medium water consumption level, requiring 6000 meters cube for 6 months. It

				requires water of moderate quality (salinity between 2000-4000 PPP). However, many farmers over irrigate this quantity, which harms the tree and lowers the fruit quality.
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	1	0.07	The private sector rarely provides technical support to farmers or farmer organizations. However, this sector is relatively organized.
	3.b) Innovation Feasibility & Capacity	4	0.53	There have been some newly introduced innovations in the use of pesticides and in colouring.
	3.c) Enabling Environment	3	0.20	The majority of pomegranate produced in UE does not comply with international standards (MRL- Maximum Residue Levels).
	3.d) Competitiveness & Synergies with development partners	3	0.20	Both UNIDO and JICA worked on this sector before. Nowadays, HEIA, IRAS, FAS, IFAD are working on the pomegranate sector by providing technical support and facilitating market linkages.
Total Score			3.07	

Table 29: Pomegranate VC Scoring.

Sugar beets

Sugar beets is one of Egypt's strategic traditional crops. It is mainly used for sugar production and manufacturing, for both industrial and household consumption. Egypt is a net exporter of processed sugar beets and its manufactured derivatives.³

Year	Exports value	Import Value	Net
2014	33,100,869	30,637,472	2,463,397
2015	33,038,730	27,026,174	6,012,556
2016	25,816,442	22,683,654	3,132,788
2017	19,275,081	25,234,370	5,959,289
2018	23,618,055	22,267,008	1,351,047

Table 30: Egypt's Annual Exports and Imports of Sugar beets and its Derived Products

The sugar beet crop has a complex value chain and requires capital intensive processing. Egypt is among the top producers of sugar beets, ranked the 10th in 2018, with a total production of 11.2 million tons. UE contributes by more than 20% to total national production. The table below shows sugar beet exports between 2014 and 2018 and the distribution of production in UE.

Governorate	Land	Quantity in tons	Production Value in 1000 EGP
Beni Suef	32,008	743,924.00	435,065
Fayoum	30,822	599,611.00	350,667
Minya	32,164	777,693.00	454,814
Assiut	5,131	156,928.00	91,775
New Valley	2,573	38,168.00	22,322
Total	102,698	2,316,324	1,354,643

Table 31: Sugar-beet Cultivation and Production in UE

³ This includes the following HS codes: 120910,170390,121291

The table below explains how the sugar beet VC was assigned its score.

Main	Sub-criteria	Score	Weighted Score	Justification
Market growth Potential	1.a) Growth potential in domestic and export markets	3	0.17	Consistent local market growth. 100% consumed by the Egyptian market of which 40-60% is manufactured. Egypt is a net importer of sugar.
	1.b) Value addition	1	0.11	There are different value-added products, mainly in the sugar industry, but also for the production of animal feed, molasses, and biofuel. However, they are all done on a large scale (not in the scope of the project).
	1.c) Potential and identified opportunities for out-grower schemes and market linkages	5	0.56	All activities related to sugar beet use contract farming.
	1.d) Comparative and Competitive Advantage	2	0.11	High productivity. High production cost. Low quality.
Development Impact and Inclusiveness	2.a) Small Farmers	3	0.14	40% of the crop is cultivated by small farmers, holders of 1 to 3 feddans.
	2.b) Women	1	0.10	Labour involved is 5% female.
	2.c) MSMEs	1	0.05	large scale processors.
	2.d) Employment intensity	2	0.10	1 Feddan requires 50-man days, which translates to 1.5 workers. In small scale farms labour cost covers the cost of wages in field operations, including planting, thinning of excess plants from multigermin seeds, weeding, irrigation and harvesting. In 2017, this cost was estimated at EGP 3,250/feddan, with an assumed wage of EGP80 per a 6-hour shift. Beet yield = 16.6 tons per feddan In large farms, the feddan requires 1 unit of labour or less.

	2.e) Sustainability	4	0.38	Water consumption of sugar beets is 3500 - 4000 cubic meters per feddan per season (6-7 months). In addition, sugar beets can survive hot weather if it is irrigated adequately in a manner that does not affect the sucrose level.
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	4	0.27	Sugar companies provide mandatory technical support to farmers. This is part of a package that companies provide contracted farmers.
	3.b) Innovation Feasibility & Capacity	4	0.53	There is a need for intervention in irrigation, fertilization, and for the improvement of the overall harvesting activities.
	3.c) Enabling Environment	1	0.07	Not coded. No standards. The Egyptian government's interventions in the sugar sector have two main objectives: (1) to support farm incomes and maintain rural employment by setting the price for sugar beet and intervening in the production and marketing of fertilizers by using price restrictions to keep prices low for farmers, and (2) to ensure an adequate and affordable supply of sugar to consumers throughout the country.
	3.d) Competitiveness & Synergies with development partners	5	0.33	None.
Total Score			2.91	

Table 32: Sugar beet VC Scoring.

Findings and VC prioritisation

The below table shows the comparison matrix made for the long-listed VCs. Based on the weighted scores, the top five VCs are the MAPs, pepper, onion, garlic, and tomatoes. The lowest three are cucumber, sesame, and sugar beets.

Main	Sub-criteria	Onions	Garlic	Pepper	Tomatoes	Cucumber-Greenhouses	Palm Dates	Pomegranate	MAPs	Sugar Beet	sesame
Market Growth Potential	1.a) Growth potential in domestic and export markets	0.22	0.28	0.11	0.22	0.06	0.22	0.11	0.17	0.17	0.11
	1.b) Value addition	0.33	0.33	0.44	0.56	0.11	0.56	0.44	0.56	0.11	0.33
	1.c) Potential and identified opportunities for out-	0.44	0.33	0.33	0.33	0.11	0.11	0.11	0.44	0.56	0.11

	grower schemes and market linkages										
	1.d) Comparative and Competitive Advantage	0.22	0.17	0.17	0.11	0.06	0.17	0.17	0.22	0.11	0.11
Development impact & Inclusiveness	2.a) Small Farmers	0.24	0.24	0.24	0.19	0.24	0.24	0.14	0.24	0.14	0.24
	2.b) Women	0.48	0.48	0.48	0.38	0.38	0.38	0.29	0.38	0.10	0.10
	2.c) MSMEs	0.14	0.19	0.19	0.10	0.10	0.14	0.19	0.19	0.05	0.19
	2.d) Employment intensity	0.24	0.19	0.24	0.24	0.19	0.10	0.24	0.24	0.10	0.05
	2.e) Sustainability	0.38	0.38	0.38	0.19	0.10	0.48	0.38	0.38	0.38	0.29
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	0.13	0.07	0.27	0.13	0.20	0.13	0.07	0.13	0.27	0.07
	3.b) Innovation Feasibility & Capacity	0.40	0.40	0.40	0.53	0.40	0.40	0.53	0.67	0.53	0.53

	3.c) Enabling Environment	0.20	0.20	0.07	0.13	0.07	0.07	0.20	0.13	0.07	0.07
	3.d) Competitiveness & Synergies with development partners	0.20	0.33	0.33	0.07	0.20	0.07	0.20	0.20	0.33	0.33
Total		3.63	3.59	3.65	3.18	2.20	3.06	3.07	3.95	2.91	2.52

Table 33: Comparison Matrix

Annexes

Annex1: Evaluation GRID

Main	Sub-category	Weights	Weight- Main Category	Highest Numerica l Score	Indices	Type	Source
Market Growth Potential	1.a) Market growth potential in domestic and export markets	5.56	33.30%	0.28	Egypt's share of World Exports in the last 3 to 5 years	Quantitative	Trade Map
					Egypt's growth in value and quantity of traded products in the last 3 to 5 years	Quantitative	Trade Map
					Total local consumption: (Total Production+ Imports- Exports) in the last 3 to 5 years	Quantitative	CAPMAS
	1.b) Value addition	11.11	0.56	Number of Processed product lines produced from this crop	Quantitative	Desk review & Experts' inputs	

					Existing or potential organic cultivation (Number of certified farms if attainable)	Quantitative	Desk review & Experts' inputs
					Range of value-added relative multiplier across different product lines (monetary)	Qualitative	Desk review & Experts' inputs
	1.c) Potential and identified opportunities for out-grower schemes and market linkages	11.11		0.56	Prevalence of or potential contract farming schemes for small farmers	Qualitative	Estimated through Expert's inputs
	1.d) Comparative and Competitive Advantage	5.56		0.28	Average crop productivity of targeted governorates compared to average global productivity	Quantitative	FAO Statistics
Production window (local and export)- Range					Quantitative	Experts' opinions	
Product quality features, including its market reputation					Qualitative	Experts' inputs	
	2.a) Small Farmers	4.76	33.30%	0.24	Average cultivation area of the crop in Feddan	Qualitative	Experts' inputs

Development impact and inclusiveness	2.b) Women	9.52		0.48	Share of paid female labour force in the crop production (disaggregated by activities)	Qualitative	Desk review & Experts' inputs
	2.c) MSMEs	4.76		0.24	Prevalence of post-harvest activities among small processing units	Qualitative	Desk review & Experts' inputs
	2.d) Employment intensity	4.76		0.24	Equivalent of full-time jobs per 1-ton production	Quantitative	Desk review & Experts' inputs
	2.e) Sustainability & Environmental impact	9.52		0.48	Climate Resilience (Is the crop sensitive to UE climate conditions)	Qualitative	
					Water Productivity (Water Consumption per ton or per feddan)	Quantitative	Water Footprint & Experts' inputs
Ability of intervention to stimulate change	3.a) Capacity of market players to adopt solutions	6.67	33.30%	0.33	Existence of effective support schemes including private sector, extension advisors and consultants	Qualitative	Desk review & Experts' inputs
					Prevalence of farmer organizations/groups/cooperatives (technical capacity)	Qualitative	Desk review & Experts' inputs

	3.b) Innovation Feasibility & Capacity	13.33		0.67	Productivity gains that can be made through innovation by introducing best practices in Fertigation and Pesticides management or introducing new varieties that will result in: (1) potential to increase yield (2) potential for value addition (3) potential for waste reduction/management (4) potential for cost reduction of production or processing (across the different value chain activities	Qualitative	Experts' inputs
					The readiness of farmers, processors and manufacturers for innovation.	Qualitative	Experts' inputs
	3.c) Enabling Environment	6.67		0.33	Existence of National legislation for Exports (i.e., GOEIC coding)	Qualitative	Experts' inputs
					Compliance with international standards (GAP, Fair Trade, BRC and others)	Qualitative	Experts' inputs
	3.d) Competitiveness	6.67		0.33	Need for new/more development partner engagement in	Qualitative	Desk review & Experts' inputs

	& Synergies with development partners				innovation practices (i.e. is the value chain over- crowded?)		
					Existing and planned initiatives complementary to GIZ projects	Qualitative	Desk review & Experts' inputs
Total		100.00	100%	5.00			

Table 34: VC Evaluation Grid

Annex 2: MAPs Crops

The following table details the MAPs crops selected for analysis, using a value chain approach for the purpose of this assignment. The MAPs value chain analysis included five MAPs crops but the below table includes seven. Since coriander and caraway are not cultivated in Upper Egypt, only coriander, marjoram, fennel, chamomile and basil or marjoram, fennel, chamomile, basil, and cumin will be included, and that will depend on the decision of the GIZ team. The data in this table is extracted from the January 2018 annual bulletin of agricultural statistics (MALR - economic affairs sector). The selection of the MAPs crops was based on whether the crop is (1) cultivated in wide areas in UE, (2) highly contributes to Egypt's production of MAPs, (3) cultivated in one or more Upper Egyptian governorate with other horticulture crops selected for the project (Beni Suef, Minya, Assiut and Sohag), (4) consumes a relatively low quantity of water in its cultivation period (while taking into consideration whether it is a seasonal or a permanent crop) and (5) whether it is being exported or not.

On a side note, basil was especially selected for being a summer crop, because the GIZ team wanted to create a balance between winter and summer crops, making sure both are included. The choice of marjoram was also influenced by it being a permanent crop not a seasonal one, as both needed to be included.

MAP crop	Name in Arabic	Share of MAP cultivated area in Upper Egypt	Share of MAP production in Egypt	UE Governorates in which the crop is cultivated	Water footprint	Cultivation Season	Exported to
Coriander	الكزبرة	6.9%	19.24%	Beni Suef, Minya	4000-5000 cubic meters per feddan during the season	Winter	Saudi Arabia, United Kingdom, Tunisia, Morocco, Algeria, Jordan
Marjoram	بردقوش	8.4%	9%	Beni Suef, Fayoum, Minya	7000-8000 cubic meter per feddan during a year	3 years straight	
Fennel	الشمر	8.3%	8.46%	Fayoum, Minya, Assiut, Qena	3000-3500 cubic meters per feddan during the season	Winter	USA, Germany, France, Algeria, Tunisia, Japan, East Asia
Chamomile	الشيح / البابونج	30.5%	7.81%	Beni Suef, Fayoum, Assiut	3000-3500 cubic meters per feddan during the season	Winter	Germany, Britain, Holland, USA
Basil	ريحان	0.03%	7.60%	Assiut	6000 cubic meters per feddan during the season	Summer	Germany, USA, France, Turkey

Caraway	كراوية	11.3%	5.64%	Fayoum, Minya, Assiut, Aswan	3000-3500 cubic meters per feddan during the season	winter	United States, Germany, Turkey, France, Tunisia, Algeria, Morocco
Cumin	الكمون	2.3%	5.40%	Minya, Assiut, Qena	3000-3500 cubic meters per feddan during the season	Winter	