Analysis of the tomato value chain in Egypt and establishment of an action plan to increase its efficiency

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ANALYSIS OF THE TOMATO VALUE CHAIN IN EGYPT AND ESTABLISHMENT OF AN ACTION PLAN TO INCREASE ITS EFFICIENCY

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ACRONYMES AND ABBREVIATIONS

AEC	Agricultural Export Council
ARC	Agricultural Research Center
CACU	Central Agricultural Cooperative Union
CFI	Cairo Food Industries (A processing plant owned by Heinz Corp)
EAB	Egyptian Agricultural Bank
EATSAP	Egyptian Association of Traders of Seeds and Agricultural Pesticides
ECOA	The Egyptian Centre of Organic Agriculture
EDB	Export Development Bank
ENPARD	European Neighborhood Policy for Agricultural and Rural Development
ESA	Egyptian Seed Association
EU	European Union
FAO	Food and Agricultural Organization
F&V	Fruits and Vegetables
GAP	Good Agricultural Practices
GCC	Gulf Countries Council
GDA	Global Development Alliance
GOE	Government of Egypt
GOEIC	General Organization for Export and Import Control
GMP	Good Manufacturing Practices
HCCP	Hazard Critical Control Point
HEIA	Horticulture Export Improvement Association
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
IMC	Industrial Modernization Center
MALR	Ministry of Agriculture and Land Reclamation
MOSS	Ministry of Social Solidarity
MOSHT	Ministry of Supply and Home Trade
MOTI	Ministry of Trade and Industry
PATVCU	Plan of Action for Tomato Value Chain Upgrading
PHH	Post-harvest Handling
SME	Small and Medium-sized Enterprises
TFAs	Tomato Farmers Associations
TVC	Tomato Value Chain
UPEHC	Union for Producers and Exporters of Horticultural Crops
VCA	Value Chain Analysis
UNIDO	United Nations Industrial Organization
USAID	United States Agency for International Development
WNRDP	West Noubaria Rural Development Project

Currency units and measures

LE	Egyptian Pound
USD	United States Dollar
LE1.00	= USD 0.056
USD 1.00	= LE 17.7
MT	Metric ton
1 feddan (fed)	= 0.42 hectare
1 hectare (ha)	= 2.38feddan
ml	Million
m^3	Cubic meter
kg	Kilogram

EXECUTIVE SUMMARY

European Neighborhood Program for Agricultural and Rural Development (ENPARDII) is an EU regional program aiming at supporting agricultural and rural development policies in six of the Southern Mediterranean countries; Egypt, Jordan, Lebanon, Tunis, Algeria, Morocco. Such support is achieved through dialogue between actors and stakeholders at all levels of the agricultural sector, complemented and augmented by scientific studies. In the context of the activities of ENPARD II/Egypt and upon a request from the Minister of Agriculture and Land Reclamation of Egypt, it was proposed to address the issue of the agricultural value chains and ways and methods to raise their efficiency. Tomato crop was selected to be studied as an example for agricultural value chains in Egypt, due to its importance. Importance of tomato is reflected in several aspects; it is the largest crop among the vegetable crops in Egypt, accounting for 36% of the total volume of vegetable production, it is cultivated by a relatively large number of farmers, it occupies the first place with respect to vegetable consumption, it enters as raw material in tomato processing, and It is an important export crops, both in fresh form and processed.

The Participatory Approach adopted in ENPARD II activities was followed. According to such approach, two workshops were organized; the first in January, 11-12, 2018 and the second in March, 14-15, 2018 with the participation of members of the Think Tank- which was formed at the beginning of ENPARDII- in addition to a group of representatives of the actors of the tomato value chain, tomato producers, cooperatives, processors, exporters, researchers and academics. The following topics were subject to discussion:

1. The status and analysis of the current value chain of tomato, its structure, actors and their roles at various stages and identification of problems, obstacles and constraints that the chain faces at the technical, institutional and economic levels identified in light of different views, knowledge and professional experience of the participating actors

2. Proposing policies, procedures and interventions necessary to address the problems, obstacles and constraints, and to identify the necessary conditions to achieve the updated value chain with improved efficiency. To integrate the participatory approach, this study is intended to deepen the analysis and formulate the proposals resulting from the two workshops and to support and document them both scientifically and practically to identify specific recommendations for improving the efficiency of the tomato value chain. The output of this work is the development of operational procedures to increase the efficiency of the value chain of tomatoes as a module that can be applied to agricultural value chains in the Egyptian agricultural sector in general, whether for horticultural crops or other crops. This will help in addressing the chronic structural problem of the sector namely the weakness of both backward and forward linkages with other sectors, which ultimately helps to develop the right directions regarding the design and implementation of agricultural policy in Egypt.

The study deals with the following topics:

- Importance of tomato crop in the context of Egyptian agriculture and agricultural economy;
- Characterization of the current value chain in terms of its map and its actors, and their functions, and activities of each category and governance relationships between actors;
- Identification of problems, obstacles and constraints at three levels; each stage of the value chain, the whole chain, and macro and sector level;

- Formulation of proposals and executive procedures for upgrading the tomato value chain.

The main findings of the discussions and the study are as follows:

First: The Importance of Tomato Crop

Tomato is the most important horticultural crop in Egypt. It is grown in all governorates and throughout the year within the three seasons; winter, summer and Nili (fall). It occupies the first place among horticultural crops in terms of volume of production. The tomato production is 7.7 million tons representing 36% of the total vegetable production (in 2015). It also occupies the first place in terms of cultivated area with about 469 thousand fed (197 thousand ha) representing 22.1% of total area of vegetables. Tomatoes are grown in the two main agricultural areas; the old lands and new lands contributing 40% and 60% respectively of the total tomato production. Tomato cultivations in the old lands are dominated by small and medium-sized farms and widespread use of conventional systems in tomato cultivation, unlike the cultivations in new land that are dominated by medium and large-scale farms, with a greater proportion of the use of more advanced systems in terms of production technologies such as green houses and stalked tomato, modern irrigation systems, and the application of good agricultural practices. Also, tomato is the most consumed vegetable crop with about 60 kg of tomatoes on average annually representing more than 40% of the average per capita consumption of vegetables. Small proportion of tomato production, less than 4 percent, is used a raw material for tomato processing. Among many enterprises, there are only 17 large-scale factories working in tomato processing located in different places in the country; October City (3), Sadat City (2), Borg El-Arab(4), Qena (2) and one factory in each of Qaha (public sector), Badr City, Damietta, Ismailia, Zagazig and BeniSuef. These factories work 50 days a year in average and with total daily capacity of tomato raw materials of 6000 MT.

At the global level, Egypt is the fifth largest producer of tomatoes in the world. Despite this large production, Egypt exports a relatively small amount of about 75 thousand tons, representing less than 1% of the total production in 2016. With such amount, Egypt is ranked 19th among the top 20 exporting countries in the world. In the Middle East, Egypt's exports of tomatoes are much lower than Morocco, Jordan and Turkey, despite Egyptian production is much larger than that of these countries. Egyptian exports of tomatoes increased by 5.6% annually during the period 2000-2016. The main destination of these exports is the Gulf countries, especially Saudi Arabia. With respect to processed tomato products, Egypt exports small quantities most of which is directed to Arab markets.

Second: Tomato Value Chain Analysis

The tomato value chain analysis includes the characterization of the chain, its map and marketing channels, and its actors; their characteristics and functions by category, their activities and their governance relationships

The stages of the chain and the actors: Five stages were identified for the tomato value chain: (1) input-supply (or pre-production), (2) agriculture and production, (3) post-harvest, (4) sales and marketing of fresh tomatoes, and (5) processing and marketing of tomato products. The activities in the value chain throughout the chain are carried out by nine categories of actors; farmers, local traders, wholesalers, processors, processors, retailers,

exporters, service and input providers, as well as support service providers for the tomato sector in general.

***Quantitative distribution of production and losses in the chain*:**
The total production is 7.7 million tons (2015) of which more than one-third (about 35.7%) or 2.7 million tons are physical losses, and 5 million tons are distributed for three purposes; domestic consumption (4.63 million tons or 92.6%), processing (300 thousand tons or 6%) and exports (90 thousand tons or 1.8%). The quantity consumed domestically reaches consumers in urban and rural areas through different marketing channels. The total losses in the chain (2.7 MT) are the sum of losses in three main stages; production, post-harvest and retail with different rates estimated at 9.7, 11.8 and 14.2% of the total production respectively.

Characteristics and functions of actors:

Farmers: Most of tomato farmers are small and medium-sized and concentrated in the old lands using traditional production systems that are usually characterized by low productivity, low production quality and high losses. They often sell their produce to village and local traders or wholesalers either as a standing crop or sell it at the farm-gate after harvest. Due to their small quantities of production, therefore low bargaining power, farmers receive low prices for their sales. For large-scale farmers, most of whom are in the new land, they sell their produce directly either in the wholesale market or sell it to a factory or an exporter, possibly by contracting.

Village and local traders: They buy the crop from small and medium-sized farmers and sell to wholesalers (governorate markets or central markets) or to retailers

Brokers: They collect the crop from the production centers for the account of wholesalers

***Wholesaler*s**: They buy tomato produce from the farmers (either as "Kelala", or through contracts, or directly in the wholesale market, delivered by farmers) or they collect the crop, through brokers, from the production areas, and sell it to the retailers, for the producer, by auction against a commission of 8-10% of the selling price. There are two levels of wholesale market; wholesale markets at the governorate level and four central wholesale markets in major cities (Obour (Cairo), Alexandria, Mansoura, Assiut).

***Purveyors*:** They collect the crop from wholesalers and sell it to retailers

***Retailers*:** There are two types of retailers; traditional and modern. Traditional retailers, such as small shops and street stalls, buy from wholesalers (or village traders) or from city-level purveyors and sell to the consumer. Modern retailers like Super and Hypermarket usually buy the crop from large-scale farmers and commercial scale firms through contracting.

***Exporters**:* They buy from large-scale farmers and commercial scale firms and export to abroad, and some have their own farms that are producing for export.
Processors: They buy raw material tomato from wholesalers when prices fall. Heinz plant is the only exception in that it purchases from farmers (small and large) with pre-contracts with fixed price

Input providers: There are wholesalers of inputs such as seeds, chemical and organic fertilizers, pesticides, agricultural machinery, irrigation systems and others. They sell to input retailers who are usually located near the production areas and sell inputs to farmers. Some wholesalers also sell inputs directly to farmers. For seedlings, there are nurseries owners who produce and sell seedlings to farmers. Some of large producers and farmers' associations have their own nurseries to satisfy their farms needs of seedlings and sell the rest.

Service providers: They provide services of transport, storage, and cooling, sorting, grading and packing stations.

Marketing Channels:
Nine main marketing channels are identified in the current tomato value chain: 1) small and medium-sized producers - village traders - retailers – consumer, 2) small and medium-sized producers - village traders - wholesalers - retailers - consumer , 3) small and medium-sized producers- wholesalers- retailers- consumers, 4) small and medium-sized producers- wholesalers- tomato processors, retailers- consumer, 5) small and medium-sized producers- wholesalers- external market, 6)Farmers 'Associations - wholesalers - retailers - Consumer, 7) Farmers' Associations - exporters - foreign market, 8) medium and large-scale farmers - exporters - foreign market, 9) medium and large-scale farmers - processors - foreign market.

Actors' relationships and governance coordination in the current value chain

The tomato value chain is characterized by a large number of actors, absence of close relations, and lack of exchange of information. This relationship is centred on traders and intermediaries who have the most important influence among the chain' actors. The governance coordination relationships are as follows:

Farmers and input supplier: In the input markets, few numbers of retailers and fewer numbers of wholesalers on the supply side face a large number of farmers on the demand side. Competition among suppliers of inputs is weak, leaving smallholders with limited choice regarding their input purchases in terms of quality and prices. In addition, what makes the position of smallholders in the input market weaker is that their purchases of inputs are too small to enable them to bargain with retailers for better prices or to make direct purchases from input wholesalers.
Unless tomato farmers are organized and represented by an association, the input retailers do have the opportunity to coordinate the relationship between the parties.

Farmers and traders: Traditional value chain for fresh tomatoes is fairly simple and quality requirements in traditional markets are also low. Traders and wholesalers, therefore, have little incentive to establish specific relationships with smallholders. Thus, smallholders find themselves at the mercy of wholesalers, since wholesalers alone determine whether they are buying or not buying, how much they will buy, when and at what price, especially if the production of smallholders is linked to credit. If a small holder declines a bid, it risks not selling anything if no other dealer appears. With this oligopolistic collusion among traders, it can be concluded that the management of the relationship between farmers and traders is coordinated and controlled by traders.

***Traders, purveyors and wholesaler*:** The governance of traders, purveyors and wholesalers is coordinated and controlled by wholesalers.

***Purveyors and retailers*:** The governance relationship between purveyors and retailers is coordinated through the market. However, controlling the relationship between the two parties depends on how modern the retail market is. In the case of traditional retailers, control is in the hands of purveyors and in the case of modern retailers, control is more balanced because modern retailers have the knowledge and ability to buy directly from wholesale markets.

Problems of current tomato value chain:
The tomato value chain suffers from many problems in each of the series, which are presented in detail in the study. The following are the most important problems:

***Pre-production stage*:**
At this stage, the chain suffers from difficulties in supplying the inputs required for the production and marketing of tomatoes. These inputs include seeds, seedlings, chemical and organic fertilizers, pesticides, herbicides, biological control supplies, plastic tunnels, packing materials and packing stations, as well as land preparation equipment, irrigation systems, cooling facilities, storage and transportation. In addition to the unavailability problem, there are problems of low quality and high prices because of the monopolistic conditions prevailing input markets. For seeds, all the seeds used for tomato production in Egypt are imported; therefore there is no possibility of controlling or directing the production of specific varieties in addition to the risk of being fully dependent on external seed companies. There are also problems with pesticides and chemical fertilizers in terms of fraud and noncompliance.

***Production stage*:**
The production of tomatoes in Egypt is affected by the problems of the agricultural sector in general, the most serious of which include the phenomenon of fragmentation of holdings and production, the dominance of small agricultural holdings and the consequent underdevelopment of the agricultural system, the use of poor agricultural practices, the use of unguaranteed inputs and consequently the decrease in productivity as well as the small size and low quality of production. The production of tomato faces special factors that lead to a decline in the quality of production and non-compliance with market requirements. The varietal composition of tomato production is dominated by traditional varieties with a small share of non-traditional varieties, and the production technologies are underdeveloped. There are open fields versus protected plantations (low and high plastic tunnels and greenhouses) and stalked tomato. Traditional inherited practices are prevailing versus good agricultural practices (GAP). The absence of information on the needs of local and global markets in terms of quantity and varieties results in production chaos and falling prices leading to significant reductions in producers' incomes. There is also the risk of fluctuations in productivity due to climatic fluctuations and pest infestations (like Tuta absoluta) and its reflection on income volatility.

The losses in produce at the farm level is considerably high; estimated at 9.7% as a result of poor practices including poor timing of harvest, poor conduct of fruit picking and the low skill of the fruit harvesting workers, use of inappropriate packaging (caters made from palm wood) and displays the fruits to the sun.
The little share of farmers in the consumer price is also a basic problem.

Post-harvest stage:
The most serious problem in the tomato value chain is the high losses of production, estimated at between 30 and 40% of the total production volume. The losses begin with

fruit picking and continue throughout the post-harvest stage within which lots of handling and activities occur such as sorting, packing, storage and transport until the wholesale market.

Packing cages: About 80% of the farmers use cages made from palm wood for local marketing, 20% use plastic cages. Cages made from palm wood are one of the most important factors that cause mechanical damage to the crop, and consequently high percentage of damage after harvest. The cages used for packaging are not uniform in size, resulting in severe damage to the crop when stacked on top of each other during transportation and marketing. Plastic cage is of higher price compared to cage made from palm wood, which makes wholesalers mostly prefer the latter, although the first is used more often.

The method of packing in cages is mostly improperly, depending on the so-called "extrusions" where the fruits of lower specifications; damaged, infected, and marinated, are stacked at the lower layers while the healthy fruits with higher specifications and unified size are placed on the top layer of the cage.

Storage: At the farm level, tomatoes are exposed to sunlight for a long period of time, especially in the absence of an umbrella or cooling facilities or during transportation.

Transportation: The loading and transport operations are not properly performed as a result of overloading transport vehicles, the roads are unpaved or the means of transportation themselves may not be appropriate.

Marketing Stage:

Traders and intermediaries of different types represent a very important part of the value chain as they control the entire process and impose their conditions on the producers. In addition they arbitrarily determine the purchase price of the produce, without having enough information about market conditions. They do not provide real services in terms of sorting and storage. This contributes to increasing the volume of production losses

Processing stage:

Processing is an important stage in adding value to the tomato value chain. In spite of the large volume of production, only small proportion;4 percent of total production is directed to processing. The number of processing units is also low, the capacity of most of these units is low, and idle capacity is estimated at 22%.

The processors range from a few large factories to some 20 factories employing fairly advanced technologies and a large number of small factories and home processing units using traditional production methods. Processors obtain their tomato needs as raw material from wholesalers when prices drop or through contracting with large-sized farmers. One of the most important problems faced by processors is the irregular supply of raw materials, and then the most supplied items are not suitable for processing, which negatively affects the efficiency of processing. Because of such problem, factories work for only 50 days a year compared to potential of 90 days. Most tomato processors are unable to invest in R & D, leading to a low level of innovation within the sector and hence limited new products.

As with the industry in general, tomato processing is dominated by Mini, Small, and Medium, Enterprises (MSMEs). In addition to size limitation, these enterprises are unregulated and, therefore, cannot benefit either from economies of scale or from value adding activities such as export marketing. Most factories affiliated to these enterprises are

not able to have quality certificates such as good manufacturing practices (GMP) and HCCP. Other problem relates to weak domestic market, underdeveloped distribution channels with little number of major retail chains. Also there is a problem of administrative and bureaucratic burdens (especially the lack of transparency in customs regulations in imported materials) and the length of customs clearance due to the bureaucratic requirements imposed on firms, which have made the business / industry sectors dependent on non-competitive imported inputs.

Export stage:

The most important problems faced by the current tomato value chain in export stage is the following:

- Market concentration: Tomato exports are concentrated in few countries with only two countries account for 70% of fresh tomato exports;
- Exporters concentration: Few top exporters are dominating the export process creating limited export base. In many case, even large producers are not able to export themselves unless they are linked to an exporter;
- Non-compliance with international standards and quality SPS, especially the problem of chemical residues;
- Poor infrastructure for export: land, sea, and air transport, and lack of appropriate transport and cooling are obstacles to the development of exports of tomatoes;
- The high cost of land transport, especially for the Gulf region by up to 50% compared to the competitor countries, as well as the poor condition of roads leading to ports and high customs on the trucks from refrigerated trucks
- Air cargo spaces are limited, and exporters have to use Egypt Air whose cost is high
- Poor condition of ports and length of inspection procedures required.

Brief

There are three types of problems in the Tomato Value Chain:

Macro and sector level problems: These are a reflection of problems in the agricultural sector in general and the environment surrounding production and marketing activities: weak institutional and legislative framework for agriculture in general due to lack of proper agricultural policy, outdated laws and legislations, ineffective farmers' organizations and commodity councils, and poor control of agricultural quality and market regulations. Both product and input markets generally are dominated by monopolistic conditions, making prevailing prices non-competitive, as well as extreme price volatility.

The chain also suffers from weak support services, mainly agricultural extension services, training, R & D, business development and poor access to finance throughout the chain, especially for small and medium-sized actors.

Problems at the whole value chain level: There are two major problems at that level; first, the lack of coordination both horizontal and vertical, as well as the lack of dialogue between the actors resulting in severely fragmented chain, second, the large volume of losses, which is as high as one third of production and occurs starting from the production stage continue in the post-harvest stage and finally in the retail stage.

Problems at each stage of value chain level: In the production stage, the most important problems is the production fragmentation resulting in a lot of problems for the whole chain among which is the non-application of good agricultural practices (GAP), which leads in turn to lower productivity on the one hand and low quality of production on the other. In the post-harvest stage, cooling and storage, poor performance of sorting services, poor packaging materials, and poor packaging practices, poor transport and overloading. In the sales marketing stage, the current chain suffers from enormous number of intermediaries without providing real services, as well as large number of marketing channels with small sales volumes and lack of market information.

Third: Proposed Procedures for Upgrading the Tomato Value Chain for Tomatoes:

Through dialogue and collective thinking with the participants in the workshops, a comprehensive plan of action for upgrading the tomato value chain has been recommended including proposal, interventions, and activities on different levels.

Improving the tomato value chain in Egypt includes a wide range of activities such as improving access to high quality inputs, developing farmers' abilities and skills, improving working conditions and productivity, enhancing business and financial services, enabling information flow, and facilitating access to higher value added markets. Furthermore, many quality and cost issues are influenced by policies, regulations and actions taken by the government.

The process of updating the tomato value chain begins with the Government's development of a national tomato sector strategy, sector support for legislation and better service of applied research and extension institutions to improve tomato productivity, good agricultural practices (GAP) by building farmers' capacities, creating an effective and efficient flow of information, training and knowledge. Advanced technologies and mechanization in agricultural practices and post-harvest is a must for effective value chain. The organizational structure of the tomato sector must be reformulated in such a way as to ensure the safety and efficiency of the tomato value chain. Equally important, for an efficient tomato value chain, is to improve the chain coordination; horizontally through tomato producers associations and vertically through contract farming. Consideration should also be given to coordinating donor efforts in the modernization of the tomato value chain.

***First:* At the Level of Enabling Environment and Supporting Services:**

- The research centers set "national varietal map" that determines the geographical and varietal distribution at the level of governorates and production regions and linking them to major consumption centers, processing and export routes;

- Issuing and activating laws that improve the efficiency of the value chain for tomatoes, especially the law of agricultural cooperatives and the law of contracting agriculture, and taking measures of incentive package to stimulate investment in the areas of improving marketing infrastructure, post-harvest handling centers, cold chain, transport and refrigerated storage, establishment of wholesale markets at the governorate level, equipped with tools for sorting, grading, storage and refrigerated storage, and to stimulate and facilitate the investment for farmers' associations in the fields of establishment of green hothouses and tomato nurseries, and stalked tomato plantations;

- Raise the performance of support services for the value chain, namely "research and development", "agricultural extension", training, business development and finance.

<u>Second:</u> At the Level of Whole Value Chain:

- The establishment of a professional board called ***"Tomato Professional Board",*** to include representatives of all actors ' categories and professions working in the value chain, with the aim of improving coordination between all chain' stages, exchanging information and disseminating good practices. Improving the chain coordination will facilitate linkages between producers and processors to determine which varieties to cultivate (the varietal map), determine the specific specifications required in the product and lead negotiation over fair prices for different actors,

- The formation of the ***"farmers' associations",*** to join in their membership small and medium-sized tomato producers in all production regions, as a means of achieving "collective action" by which producers are able to benefit from economies of scale, and to adopt good agricultural practices. Other functions could be performed by the associations including dissemination of information concerning various varieties that are suitable for processing or direct consumption, providing the appropriate means for sorting and grading, storage and refrigerated transport, which will reduce post-harvest losses, collect the crop from small producers and negotiate on their behalf with the exporters and processors to obtain fair prices for their produce,

- The use of the ***"contracting farming"*** mechanism in linking farmers' associations to tomato processors and exporters, as well as to retail chains and large stores. Through such mechanism, the "vertical coordination" of the value chain is achieved, so that the tomato production is matched to the market requirements at the higher levels of the chain.

<u>Third:</u> At the Level of Each Stage of the Chain

- **Farmers**: Train farmers in sound techniques and good agricultural practices to reduce losses, improve quality and increase productivity. This will be better achieved in the case the farmers are members in the associations,

- **Traders and brokers**: Spreading and supporting sorting and grading services and appropriate packaging means (replacing plastic cages for cages made from palm wood), cooling, storage, and proper transport means and practices to reduce losses,

- **Processors**: Establishment of small and medium enterprises engaged in processing tomato products and solving the problem of scarcity of tomato varieties suitable for processing by contracting with farmers associations to produce them, providing the required financing, extension and logistics services. The tomato drying processing has great potential for expansion especially It does not require large investment spending,

- **Exporters:** The stage of export is so important with respect to the chain efficiency due to its high value addition. To increase the exporters 'contribution to the chain, it is proposed to take a number of measures to improve tomato export performance. The most important of these is to commit exporters to export a product that meets the international specifications, sufficient cold facilities should be available at the airports, focusing on exporting non-traditional varieties such as organic tomatoes, cherry tomatoes and dried tomatoes, as well as diversifying Egyptian tomato export markets to avoid the risk of being concentrated in few markets.

A Plan of Action to Upgrade the Tomato Value Chain

The plan of action for upgrading tomato value chain proposed by this study is to be implemented at three levels:

First Level: ***Implementation of proposed interventions at the tomato sector level for improved Enabling Environment and supporting services***, including the following activities:

- The Ministry of Agriculture and Land Reclamation will design and implement a ***tomato sector policy*** in consultation with tomato stakeholders.

- Upon proposition by the Ministry of Agriculture and Land Reclamation, the Cabinet of Ministers will issue a decree to establish the ***"Tomato Professional Board".*** The formation of the Board will be in consultation with the relevant ministries, namely the Ministry of Trade and Industry and the Ministry of Supply and Home Trade as well as the chamber of food industry, Agricultural Export Council, Chamber of Trade, cooperatives and Tomato Producers Associations. The Board will encompass representatives for all the players in the tomato sector,

- The Horticulture Research Institute (HRI) of the Agricultural Research Center (ARC) will, in consultation with the Tomato Professional Board and stakeholders, set a ***"national varietal map"*** that should be in line with the objectives of the tomato sector policy,

- Formulate a public policy to include the following ***policy measures***: 1) An incentive package to encourage the private sector investments in the areas of ***marketing infrastructure***, tomato and agricultural collection and packing centers and the establishment of a ***network of tomato nurseries*** covering the various production areas, (2) facilitating the access of tomato producers associations to sources of finance for establishing their own facilities in these areas, (3) encourage the private sector to establish ***business development companies***, especially in the areas of upgrading the value chain for tomatoes such as packaging materials ***(replacing plastic caters for caters made from palm wood)*** and technical support, etc. 4) Stimulating the private sector to establish wholesale markets at the governorate level in cooperation with the Ministry of Local Development (governorates authorities) using relevant forms of ***public-private partnership***,

- Horticulture Research Institute is to launch a ***research and development program*** to develop and register local tomato seeds and adaptation of imported seeds,

- The Ministry of Agriculture and Land Reclamation is to sufficiently qualify and strengthen the "***Contracting Agriculture Unit***" to provide an effective assistance to the tomato producers associations on the contracting procedures with processors and exporters as well as legal follow-up of contracts

- The service sector of the Ministry of Agriculture and Land Reclamation in collaboration with the researchers of the Horticulture Research Institute and the Union of Producers and Exporters of Horticultural Crops prepare a ***plan for tomato demonstration and model farms*** to be possibly used by tomato producers associations.

***<u>Second Level:</u> Implementation of proposed interventions to upgrade the tomato value chain at Pilot Area level*:**

The study suggests to firstly implementing the proposed tomato upgrading plan on a ***Pilot Area*** before generalizing the application non the country-wide scale. The Pilot Area includes two specific areas; ***Esna*** district (Upper Egypt) and ***Nubaria*** area (West Delta). These two areas witnessed the implementation of a number of successful projects funded by foreign grants aiming to upgrade value chains for tomatoes and other horticultural crops. Activities to be implemented at this level include:

- Organizing small and medium-sized tomato producers in ***"groups***" as a nucleus for the formation of tomato producers' associations. This activity requires some ***"Seed money***", which may be made available by one or more of relevant sources including the public budget, the agricultural cooperatives, and foreign grants. Union of Producers and Exporters of Horticultural Crops can take part of this job,

- A ***training program*** for these "groups" is implemented on the application of ***Good Agricultural Practices(GAP),*** provided by specialized university units or private sector training companies and centers,

- "***Tomato Producers' Associations***" are established and registered either in accordance with the Law of Agricultural Cooperatives or in accordance with the Law of NGOs (the Ministry of Social Solidarity),

- Link 'Tomato Producers Associations: with processors, exporters and major retail chains through ***"Contracting Agriculture***" arrangements. In this regard, the associations would be assisted by the "Contracting Agriculture Unit" of MALR in cooperation with the Union of Producers and Exporters of Horticultural Crops and follow-up by the "Tomato Professional Board",

- ***Qualify the "Tomato Producers Associations"*** in the fields of ***business management*** including planning and management of production and marketing of tomatoes, quality specifications, contracting agriculture and methods of access to quality- guaranteed inputs as well as access to sources of finance. This will be done by private training centers and companies,

- The "Tomato Producers' Associations" will be ***certified for the Global GAP*** with the support of relevant bodies such as HEIA, Horticultural Producers and Exporters Association,

***<u>Third Level:</u> Implementation of proposed interventions for upgrading the tomato value chain at all tomato production areas in the country*:**

The tomato sector-wide implementation of the chain upgrading interventions will be done after the ***"Monitoring and Evaluation"*** of the interventions and activities under the tomato value pilot area have been conducted and after the ***lessons learned*** have been absorbed. At the same time, the features of the upgraded chain have crystallized; the supporting environment and supporting services have become stronger and coordination mechanisms, horizontal and vertical, have become well-rooted. In addition, the more successes and accumulated experience achieved in the context of the Pilot Area will help relaxing many

of the technical, financial, and institutional constraints which gives impetus to further progress for upgrading the tomato chain at the sector-wide level.

Economic returns of upgrading the tomato value chain

If the proposed plan of action to upgrade the tomato value chain is implemented and the included interventions are fulfilled at the tomato sector level, significant economic returns will be achieved with respect to both economic efficiency and equity objectives. These returns can be summarized as follows:

- Total tomato production (from the same cultivated area) increases from 7.7 million tons (2015) to 11.6 million tons per year,

- ***Total losses are reduced from 2.7 million tons (35% of total production) to 1.7 million tons (15% of total production),***

- The total volume of tomato sales (net of losses) increases from 5 million tons to 9.9 million tons per year, of which 7.55 million tons are directed to domestic consumption as fresh tomatoes, 2 million tons as raw materials for processing of tomato products (ketchup, sauce and others), 350 thousand tons are exported (compared to 90 thousand tons currently),

- The production of tomato processed products increases from 60 thousand tons (currently) to 500 thousand tons per year, of which 200 thousand tons for domestic consumption, and 300 thousand tons for export,

- ***The total value of the tomato value chain increases from LE 23 billion (in the current situation) to LE 50 billion per year, making a total value added of LE 27 billion per year.***

- There will be equity or distributional effects of the upgraded chain reflected mainly in increasing incomes of most of the participants, yet with varying degrees. Incomes of small and medium-sized tomato producers will increase at higher rate compared to other actors, provided they become members of producer associations. At the same time, the upgraded chain will exclude a large number of intermediaries and brokers whose services will be replaced by tomato producer associations particularly if they are directly linked, through contracting, to the higher categories in the chain. The wholesalers, under upgraded chain, in trying to maximizing their share in tomato sales for the domestic consumption, will have to reduce their margins and, at the same time, provide improved marketing services.

ملخص دراسة
تحليل سلسلة القيمة للطماطم فى مصر وخطة رفع كفاءتها

) هو برنامج يستهدف مساندة ENPARD2برنامج الجوار الأوروبي للزراعة والتنمية الريفية مرحلة 2 (سياسات التنمية الزراعية و الريفية في ست من دول منطقة جنوب المتوسط (مصر، لبنان، تونس، المغرب، الأردن، الجزائر)، وذلك من خلال الحوار بين الفاعلين وأصحاب المصلحة على كافة مستويات القطاع الزراعي وكذا دعم هذا الحوار من خلال إجراء الدراسات العلمية. وفي إطار انشطة برنامج "إنبارد2" فى مصر وبناء على توجيه من السيد وزير الزراعة واستصلاح الأراضي، فقد تناول البرنامج موضوع سلاسل القيمة الزراعية وسبل رفع كفاءتها. وقد تم اختيار منتج الطماطم كمثال نظرا لأهميته من عدة نواحي. فهو المحصول الأكبر حجما بين محاصيل الخضر في مصر، إذ يمثل 36% من الحجم الكلى لإنتاج الخضر، ويقوم بزراعته عدد كبير نسبيا من صغار المزارعين، ويحتل هذا المنتج المرتبة الاولى في الاستهلاك، هو أيضا محصول تصنيعي يدخل كمادة خام في صناعة منتجات الطماطم، وكذلك يعتبر من أهم المحاصيل التصديرية سواء في صورته الطازجة أو كمنتجات مصنعة.

المتبع في أنشطة "إنبارد" حيث تم تنظيم ورشتي Participatory approachوقد تم تبنى المنهج التشاركي عمل ، الأولى في يومي 11و 12 يناير 2018 و الثانية في يومي 14 و 15 مارس 2018 بمشاركة أعضاء "مجمع - الذي تم تشكيله في بداية المرحلة الثانية من برنامج "انبارد" - بالإضافة إلمجموعة من Think Tank التفكير" في سلسلة القيمة للطماطم، من منتجين للطماطم وتعاونيات ومصنعين ومصدرين وكذلك باحثين Actorsممثلي الفاعلين وأكاديميين، وقد تمت مناقشة ما يلي:

1- حالة وتحليل سلسلة قيمة الطماطم التقليدية بوضعها الراهن وتنظيمها ودور الفاعلين فى مراحلها المختلفة وتحديد المشاكل والعقبات والقيود التي تنطوي عليها السلسلة على المستوى الفني والمؤسسي والاقتصادي حسب وجهات النظر المختلفة والتجارب والخبرات المهنية لكل فئة من الفاعلين المشاركين.

2- اقتراح السياسات والإجراءاتوالتدخلات اللازمة لمواجهة المشاكل والعقبات والقيود وتوفير الشروط الضرورية لرفع كفاءة سلسلة القيمة، وتحقيقا لسلسلة القيمة المحدثة.

واستكمالا لتطبيق المنهج التشاركي تأتى هذه الدراسة هادفة إلى تعميق التحليلات وصياغة المقترحات الناتجة عن ورشتي العمل ودعمها وتوثيقها من الناحيتين العلمية والعملية للوصول إلى توصيات حاسمة وملموسة فيما يتعلقبتحسين كفاءة سلسلة قيمة الطماطم. وتتمثل مخرجات هذا العمل في وضع إجراءات تنفيذية لزيادة كفاءة سلسلة القيمة للطماطم كنموذج يمكن تطبيقه على سلاسل القيمة الزراعية في القطاع الزراعيالمصري بوجه عام سواء بالنسبة للمحاصيل البستانية أو لغيرها من المحاصيل . وسوف يفيد تطبيقسلاسل الفيمة الزراعية في معالجة المشكلة الهيكلية المزمنة التي يعانى منها القطاع وتتمثل في ضعف روابطه الخلفية والأمامية بالقطاعات الأخرى غير الزراعية، وهو ما يساعد في نهاية الأمر بوضع توجهات صحيحة فيما يتعلق بتنفيذ السياسة الزراعية في مصر.
وتتناول الدراسة الموضوعات التالية:

- أهمية محصول الطماطم في إطار الزراعة المصرية والاقتصاد الزراعي.
- تحليل سلسة القيمة شاملا توصيف خريطتها والفاعلين فيها ودور ووظائف كل فئة منهم وأنشطتهم وعلاقات الحوكمة والتنسيق بينهم.
- تحديد المشاكل والعقبات والقيود على مستوى كل مرحلة من مراحل سلسلة القيمة ، وكذا على مستوى السلسلة ككل ، وعلى المستوى الكلى والقطاعى.
- صياغة المقترحات والإجراءات التنفيذية لتحديث سلسلة القيمة للطماطم.

وفيما يلي أهم ما توصلت إليه المناقشات والدراسة من نتائج:

<u>أولا: نبذة عن أهمية محصول الطماطم</u>

يعتبر الطماطم محصولا مهما على صعيد القطاع الزراعي المصري، فهو محصول غذائي وتصنيعي وتصديري فضلا عن كونه مصدرا رئيسيا للدخل بالنسبة لعدد كبير من الأسر الزراعية. والطماطم أكثر المحاصيل البستانية انتشارا جغرافيا في مصر، فهو يزرع في جميع المحافظات وعلى مدار السنة في إطار المواسم الثلاثة، الشتوي والصيفي والنيلي. وهو يشغل المركز الأول بين المحاصيل البستانية من حيث حجم الإنتاج، إذ يبلغ إنتاج الطماطم 7.7 مليون طن ممثلا 36% من إجمالي إنتاج الخضر(في 2015)، كما يشغل المركز الأول أيضا من حيث المساحة

المزروعة والتي تبلغ حوالي 469 ألف فدان تمثل 22.1% من إجمالي مساحة الخضر. ويقوم بزراعة الطماطم حوالى 200 ألف مزارع ، يمثل الطماطم المصدر الرئيسي لدخولهم الأسرية، ويزرع الطماطم في الأراضي القديمة والأراضي الجديدة، والأخيرة تنتج أكثر من 60% من إجمالي إنتاج الطماطم، بينما تساهم الأراضي القديمة بالـ 40% الباقية. وتتسم زراعات الطماطم في الأراضي القديمة بسيادة المزارع صغيرة ومتوسطة الحجم وبانتشار استخدام النظم التقليدية في زراعة الطماطم، على عكس زراعات الأراضي الجديدة التي تتسم بسيادة المزارع متوسطة وكبيرة الحجم مع نسبة أكبر من استخدام النظم الأكثر تقدما من ناحية تكنولوجيات الإنتاج مثل الصوب الزراعية والزراعة على أسلاك ونظم الري الحديثة وتطبيق الممارسات الزراعية الجيدة. كما أن الطماطم يعد أكثر المحاصيل الخضرية استهلاكا، فيستهلك الفرد المصري نحو 60 كيلوجرام من الطماطم في المتوسط سنويا تمثل أكثر من 40% من متوسط استهلاك الفرد من الخضر. ومن حيث التصنيع، يدخل جزء ضئيل من إنتاج الطماطم -لا تتجاوز نسبته 4% - كمادة خام لتصنيع منتجات الطماطم مثل الكاتشاب والصوص وغيرها حيث يوجد 17مصنعا رئيسيا يصنعون هذه المنتجات ويتمركزون في مدينة اكتوبر (3) ومدينة السادات (2) وبرج العرب (4) قنا (2) ومصنع واحد في كل من قها (قطاع عام) ومدينة بدر ودمياط والاسماعيلية والزقازيق وبنى سويف.وتعمل هذه المصانع 50 يوما فى السنة فى المتوسط بطاقة استيعابية كلية من الطماطم الخام تبلغ 6000 طن يوميا .

وعلى الصعيد العالمي تشغل مصر المركز الخامس بين الدول المنتجة للطماطم فى العالم.وعلى الرغم من هذا الإنتاج الكبير، تقوم مصر بتصدير كميات ضئيلة نسبيا تبلغ حوالي 75 ألف طن تمثل أقل من 1٪ من إجمالي الإنتاج في عام 2016. وتحتل مصر المركز التاسع عشر بين الدول العشرين الأولى على مستوى العالم. وعلى صعيد منطقة الشرق الأوسط، تعد صادرات مصر من الطماطم أقل بكثير من المغرب والأردن وتركيا رغمتفوقها على هذه الدول من حيث الإنتاج. وقد زادت صادرات مصر من الطماطم بمعدل 5.6٪ سنوياً خلال الفترة 2000-2016. والوجهةالرئيسية لهذه الصادرات هي دول الخليج وبصفة خاصة المملكة العربية السعودية.كما تقوم مصر بتصدير كميات قليلة من منتجات الطماطم المصنعة يتجه معظمها إلى الأسواق العربية.

ثانيا : تحليل سلسلة القيمة للطماطم

يشمل تحليل سلسلة القيمة للطماطم توصيف السلسلة وخريطتها والفاعلين فيها من حيث خصائصهم ووظائف كل فئة منهم وأنشطتهم وعلاقات الحوكمة بينهم.

مراحل السلسلة والفاعلون:تم تحديد خمس مراحل لسلسلة القيمة للطماطم وهى: (1) توريد المدخلات (ما قبل الإنتاج)،) تصنيع وبيع وتسويق 5(2) الزراعة والإنتاج، (3) التوزيع والتسويق، (4) مبيعات وتسويق الطماطم الطازجة، (منتجات الطماطم. ويقوم بأداء الأنشطة في سلسلة القيمة على مدى مراحل السلسلة الفئات التالية من الفاعلين: المزارعون، والتجار المحليون، وتجار الجملة، والقماطون، والمصنعون، وتجار التجزئة، والمصدرون، وموردو الخدمات والمدخلات، بالإضافة إلى موردي خدمات دعم قطاع الطماطم بوجه عام.

التوزيع الكمي للإنتاج والفاقد في السلسلة:يبلغ الإنتاج الكلى 7.7 مليون طن (2015) أكثر من ثلثه (نحو 35.7%) يمثل كمية الفاقد الفيزيقي ويبلغ 2.7 مليون طن سنويا، أما بقية الإنتاج الإجمالي (الصافي بعد الفاقد)، أي 5 مليون طن، فيتم توزيعه على ثلاثة أغراض هي: الاستهلاك الغذائي المحلي والتصنيع والصادرات. إذ يتم توجيه نحو 4.63 مليون طن – بنسبة 60.1٪ من إجمالي الإنتاج - إلى الاستهلاك الطازج عبر قنوات تسويقية مختلفة. ويتم توجيه الـ 390 ألف طن المتبقية لكل من التصنيع والتصدير منها 300 ألف طن – بنسبة 3.9% من إجمالي الإنتاج- كمواد خام لتصنيع منتجات الطماطم، و 90 ألف طن – بنسبة 1.3% من إجمالي الإنتاج- تمثل صادرات الطماطم الطازجة إلى الأسواق الدولية.وبالنسبة للفاقد الكلي في السلسلة (البالغ 2.7 مليون طن) فيحدث فى المراحل الرئيسية الثلاث، الإنتاج ومابعدالحصاد والتجزئة بنسب مختلفة. يقدر في المراحل الثلاث بنحو 9.7 و 11.8 و 14.2% من الإنتاج الكلي على التوالي، أى يبلغ 0.7 و0.9 و 1.1 مليون طن على التوالي.

خصائص الفاعلين ووظائفهم:

المزارعون: أغلبهم من صغار ومتوسطي الحجم ويتركزون في الأراضي القديمة، ويستخدمون النظم التقليدية في الإنتاج والتي تتسم عادة بانخفاض الإنتاجية الفدانية وانخفاض نوعية الإنتاج وارتفاع الفاقد، و يقومون ببيع إنتاجهم بطرق مختلفة ، إلا أنهم في الأغلب يبيعون إنتاجهم لتجار القرية أو تجار الجملة إما كمحصول قائم (كلالة) أو يبيعونه عند باب المزرعة بعد أن يحصدونه. وغالبا يحصل هؤلاء المزارعين على أسعار متدنية لإنتاجهم لصغر كمياتهم وضعف قدرتهم المساومية.أما بالنسبة لكبار الزراع والذين يتواجد أغلبهم فى الأراضي الجديدة فيبيعون إنتاجهم مباشرة

إما فى سوق الجملة حيث يباع لحسابهم عن طريق تاجر الجملة أو يبيعونه إلى مصنع أو مصدر وقد يكون ذلك عن طريق التعاقد.
تجار القرية: يشترون من صغار ومتوسطي المزارعين ويبيعون لتجار الجملة (إما بأسواق المحافظة أو بالأسواق المركزية) أو لتجار التجزئة
السماسرة: يقومون بتجميع المحصول من مراكز الإنتاج لحساب تجار الجملة.
تجار الجملة: يشترون من المزارعين (كلالة أو تعاقدات أو مباشرة فى سوق الجملة توصيل المزارع) أو من خلال تجميع المحصول من مراكز الإنتاج، ويبيعون لتجار التجزئة حساب المنتج بالمزاد مقابل عمولة تتراوح بين 8-10% من سعر البيع.
وهناك مستويان لتجارة الجملة: أسواق الجملة على مستوى المحافظة وأسواق الجملة المركزية في المدن الكبرى (العبور (القاهرة)، الإسكندرية، المنصورة، أسيوط).
القماطون: يقومون بتجميع المحصول من تجار الجملة ويبيعون لتجار التجزئة.
تجار التجزئة: هناك نوعان من تجار التجزئة:التجار التقليديون مثل المحلات الصغيرة والأكشاك وهؤلاء يشترون من تجار الجملة (أو من تجار القرية) أو من القماطين على مستوى المدن ويبيعون للمستهلك،تجار التجزئة الحديثة مثل سوبر وهايبر ماركت: يشترون من كبار المزارعين بالتعاقد.
المصدرون: يشترون من كبار المزارعين ويصدرون للخارج، وبعضهم لديه مزارعه الخاصة التى يخصص إنتاجها للتصدير
المصنعون: يشترون طماطم المادة الخام من تجار الجملة عندما تنخفض الأسعار ، باستثناء وحيد هو صنع هاينز الذى يشترى من المزارعين (صغار وكبار) بعقود مسبقة وسعر محدد.
موردو مستلزمات الإنتاج: هناك تجار الجملة للمستلزمات مثل البذور والأسمدة الكيماوية والعضوية والمبيدات والآلات الزراعية وشبكات الري وغيرها وهم يبيعون إلى تجار التجزئة المنتشرون قرب مناطق الإنتاج وهؤلاء بدورهم يقومون ببيع المستلزمات للمزارعين ، كما أن بعض تجار الجملة يبيعون أيضا للمزارعين مباشرة. وبالنسبة للشتلات فهناك أصحاب المشاتل الذين يبيعون الشتلات للمزارعين، وقد يقيم كبار المزارعين وجمعيات المزارعين مشاتلهم الخاصة.
موردو الخدمات: خدمات النقل والتخزين ووحدات التبريد ومحطات الفرز والتدريج والتعبئة .
القنوات التسويقية:تنطوي سلسلة القيمة للطماطم فى الوضع الراهن على تسع قنوات تسويقية رئيسية: 1) صغار ومتوسطي الحجم من المنتجين – تجار القرية – تجار التجزئة – المستهلك، 2) صغار ومتوسطي الحجم من المنتجين – تجار القرية – تجار الجملة – تجار التجزئة – المستهلك، 3) صغار ومتوسطي الحجم من المنتجين – تجار الجملة – تجار التجزئة – المستهلك، 4) صغار ومتوسطي الحجم من المنتجين – تجار الجملة– مصنعو الطماطم - تجار التجزئة – المستهلك، 5) صغار ومتوسطي الحجم من المنتجين – تجار الجملة– مصنعو الطماطم – السوق الخارجي 6) جمعيات المزارعين – تجار الجملة – تجار التجزئة – المستهلك، 7) جمعيات المزارعين – المصدرين – السوق الخارجي، 8) متوسطو وكبار المزارعين – المصدرين – السوق الخارجي، 9) متوسطو وكبار المزارعين – المصنعون – السوق الخارجي.

علاقات الفاعلين وتنسيق الحوكمة فى سلسلة القيمة
تتسم سلسلة القيمة لمحصول الطماطم بوجود عدد كبيرمن الفاعلين مع غياب العلاقات الوثيقة وتبادل المعلومات بين اغلبهم وتتركز هذة العلاقة حول التجار أو الوسطاء الذين يحتلون المساحة الأهم في خريطة الفاعلين فى سلسلة الانتاج.

المزارعون وموردو مستلزمات الإنتاج: في أسواق المدخلات، يوجد عدد قليل من موردي وتجار التجزئة ، وعدد أقل من موردي وتجار الجملة، في جانب العرض يواجهون عددا كبيرا من المزارعين في جانب الطلب.وعلي ذلك فالمنافسة بين موردي المدخلات محدودة، مما يترك لصغار الحائزين خيارات محدودة فيما يتعلق بمشترياتهم من المستلزمات والأسعار.ومن ناحية أخرى فكمية مشتريات صغار الزراع من المستلزمات تعد من الصغر بحيث لا تكفى سواء لتمكينهم من المساومة مع تجار التجزئة للحصول على أسعار أفضل أو لإجراء مشتريات مباشرة من تجار الجملة (بأسعار أقل من التجزئة). وما لم يتم تنظيم المزارعين وتمثيلهم من قبل جمعية، فالفرصة مهيأة لموردى وتجار المستلزمات للقيام بالتنسيق والتحكم فى العلاقة بين الطرفين.
المزارعون والتجار: سلسلة القيمة الطماطم الطازجة التقليدية بسيطة نوعا ما ومتطلبات الجودة في الأسواق التقليدية منخفضة أيضا.
وعلى هذا فإن التجار وتجار الجملة ليس لديهم حافز يذكر لإقامة علاقات محددة مع صغار الحائزين. ومن ثم يجد هؤلاء أنفسهم تحت رحمة تجار الجملة، حيث أن تجار الجملة هم من يحددون ما إذا كانوا يشترون أو لا يشترون، وكم سيشترون ومتى وبأي سعر، خاصة إذا كان إنتاج صغار الحائزين مرتبط بالائتمان.وإذا رفض أحد صغار الحائزين عرضا، فذلك ينطوي على خطر عدم بيع أي شيء إذا لم يظهر أي تاجر آخر.
مع هذا التواطؤ احتكار القلة بين التجار، يمكن استخلاص أن إدارة العلاقة بين المزارعين والتجار يتم تنسيقها والسيطرة عليها من قبل التجار.

التجار والقماطون وتجار الجملة: يتم تنسيق الحوكمة بين التجار والقماطين وتجار الجملة والسيطرة عليها من قبل تجار الجملة.
القماطون وتجار التجزئة: تنسق علاقة الحوكمة بين القماطين وتجار التجزئة من خلال السوق. ومع ذلك، فإن السيطرة على العلاقة بين الطرفين يعتمد على مدى حداثة سوق التجزئة، ففي حالة تجار التجزئة غير الحديثة؛ تكون السيطرة هي في أيدي القماطين وفي حالة تجار التجزئة الحديثة، تكون السيطرة أكثر توازنا لأن تجار التجزئة الحديثة تمتلك المعرفة والقدرة على الشراء مباشرة من أسواق الجملة.

مشاكل سلسلة القيمة للطماطم:

تعاني سلسلة القيمة لمحصول الطماطم من مشاكل عديدة فى كل حلقة من حلقات السلسلة، يتم عرضها تفصيليا فى الدراسة. وفيما يلي أهم هذه المشاكل على مستوى كل مرحلة:

مرحلة ما قبل الانتاج:

تعانى السلسلة فى هذه المرحلة من صعوبة توريد المدخلات التييتطلبها إنتاج وتسويق الطماطم، البذور والشتلات والأسمدة الكيماوية والعضوية ومبيدات الآفات والحشائش ومستلزمات المقاومة البيولوجية والعبوات والأنفاق البلاستيكية والصوب الزراعية ومحطات التعبئة، فضلا عن معدات تجهيز الأرض للزراعة وأنظمة الري وتسهيلات التبريد والتخزين والنقل. وبالإضافة إلى صعوبة التوريد هناك مشكل تتعلق بانخفاض النوعية وكذا ارتفاع الأسعار بسبب الأوضاع الاحتكارية التي تسود أسواق هذه المدخلات. وبالنسبة للبذور، فكل البذور المستخدمة لإنتاج الطماطم في مصر مستوردة وبالتالي لا توجد أي إمكانية للرقابة أو توجيه الإنتاج للأصناف محددة بالإضافة إلى المخاطرة التي تنطوي عليها ظروف التبعية الكاملة للسوق الخارجي. كما أن المزارعين لا يقومون بزراعة الأصناف المفضلة للتصنيع إلا في حالة واحدة في إطار التعاقدات التي يقوم بها مصنع هاينز مع بعض المنتجين. وهناك أيضا مشاكل تتعلق بالمبيدات والأسمدة الكيماوية من حيث الغش وعدم المطابقة للمواصفات.

مرحلة الإنتاج:

يتأثر إنتاج الطماطم فى مصر بمشكلات القطاع الزراعي بشكل عام وخاصة فيما يتعلق بظاهرة التفتت الحيازي والإنتاجي وسيادة الحيازات المزرعية الصغيرة وما يستتبعها من تخلف النظام الزراعي واستخدام الممارسات الزراعية غير الجيدة واستخدام مدخلات غير مضمونة الجودة ومن ثم انخفاض الإنتاجية فضلا عن صغر حجم الإنتاج وانخفاض نوعيته. ويواجه إنتاج الطماطم عوامل خاصة تؤدى إلى هبوط مستوى جودة الانتاج وعدم مطابقته لمتطلبات السوق. فالتركيب الصنفي للإنتاج تسوده الأصناف التقليدية مع ضآلة نصيب الأصناف غير التقليدية، وتكنولوجيات الإنتاج تتسم بالتخلف، فهناك سيادة الحقول المفتوحة مقابل الزراعات المحمية (الأنفاق البلاستيكية المنخفضة والمرتفعة والصوب الزراعية) والزراعة على أسلاك. وهناك سيادة الممارسات التقليدية الموروثة مقابل الممارسات الزراعية الجيدة (GAP). كما أن غياب المعلومات عن احتياجات السوق المحلي والعالمي من ناحية الكمية والأصناف ينتج عنه فوضى في الإنتاج وهبوط الأسعار إلى حد يمثل خسائر كبيرة في دخول المزارعين أو بالعكس إلى نقص الإنتاج. أيضا هناك مخاطر التقلبات في الإنتاجية بسبب التقلبات المناخية والإصابة بالآفات (مثل توتا أبسليوتا) وانعكاسها على تقلبات الدخول.
ومن المشاكل الرئيسية فى مرحلة الإنتاج ارتفاع نسبة الفاقد الفيزيقي على مستوى المزرعة حيث تقدر نسبة الفاقد في المحصول فى هذه المرحلة 9.7% نتيجة لسوء تحديد توقيت الجنى وسوء أداء عملية قطف الثمار وانخفاض مهارة اليد العاملة التي تقوم بعملية قطف الثمار, و تؤدى الممارسات الخاطئة إلى افساد الثمار وفقد جزء من المحصول واستخدام عبوات غير ملائمة (أقفاص الجريد) وتعرض الثمار لأشعة الشمس، فضلا عن الصنف نفسه.وهناك أيضا مشكلة ضآلة نصيب المزارع في سعر المستهلكتعد أيضا مشكلة أساسية للمنتجين.

مرحلة ما بعد الحصاد:

أهم وأكبر مشكلة في سلسلة قيمة محصول الطماطم هي ***فاقد الإنتاج*** الذي يقدر بما يتراوح ما بين 30 و 40% من حجم الانتاج الكلي. ويبدأ الفقد منذ قطف الثمار ولكن الفاقد الأهم يكون في مرحلة التعبئة والتخزين والنقل حيث لا تتوافر الأدوات الملائمة مع انتشار استخدام الاقفاص التقليدية التى تتلف الثمار وعدم وجود أسطول نقل مبرد أو أماكن تخزين مبردة.

التعبئة: نحو 80% من المزارعين يستخدمون أقفاص الجريد للتسويق المحلي، 20% يستخدمون أقفاص بلاستيكية. وتعتبر أقفاص الجريد من أهم العوامل التي تتسبب في أضرار ميكانيكية للمحصول (تجريح الثمار) ومن ثم نسبة كبيرة من التلف بعد الحصاد. العبوات المستخدمة غير موحدة في مقاساتها مما ينتج عنه ضرر بالغ للمحصول عند رصها فوق بعضها البعض أثناء النقل والتسويق. القفص البلاستيك أعلى سعرا من القفص الجريد مما يجعل تجار الجملة في الأغلب يفضلون الأخير، بالرغم من أن الأول يتم استخدامه عددا أكثر من المرات.

طريقة التعبئة:تتم التعبئة في الأغلب بشكل غير سليم، إذ تعتمد على ما يسمى ب «التوشيش» حيث توضع على واجهة القفص الثمار السليمة ذات الحجم الموحد بينما توضع فى الطبقات الدنيا ثمار بمواصفات أقل، وتوضع فى الأقفاص بعض الثمار المعطوبة والتالفة أو المصابة والتي تتسبب في إتلاف المزيد من الثمار وزيادة الفاقد.

التخزين:على مستوى الحقل تتعرض الطماطم إلى أشعة الشمس لمدة قد تطول سواء في الحقل خاصة في حالة عدم وجود مظلة (تعريشة) أو تسهيلات تبريد, أو أثناء النقل.

النقل:عمليات التحميل والنقل لا تتم بطريقة سليمة نتيجة تحميل زائد فى سيارات النقل، أو تكون الطرق غير ممهدة أو أن وسائل لنقل نفسها قد تكون غير مناسبة أي أنها غير مجهزة بالتبريد اللازم لعدم إتلاف الطماطم.

مرحلة التسويق:

يمثل التجار والوسطاء بأنواعهم المختلفة جزءا شديد الأهمية فى سلسلة القيمة حيث يتحكمون بالكامل فى العملية التسويقية و يفرضون شروطهم على المنتجين, فبالإضافة إلى تحديد سعر الشراء من المنتج بشكل تعسفي ودون أن يكون لدى المنتج أي معلومات عن ظروف السوق، يحمل التجار كل تكلفة النقل على المنتج أيضا, كما أنهم لا يوفرون الإمكانيات اللازمة للتخزين الجيد. و بالتالي يساهم هذا الأمر في زيادة حجم الفاقد من الإنتاج.

مرحلة التصنيع:

يعتبر التصنيع مرحلة مهمة فيما يتعلق بإضافة القيمة في سلسلة القيمة للطماطم. وبالرغم من كبر حجم الإنتاج إلا أن كمية الإنتاج الموجهة للتصنيع مازالت ضئيلة ولا تتجاوز نسبتها 4%من الإنتاج الكلي كما يلاحظ قلة عدد وحدات التصنيع وضعف القدرة الاستيعابية لمعظم هذه الوحدات فضلا عن وجود طاقات عاطلة تقدر بنسبة 22%. ويتنوع المصنعون بين عدد قليل من المصانع الكبيرة لا يتجاوز نحو 17 مصنعا تستخدم تكنولوجيات متقدمة إلى حد ما وعدد كبير من المصانع الصغيرة ووحدات التصنيع المنزلي التي تستخدم أساليب إنتاجية تقليدية، ويحصل المصنعون على احتياجاتهم من الطماطم كمادة خام بالشراء من تجار الجملة عندما تنخفض الأسعار أو من خلال التعاقد مع كبار المزارعين. ومن أهم المشاكل التي يواجهها المصنعون هو عدم انتظام توريد المواد الخام، ثم إن الأصناف الموردة في أغلبها ليست ملائمة للتصنيع مما يؤثر سلبا على كفاءة التصنيع وعدد أيام التشغيل والذى لا يتجاوز 50 يوما فى السنة بينما يمكن للمصانع ، لو تم حل مشكلة توريد الطماطم الخام ، أن تعمل 90 يوما فى السنة.وتتسم غالبية الشركات المصنعة للطماطم بعدم القدرة على الاستثمار في البحوث والتطوير، مما يؤدى إلى انخفاض مستوى الابتكار داخل القطاع، ومن ثم محدودية المنتجات الجديدة.

ويتسم تصنيع الطماطم، شأنه شأن قطاع الصناعة عموما، بسيادة المشروعات متناهية الصغر والصغيرة ومتوسطة الحجم MSMEs من . وهذه المشروعات، بالإضافة إلى محدودية الحجم ، فهى غير منظمة ولا يمكنها بالتالي الاستفادة وفورات الحجم أو من النشطة المضيفة للقيمة مثل التسويق التصديري.وأغلب المصانع التابعة لهذه المشروعات لا يتمكنون من الحصول على شهادات الجودة مثل الممارسات الصناعية الجيدة (GMP و HCCP) . وهناك مشاكل أخرى تواجه هذه المرحلة منها ضعف السوق المحلية وتخلف قنوات التوزيع وقلة سلاسل التجزئة الكبرى. ومشاكل تتعلق بالأعباء الإدارية والبيروقراطية (خاصة عدم وجود شفافية في الأنظمة الجمركية الخاصة بالمستلزمات المستوردة) وطول وقت التخليص الجمركي بسبب المتطلبات البيروقراطية المفروضة على الشركات، والتي جعلت قطاعات الأعمال / الصناعة تعتمد على المدخلات المستوردة غير التنافسية.

مرحلة التصدير:

من أهم المشاكل التي تواجهها سلسلة القيمة للطماطم ما يلي:

تركز الأسواق: تتركز صادرات الطماطم فى عدد قليل من الدول ،وتستحوذدولتان فقط على 70% من صادرات الطماطم الطازجة.

تركز المصدرين: تقتصر عملية التصدير على عدد قليل من كبار المصدرين،وتتسم القاعدة التصديرية بالضيق، وحتى الكثير من كبار المنتجين لا يتمكنون من التصدير إلا من خلال كبار المصدرين.
عدم الالتزام بالمواصفات والجودة العالمية SPS وخاصة مشكلة متبقيات الكيماويات.
ضعف البنية التحتية للتصدير: النقل البري والبحرى والجوي، ويشكل النقص في وسائل النقل الملائمة والتبريد عائقا أمام تنمية صادرات الطماطم.
ارتفاع تكاليف النقل البرى وخاصة بالنسبة لمنطقة الخليج بنسبة قد تصل إلى 50% بالمقارنة للدول المنافسة، فضلا عن سوء حالة الطرق المؤدية إلى الموانئ وارتفاع الجمارك على الواردات من الشاحنات المبردة.
محدودية فراغات الشحن الجوى، واضطرار المصدرين إلى استخدام مصر للطيران مع ارتفاع تكلفتها.
ضعف حالة الموانئ وطول إجراءات التفتيش المطلوب

خلاصة:

هناك ثلاثة أنواع من المشاكل في سلسلة قيمة محصول الطماطم:

مشاكل كلية وقطاعية وهي انعكاس لمشاكل موجودة في القطاع الزراعي عامة والبيئة المحيطة بالنشاط الإنتاجي والتسويقى: ضعف الإطار المؤسسي والتشريعي للزراعة بوجه عام بسبب الافتقار إلى السياسة الزراعية الصحيحة وتقادم القوانين والتشريعات وانعدام فعالية منظمات المزارعين والمجالس السلعية وضعف أجهزة الرقابة على نوعية مستلزمات الزراعية وضوابط الأسواق. والأسواق الزراعية سواء أسواق المنتجات أو المدخلات يسودها عموما الأوضاع الاحتكارية مما يجعل الأسعار السائدة غير تنافسية، فضلا عن التقلبات السعرية الشديدة. كما تعاني السلسلة من ضعف الخدمات المساندة والداعمة للفاعلين ومن أهمها خدمات الإرشاد الزراعي والتدريب والبحث وتطوير الأعمال وضعف النفاذ إلى التمويل على امتداد مراحل السلسلة وخاصة بالنسبة لصغار ومتوسطي الحجم من الفاعلين من مزارعين وتجار ومصنعين ومصدرين وموردي الخدمات.

مشاكل على مستوى سلسلة القيمة ككل: وعلى الأخص غياب التنسيق بمستوييه الأفقي والرأسي وكذا انعدام الحوار بين الفاعلين وضخامة حجم الفاقد والذي ترتفع نسبته إلى أكثر من ثلث الإنتاج ويحدث بدءا بمرحلة الإنتاج ثم مرحلة ما بعد الحصاد وأخيرا مرحلة التجزئة.

مشاكل على مستوى حلقات (مراحل) سلسلة القيمة: في مرحلة الإنتاج تتمثل أهم المشاكل في الأمر الذى ينشأ عنه انخفاض الإنتاجية GAPالتفتت الإنتاجي وعدم تطبيق الممارسات الزراعية الجيدة الفدانية من ناحية وانخفاض نوعية الإنتاج من ناحية أخرى. وفي مرحلة ما بعد الحصاد تعانى السلسلة من نقص تسهيلات التبريد والتخزين وضعف أداء خدمات الفرز والتدريج وسوء مواد التعبئة وسوء ممارسات عملية التعبئة وسوء وسائل النقل والتحميل الزائد. وفى مرحلة التسويق المبيعات تعانى السلسلة الحالية من تعدد الوسطاء دون تقديم خدمات حقيقية وكذا تعدد القنوات التسويقية وصغر أحجام المبيعات وقلة المعلومات عن الأسواق.

ثالثا: الاجراءات المقترحة لتحديث سلسلة القيمة للطماطم:

من خلال الحوار والتفكير الجماعي مع المشاركين فى ورشتي العمل، تم التوصل إلى التوصية بخطة كاملة تشمل مقترحات وتدخلات على كل المستويات التي تم عرضها سابقا.وتتضمن خطة تحسين سلسلة قيمة الطماطم في مصر مجموعة واسعة من الأنشطة مثل تحسين النفاذ إلى المدخلات عالية الجودة، وتطوير قدرات ومهارات المزارعين، وتحسين ظروف العمل والإنتاجية، وتعزيز تقديم الخدمات التجارية والمالية، وتمكين تدفق المعلومات، وتسهيل النفاذ للأسواق لاسيما الأسواق ذات القيمة الأعلى أو المنتجات ذات القيمة المضافة. علاوة على ذلك، فإن العديد من القضايا المتعلقة بالجودة والتكلفة تتأثر بالسياسات واللوائح والإجراءات التي تتخذها الحكومة.

نذكر بصفة خاصة ما يلي:Key interventionsومن أهم المقترحات التي تعتبر مفتاحية

ينبغي أن يتم تحسين كفاءة سلسلة قيمة الطماطم بطريقة شاملة وفعالة ومستدامة، ***والتحول من الوضع الراهن حيث سلسلة القيمة تحقق إنتاجا ضخما ولكن بنوعية منخفضة وفاقد كبير وربحيات منخفضة بالنسبة لأغلب الفاعلين صغار متوسطي الحجم ونصيب متضائل وغير عادل بالنسبة للمزارعين صغار ومتوسطي الحجم، إلى سلسلة محدثة تتسم بالكفاءة تحقق المنتجات المستهدفة ذات الجودة العالية والقيمة العالية وتقلل الفاقد إلى أدنى حد ممكن.***

وتبدأ عملية تحديث سلسلة القيمة للطماطم بوضع الحكومة لاستراتيجية وطنية لقطاع الطماطم وتقديم خدمة أفضل لمؤسسات البحوث التطبيقية والإرشاد الزراعي لتحسين إنتاجية الطماطم، ونشر الممارسات الزراعية الجيدة) من خلال بناء قدرات المزارعين، وخلق تدفق فعال وكفء للمعلومات والتدريب والمعرفة. وإدخال التقنيات GAP(المتقدمة والميكنة في الممارسات الزراعية وما بعد الحصاد أمر لا بد منه لسلسلة القيمة الفعالة. يجب إعادة صياغة الهيكل التنظيمي لقطاع الطماطم بطريقة تضمن سلامة وكفاءة سلسلة القيمة الطماطم. بنفس القدر من الأهمية، من الضرورى تحسين تنسيق السلسلة؛ أفقيا من خلال جمعيات منتجي الطماطمورأسيا من خلال الزراعة التعاقدية. كما ينبغي النظر في تنسيق جهود الجهات المانحة في مجال تحديث سلسلة قيمة الطماطم.

أولا:على مستوى البيئة المناسبة والخدمات المساندة:

- تضع مراكز الابحاث "خريطة صنفيه قومية" يوضح بها التوزيع الصنفي الجغرافي على مستوى المحافظات والمناطق المنتجة وربطها بمراكز الاستهلاك الرئيسية والتصنيع ومسارات التصدير،
- إصدار وتفعيل القوانين التى من شأنها رفع كفاءة سلسلة القيمة للطماطم، وفي مقدمتها قانون التعاونيات الزراعية وقانون الزراعة التعاقدية، واتخاذ الاجراءات الخاصة بتحفيز الاستثمار فى مجالات تحسين البنية التحتية التسويقية ومراكز تداول مابعد الحصاد وسلسلة التبريد والنقل والتخزين المبرد وإنشاء أسواق الجملة على مستوى المحافظات وتجهيزها بوحدات الفرز والتدريج والتخزين المبرد، وتحفيز وتسهيل استثمار جمعيات المزارعين فى مجالات إنشاء الصوب الزراعية وزراعة الطماطم على أسلاك وإنشاء مشاتل الطماطم.
- رفع أداء الخدمات المساندة لسلسلة القيمة، وهي على وجه خاص "البحث والتطوير" و"الإرشاد الزراعى" والتدريب وتطوير الأعمال والتمويل.

ثانيا: على مستوى سلسلة القيمة عامة:

- إنشاء مجلس مهني يسمى "مجلس الطماطم " ويضم ممثلين لكل الفئات الفاعلة والمهن العاملة في سلسلة القيمة بهدف تحسين التنسيق بين كل حلقات السلسلة وتبادل المعلومات ونشر الممارسات الجيدة حيث أن تحسين التنسيق بين كل الحلقات سيؤدى إلى تسهيل الربط بين المنتجين والمصنعين لتحديد الأصناف المناسبة التي يجب زراعتها (الخريطة الصنفية) وتحديد المواصفات النوعية المطلوبة في المنتج و التفاوض لتحديد السعر العادل للفئات المختلفة من الفاعلين.
- تكوين "جمعيات المزارعين" تضم في عضويتها صغار ومتوسطي منتجي الطماطم في كل مناطق الإنتاج، باعتبارها وسيلة لتحقيق "العمل الجماعي" وتمكين المنتجين من الاستفادة بمزايا اقتصاديات الحجم ، فضلا عن أنها أداة فعالة فى تمكين المنتجين من تبني الممارسات الزراعية الجيدة كما يتم من خلالها القيام بعدة وظائف مثل: نشر المعلومات عن الأصناف المختلفة المناسبة للتصنيع أو للاستهلاك المباشر، توفير الوسائل المناسبة للفرز والتخزين والنقل المبرد بما سيؤدى إلى تقليل الفاقد في مرحلة ما بعد الحصاد، وتجميع المحصول من صغار المنتجين والتفاوض نيابة عنهم مع المصدرين والمصنعين للحصول على أسعار مناسبة وعادلة.
- استخدام آلية "الزراعة التعاقدية" في ربط "جمعيات المزارعين" بمصنعي ومصدري الطماطم وكذا بسلاسل ومحلات التجزئة الكبرى، وعن طريق هذه الآلية يتم تحقيق "التنسيق الرأسي" لسلسة القيمة، بحيث يتم مطابقة إنتاج الطماطم كما ونوعا لمتطلبات السوق في المستويات الأعلى من السلسلة.

ثالثا: على مستوى كل حلقة من سلسلة الإنتاج:

المزارعون: التدريب على التقنيات الحديثة والممارسات الزراعية الجيدة لتقليل الفاقد وتحسين النوعية وزيادة الإنتاجية الفدانية، الأمر الذي يتحقق بصورة أفضل في حالة وجود جمعيات مزارعي الطماطم.

التجار والوسطاء: نشر ودعم خدمات الفرز والتدريج ووسائل التعبئة الملائمة (إحلال الأقفاص البلاستيكية محل اقفاص الجريد) والتبريد والتخزين ووسائل وممارسات النقل السليمة للحد من الفاقد.

المصنعون: إنشاء جمعيات تضم أصحاب المشروعات الصغيرة والمتوسطة الضالعة في تصنيع منتجات الطماطم، وحل مشكلة ندرة توريده أصناف الطماطم الملائمة للتصنيع عن طريق التعاقد مع جمعيات المزارعين لإنتاج هذه الأصناف مع توفير الخدمات التمويلية والإرشادية واللوجستية المطلوبة. ويوجد لصناعة تجفيف الطماطم إمكانيات كبيرة للتوسع فى الإنتاج والتصدير لا سيما أنها لا تتطلب انفاقات استثمارية كبيرة.

المصدرون: تنطوي حلقة التصدير على تحقيق قيمة مضافة مرتفعة تساعد على رفع كفاءة سلسلة القيمة للطماطم، ولزيادة مساهمتها فى السلسلة المحدثة يقترح اتخاذ عدد من الإجراءات لتحسين أداء صادرات الطماطم والإسراع بمعدلاتها، ومن أهمها إلتزام المصدرين بتصدير منتج تتوافر فيه المواصفات العالمية وتوافر تسهيلات التبريد في المطارات، وتنويع الأصناف المصدرة بالتركيز على تصدير الأصناف غير التقليدية مثل الطماطم العضوية والطماطم الشيرى والعنقودية والطماطم المجففة، وكذلك تنويع أسواق صادرات الطماطم المصرية لتجنب مخاطر تركزها في عدد قليل من الأسواق.

خطة تنفيذية لتحديث سلسلة القيمة للطماطم

يتم تنفيذ خطة تحديث سلسلة القيمة للطماطم على ***ثلاث مستويات***:

Enabling**المستوى الأول**: **تنفيذ التدخلات المقترحة على مستوى قطاع الطماطم والمتعلقة بتحسين البيئة الداعمة** ويشمل ذلك الأنشطة الآتية:Supporting Services **وكذا تحسين الخدمات المساندة** Environment

- قيام وزارة الزراعة واستصلاح الأراضى بوضع سياسة محددة لقطاع الطماطم وذلك بالتشاور مع أصحاب المصلحة.
- ***إنشاء "المجلس المهني للطماطم"*** وذلك بمقترح من وزارة الزراعة واستصلاح الأراضى بالتشاور مع الوزارات المعنية وهي بالتحديد وزارة التجارة والصناعة ووزارة التموين والتجار الداخلية وغرف الصناعة والتجارة وتعاونيات وجمعيات منتجى الطماطم، ويضم المجلس ممثلين عن كافة أنشطة القطاع.
- يقوم "معهد بحوث البساتين" التابع لمركز البحوث الزراعية بوضع ***"خريطة صنفية قومية"*** تتطابق مع أهداف سياسة قطاع الطماطم، وتتم بالتشاور مع "المجلسالمهني للطماطم" واصحاب المصلحة.
- صياغة سياسة عامة تتضمن التدابير التالية: 1) حوافز للقطاع الخاص لتشجيع ***الاستثمارات فى مجالات البنية التحتية التسويقية*** خاصة فى مجالات تسهيلات سلسلة التبريد فى مناطق إنتاج الطماطم ومراكز التجميع والتعبئة والصوب الزراعية وإنشاء ***شبكة مشاتل للطماطم*** تغطي مختلف مناطق إنتاجها، 2) تسهيل نفاذ جمعيات منتجى الطماطم إلى مصادر التمويل لإقامة تجهيزاتها الخاصة فى المجالات المذكورة، 3) تحفيز القطاع الخاص لتأسيس شركات تطوير الأعمال خاصة فى مجالات تحديث سلسلة القيمة للطماطم مثل مواد التعبئة والتغليف ***(إحلال الأقفاص البلاستيكية محل أقفاص الجريد)*** والدعم الفنى وغيرها، 4) تحفيز القطاع الخاص لإنشاء أسواق الجملة على مستوى المحافظات بالتعاون مع وزارة التنمية المحلية (المحافظات) يغ المناسبة باستخدام الصيغ المناسبة من ***المشاركة بين القطاعين العام والخاص***
- يقوم "معهد بحوث البساتين" بالبدء في ***برنامج بحثي لتطوير بذور الطماطم*** المحلية.
- تقوم وزارة الزراعة واستصلاح الأراضي بالتأهيل الكافي ***لوحدة الزراعة التعاقدية*** لتقديم المساعدة لجمعيات منتجي الطماطم بشأن إجراءات التعاقد مع المصنعين والمصدرين والمتابعة القانونية للعقود.
- يقوم قطاع الخدمات بوزارة الزراعة واستصلاح الأراضى بالتعاون مع الباحثين المختصين بمعهد بحوث البساتين واتحاد منتجي ومصدري الحاصلات البستانية بإعداد ***مخطط لمزارع الطماطم الإرشادية والمزارع النموذجية*** وكذا إعداد نماذج النشرات والرسائل الإرشادية التي يمكن لجمعيات منتجي الطماطم الاستعانة بها.

Pilot المستوى الثاني: تنفيذ التدخلات المقترحة لتحديث سلسلة القيمة للطماطم على مستوى منطقة تجريبية Area، وتقترح الدراسة أن تضم ***مركز إسنا*** (الوجه القبلى) بالإضافة ***لمنطقة النوبارية*** (غرب الدلتا)، حيث شهدت هذه المنطقة تنفيذ عدد من المشاريع الناجحة الممولة في إطار منح أجنبية فى مجال سلسلة القيمة للطماطم وغيرها من الحاصلات البستانية. وتشتمل الأنشطة التي سوف تنفذ على هذا المستوى ما يلي:

- تنظيم صغار ومتوسطي الحجم من منتجي الطماطم في ***"مجموعات"*** كنواة لتكوين "جمعيات منتجي الطماطم"، ويتطلب هذا النشاط تمويلا أوليا ***"Seed money"*** قد يتم توفيره من الميزانية العامة أو من موارد التعاونيات الزراعية أو من خلال المنح الأجنبية، ويتولى هذه العملية اتحاد منتجي ومصدري الحاصلات البستانية والذي لديه خبرة في هذا المجال.
- يتم تنفيذ ***برنامج تدريبي لهذه "المجموعات" على تطبيق الممارسات الزراعية الجيدة***، ويمكن أن يتولى هذا التدريب وحدات جامعية متخصصة أو شركات ومراكز التدريب التابعة للقطاع الخاص.
- يتم إنشاء ***"جمعيات منتجي الطماطم"*** إما طبقا لقانون التعاونيات الزراعية أو طبقا لقانون الجمعيات الأهلية (وزارة التضامن الاجتماعى).
- ربط جمعيات منتجي الطماطم بالمصنعين والمصدرين وسلاسل التجزئة الكبرى من خلال عقود ***"الزراعة التعاقدية"***، ويساعد الجمعيات فى هذا الأمر"وحدة الزراعة التعاقدية" بالوزارة بالتعاون مع اتحاد منتجي ومصدري الحاصلات البستانية، مع متابعة من قبل "المجلس المهنى للطماطم".
- تأهيل "جمعيات منتجي الطماطم" في مجالات ***تطوير الأعمال*** بما فى ذلك تخطيط وإدارة الإنتاج وتسويق الطماطم ومواصفات الجودة والزراعة التعاقدية وطرق النفاذ إلى المستلزمات مضمونة الجودة وكذا النفاذ إلى مصادر التمويل ، ويتولى ذلك مراكز وشركات تدريب خاصة بجانب وحدات جامعية متخصصة.
- يتم تأهيل "جمعيات منتجي الطماطم" للحصول على شهادة ممارسات الجودة العالمية ***Global GAP*** وذلك بدعم من الجهات المعنية مثل "جمعية تحسين الصادرات البستانية" HEIA و"اتحاد منتجي ومصدري الحاصلات البستانية".

المستوى الثالث: تنفيذ التدخلات المقترحة لتحديث سلسلة القيمة للطماطم على مستوىكافة مناطق إنتاج الطماطم بالبلاد، ويتم ذلك بعد إجراء تحليل ***"المتابعة والتقييم"*** Monitoring & Evaluation لما تم من تدخلات وأنشطة في إطار المنطقة التجريبية لسلسلة القيمة المحدثة للطماطم، وبعد استيعاب **الدروس المستفادة** منها. وفى نفس الوقت تكون ملامح السلسلة المحدثة قد تبلورت، وتكون البيئة الداعمة والخدمات المساندة قد أصبحت أكثر قوة ووضوحا، وتكون آليات التنسيق الأفقي والرأسي قد أصبحت أكثر رسوخا. وبالإضافة إلى ذلك، فإنه مع استمرار وتواصل النجاحات الأولى وازدياد قوة جمعيات منتجي الطماطم وتحقيقها لعوائد عالية سوف تحل كثير من العوائق المالية وهو ما يعطى زخما لمزيد من التقدم والتوسع المستقبلى فى تطبيق السلسلة المحسنة.

العوائد الاقتصادية لتحديث سلسلة القيمة للطماطم

عند اكتمال تنفيذ التدخلات المقترحة لتحديث سلسلة القيمة للطماطم على مستوى القطاع ككل،تتحقق قفزة كبيرة بالنسبة للأهداف المنوطة بالسلسلة، سواء تلك المتعلقة بالكفاءة الاقتصادية أو المتعلقة بالتوزيع العادل لأنصبة المشاركين فى السلسلة ، ويمكن إيجاز ذلك فيما يلي:

- يزيد الإنتاج الكلي من الطماطم (من نفس المساحة المزروعة) من 7.7 مليون طن (2015) إلى 11.6 مليون طن سنويا،
- ***ينخفض الفاقد من 2.7 مليون طن (بنسبة 35% من الإنتاج الكلى) إلى 1.7 مليون طن (بنسبة 15% من الإنتاج الكلى) سنويا،***
- يرتفع حجم المبيعات الكلية من الطماطم (الانتاج مخصوما منه الفاقد) من 5 مليون طن إلى 9.9 مليون طن سنويا، يتجه منها نحو 7.55 مليون طن إلى الاستهلاك المحلي من الطماطم الطازجة، 2 مليون طن تستخدم كمادة خام لتصنيع منتجات الطماطم (الكاتشاب والصوص وغيرها)، 350 ألف طن تتجه للتصدير (مقارنة ب 90 ألف طن حاليا)
- يزيد إنتاج منتجات الطماطم (الكاتشاب والصوص وغيرها) من 60 ألف طن (حاليا) إلى 500 ألف طن سنويا ، خاصة فى ظل تمديد فترة تشغيل المصانع من 50 إلى 90 يوما مع رفع كفاءة التصنيع ،ويتجه من الكمية المنتجة 200 ألف طن للاستهلاك المحلي, 300 الف طن للتصدير

- ***تزيد القيمة الكلية لسلسلة القيمة للطماطم من 23مليار جنيه (في الوضع الحالي) إلى 50مليار جنيه سنويا فى ظل السلسلة المحدثة)، وعلى ذلك تكون القيمة المضافة الناشئة عن تحديث السلسلة 27 مليار جنيه سنويا.***
- تتمثل الآثار التوزيعية لتحديث السلسلة في أن دخول أغلب المشاركين سوف تزيد ولكن بنسب متفاوتة ، فصغار ومتوسطي الحجم من منتجي الطماطم سوف تزيد دخولهم بنسبة أكبر بشرط انتظامهم في عضوية جمعيات المنتجين، وفى نفس الوقت سوف تستبعد السلسلة المحدثة عددا كبيرا من الوسطاء والسماسرة (لاسيما تجار القرية والتجار المحليين) الذين سوف تحل الجمعيات محلهم فى إنجاز الخدمات التسويقية وبصفة خاصة عند ربطها مباشرة بالفئات الأعلى من الفاعلين بالسلسلة (المصدرين والمصنعين وسلاسل التجزئة الكبرى). أما تجار الجملة فسوف يحاولون الاحتفاظ بوضعيتهم فى ظل السلسلة المحدثة ولكنهم سوف يضطرون إلى تخفيض هوامشهم وكذا تحسين مستوى الخدمات التسويقية التى يقدمونها حتى يحصلوا على أكبر حجم من المبيعات المتجهة للاستهلاك المحلى

I. INTRODUCTION

European Neighborhood Program for Agricultural and Rural Development (ENPARD) is an EU regional program that covers six Arab Countries; Egypt, Jordan, Lebanon, Tunis, Algeria, Morocco. In the context of ENPARD2activities in Egypt, the Minister of Agriculture and Land Reclamation requested the "Think Tank" of ENPARD/ Egypt to handle the objective of improving the efficiency of the agricultural value chains in Egypt. Tomato value chain has been selected by the Ministry to be studied and assessed to be used as a model to identify the interventions needed to enhance the other agricultural value chains.

1. Background and Study rational

Importance of tomato in the Egyptian context: Tomato is an important crop in Egypt's agricultural economy. It is the most widely grown vegetable crop in Egypt; with approximately 36% share of total volume of vegetable production in the country in 2015. Tomatoes are considered a labor intensive crop, thus generate important rural employment, and increase the level of income and standard of living of the rural population. Tomatoes are the most consumed vegetables in Egypt. The tomato sector has major opportunities to grow and support revenue increase for the producers and has opportunities as a source of foreign reserve by increasing the exports. Egypt is an exporter of tomatoes either fresh or processed. However,
Egypt's exports of tomato are relatively limited; fresh exports amount to only 90,000 MT or 1.2 percent of the total production indicating potential for greater exports.

Egypt enjoys several competitive advantages for tomatoes. Climactically, Egypt has advantages over Europe and could have a year-round planting cycle with better planning and coordination of production. Proximity to the GCC, EU and the African markets offer an advantage over other producing countries, which require more expensive logistics.

Importance of studying agricultural value chains: Studying agricultural value chains for Egypt's agriculture is of great importance for the Egyptian agricultural economy. Improved agricultural value chains could effectively contribute to resolving the critical problems the Egyptian agriculture is facing either in the present or in the future. Value chains are also essential for commercialization of the farming sector.

Because of limited arable land compared to population, Egyptian agriculture is featured with a high degree of fragmentation and dominance of smallholders that result in a numerous problems. Among these problems are fragmented production, low productivity as well as low income and poverty.

Egypt faces huge post-harvest losses particularly for perishable agro-commodities such as fruits and vegetables, the post-harvest losses average 30-40% of total attainable production, due to poor storage, lack of improved marketing services and other farm infrastructure.
Enhancement of the agro-food sector, with smallholder agriculture linked to agro-food sector and the business community, has considerable positive impacts on the primary agricultural sector as well as the consequences as per the economy- wide growth. Furthermore, stronger forward linkages between agricultural production sector and agro-food sector could be an engine for agricultural growth. Increases of investments in agricultural value chains can contribute to generation of decent jobs, development of

domestic value chains and infrastructure, provide access to global markets and stimulate uptake of new technologies or business models.

To promote additional investments required for agribusiness and agro-industries capital outlays, Egypt's agriculture needs business models that can significantly increase the level of investment from the private and public sectors. Increased investments should focus on opportunities relating to developing technological breakthroughs, the development of input and output markets structures in the context of local and global value chains and incentives that allow the full realization of the value of increased production with the aim to help groups of farmers raise their productivity and improve their access to markets, and a well-functioning and vibrant private sector that can manage and allocate skill and capital to scale emergent success and drive long-term sustainable agribusiness growth.

The three levels-value chain from-farmer-to-market in the context of public-private partnership initiatives is central to any potential transformation of Egypt's agriculture. Transformation at three levels can bring broad benefits to this *farmer-to-market value chain.* With respect to farmers, smallholders contribute up to 80 percent of Egypt's food supply, with an estimated 5 million smallholder farms. Increasing farmer capabilities would increase Egypt's output and, as a consequence, help solve Egypt's poverty and malnutrition. Farmer-level transformation should seek to increase yields, reduce post-harvest losses, improve market access and increase product margins.

The overall goal of the agricultural transformation is to support improved conditions for broad-based economic growth, create employment opportunities and contribute to poverty alleviation through increases in competitiveness of horticulture value chains in partnership with all stakeholders. Specific objectives of increasing competitiveness of horticultural value chains are to; (i) Strengthen the capacity in horticulture value chains to increase sales to domestic and foreign markets; (ii) Strengthen the capacity of smallholders and farmer enterprises to operate autonomously and effectively; and, (iii) Increase agriculture efficiency and productivity through adoption of new farming techniques and technological innovation among targeted beneficiaries.
Truly transforming Egyptian agriculture at the farmer, market, and cluster levels depends on three key levers: financing, government enablement and sustainability. Financing will fund the improvements in the value chain on both the micro (farmer) and macro (export) levels.

As for the current tomato value chain, a number of major problems and inefficiencies could be identified, ranging from product quality, unfair distribution of value shares for actors to high losses in the marketing chain. The current marketing system is inefficient and does not generate fair income for the growers. There are inefficiencies of the tomato subsector in general and on the different levels of the chain; production, post-harvest and marketing system.

2. Objective of the Study

The overall objective of the study is to assess and analyse the current situation of the value chain. The specific objectives are as follows:

- Outline the value chain actors including growers, traders and middlemen, processors, retailers, exporters, Input and service providers, sector support service providers.

- Assess the extent to which these actors contribute, positively or negatively, to performance.
- Analyze the performance drivers under the following broad themes: enabling environment, technologies, market structure, chain coordination, managing business operations, inputs and product demand.
- Identify the precise gaps and therefore, the potential of producers in the tomato value chain.
- Identify attractive/alternative markets for the value chain products.
- Identify policy recommendations and interventions needed to improve the competitiveness and performance of the value chain and enhance value for all the chain actors.
- Prioritize of the potential interventions in light of the augmented information and analysis.
- Evaluate the upgrading interventions.

3. Methodological Approach

To achieve the objectives of the study, the same approach followed previously by ENPARD has been adopted. Such approach is based on two pillars: First, is participatory approach and brainstorming over the assessment of tomato value chain; second is a complementary scientific study on the issue.

With respect to the participatory approach, the Think Tank of ENPARD-Egypt has played the main role within two workshops. The Think Tank is composed of group that includes representatives for various actors of the agricultural sector, particularly officials from the Ministry of Agriculture and Land Reclamation, producers, cooperatives, academics of universities and researchers of ARC, and civil society (NGOs). As well as the Think tank members other stakeholders of tomato sector have been invited to the workshops including tomato producers, processors, and exporters, and cooperatives specialized in tomato. With this diversified group, two workshops have been held in Cairo (the location of the MALR) under the supervision of the Expert of ENPARD CIHEAM-IAMM, the first in January 14-15, 2018 and the second in March 11-12, 2018. The focus of the first workshop was to identify the value chain framework analysis including identifying the tomato value chain actors, their internal relationships and constraints. As per the second workshop, the objective has been to use the first workshop discussions and results to identify the appropriate policy interventions for the identified problems.

In parallel to the workshops, a scientific study is conducted aiming at deepening the analysis of the tomato value chain and reformulating the interventions that are primarily proposed by the work groups.

With regard to data and information, the study relied mainly on secondary data and relevant information sourced by interviews and communications with tomato informants. As much information as possible was gathered concerning prices, costs, and efficiency metrics at each level as well as volumes of product flowing through each of these channels. In parallel, world market information was obtained to assess Egypt's recent performance in the tomato chain, assess its relative position in the face of regional competitors. Further information sources include a review of previous studies, interviews with adequate representation of all functions and participant groups in the value chain including producers, traders, exporters, input suppliers as well as key informants from among

academic, research and development professionals. The data presented in the study primarily comes from reports and databases published by the Ministry of Agriculture and land Reclamation (Economic Affairs sector), Ministry of Trade and Industry, Central Agency for Public Mobilization and Statistics (CAPMAS) and other domestic and international secondary sources of information, particularly international databases such as International Trade Center (ITC) in Geneva and FAOSTAT,COMTRADE, UNCTAD. For each specific chain, various knowledge and information sources available on the worldwide web were utilized as well.

Assistance was provided to the value chain consultant by ENPARD Expert of CIHEAM-IAMM Dr. Tahani Abdel HAKIM who assisted in the design of the overall framework and provided guidance throughout the elaboration of the work.

The combined approach entails the following stages:

• Mapping tomato value chain (TVC) to obtain a clear understanding of the sequence of activities and the key actors and relationships involved in the TVC. This includes refining maps of the functions and actors participating in the TVC, identifying variations in each depending on the product and relative efficiency of the different participants.

This exercise is carried out in qualitative and quantitative terms through graphics presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to industrial processing and marketing. Depending on the level of detail needed, this exercise may focus also on factors such as the size and scale of main actors; production volume; number of jobs; sales and export destinations and concentration; etc.

• Analyzing the value chain technological capacities is made in order to assess the value chain production system and tools; evaluate their technical performance and determine the principal technical actions that need to be carried out to upgrade individual enterprises within the chain in order to enhance their competitiveness. Among the elements that are assessed is the utilization of inputs, human resources and technical capacities; the technology and processes used; the production management methods and the environmental aspects.

• Analyzing the value chain economic performance and competitiveness entails the measurement of economic factors. This includes production costs, margins, added-value as well as benchmarking in order to position the chain vis-à-vis alternatives or competitors. It is an effective means of identifying strategic and non-strategic activities, cost drivers, price margins and value addition possibilities. It also reveals leverage points for action at policy, institutional and enterprise level.

• Formulating an upgrading strategy for the tomato value chain in which, at this stage, upgrading plan is drawn up describing the interventions required in the TVC, including policy and institutional recommendations. Specific interventions at enterprise level are also outlined and so is the advocacy necessary to implement them. Roles and responsibilities are assigned to all actors and agencies involved.

II. II.OVERVIEW ON EGYPTIAN AGRICULTURE

1. Importance of Agriculture in Egyptian Economy

Agriculture is a key sector in the Egyptian economy. Although its contribution has fallen, it still accounts for about 13 per cent of gross domestic product and 20 per cent of total exports. In addition, industries related to agriculture, such as processing, marketing and input supplies, account for another 20 per cent of Gross Domestic Product. Further , it provides livelihoods for 55 per cent of the population and directly employing about 27 per cent of the labor force. Domestically produced food satisfies, in average, about 60 per cent of national food requirements while Egypt still has to import the rest 40 per cent.

2. Land-Use and Cropping Pattern

The agricultural land-base of Egypt totalling about 9.1 million fed (3.8 million ha) consists of 6.0 million fed (2.5 million ha) in the "Old Land", and the remaining 3.1 million fed (1.3 million ha) exist in the "New Land". The old lands are found in the Nile Valley and the Delta and include areas that were reclaimed from desert many generations ago and have been irrigated and intensively cultivated ever since. Old lands tend to be deep, flat and fertile. The new lands are areas that have been reclaimed from the desert relatively recently or are in the process of being reclaimed now. New lands are initially not fertile, but, over time, with good soil and water management techniques (especially the incorporation of compost and crop residues), their productivity improves and, in successful areas, eventually approaches that in the old lands.

In 2016, agricultural population was estimated at 41.3 million or about 43.2 percent of the total population (Table 1). On per capita basis, Egypt's area of cultivated land at 0.1 fed (0.04 ha) per head is among the lowest in the world. Farm sizes are small with an estimated 70 percent of holdings less than one fed. Almost all farms are small (an average of about 2 fed (0.8 ha); 95 per cent of farms are less than 5 fed (2.1 ha) each).

Agriculture is almost entirely dependent on irrigation from the Nile River with a total supply of 55.5 billion m^3annually. Other water resources amount to 16.5 billion m^3 including reuse of drainage water, ground water, and rain which makes up the total water resources to 72 billion m^3 annually. Agriculture is the largest user of water in Egypt, accounting for 83 per cent of the total use, compared with 6.5 and 10.5 per cent for municipal and industrial uses, respectively. The growing population of Egypt and related industrial and agricultural activities has increased the demand for water to a level that reaches the limits of the available supply In the future, the increased water demand for non-agricultural uses will impose continuous limitations on the water supplies available for agriculture..

Mixed farming is common, with a variety of crops being combined with a few heads of cattle, sheep or poultry. Most agricultural land is privately owned. Reclaimed new lands, which were owned and operated by the government through public sector enterprises, have gradually been sold. Around 90% of these new lands are currently operated by private sector.

For seasonal cultivations, there are three cropping seasons; winter (November-May), summer (April-October) and Nili (July – October). Thus, with an agricultural land of 9.1

million fed and cropping intensity of around 172 per cent, the total cropped area covers about 15.6 million fed annually.

Table 1: Egypt's total population, rural and agricultural population, per capita land and water, 2005 – 2016

Year	Total Population (000')	Rural population		Agricultural population		Per capita land	Per capita water
		(000')	% to Total pop.	(000')	% To total pop.	fed	M^3
2005	76778	43743	57.0	33035	43.0	0.12	723
2006	78159	44494	57.0	33665	43.0	0.12	710
2007	79537	45274	56.9	34263	43.1	0.12	698
2008	80964	46097	56.9	34857	43.1	0.12	685
2009	82465	46973	57.0	35492	43.0	0.11	674
2010	84108	47925	57.0	36182	43.0	0.11	660
2011	85898	48062	57.0	36936	43.0	0.11	646
2012	87813	50052	57.0	37761	43.0	0.11	632
2013	89807	51168	57.0	38640	43.0	0.11	618
2014	91813	52270	56.9	39543	43.1	0.10	605
2015	93778	53327	56.8	40451	43.1	0.10	592
2016	95689	54330	56.8	41359	43.2	0.10	579
R*	1.9%	1.8%		1.9%		- 1.5%	-1.8%

R* =Annual rate of growth
Source: Collected and computed from FAOSTAT

The main winter crops are wheat, "berseem" (Egyptian clover), and broad beans. Among the summer crops, maize and rice are dominant. Vegetable crops such as tomato, potato, cucumber, melons and others are cultivated in the three seasons. The makeup of the crop production is presented in Table 2. About 49 per cent of the cropped area is used for cereals with wheat representing 18 percent, maize 14 percent, and rice 11 percent. Green fodders area constitutes 14 percent. Together, cereals and green fodders represent two-thirds of the total cropped area. Wheat and berseem (Egyptian clover) are the major winter crops, while cotton, rice, and maize, are the main summer crops. Fruits and vegetables together constitute about 24.3 percent of the total cropped area. All other crops including sugar, oilseeds, legumes and others represent 12.5 percent of cropped area.

Table 2: Cropping pattern in Egypt in selected years

Crops	1990		2000		2015	
	000' fed	%	000' fed	%	000' fed	%
Cereals:	5479	45	6657	47	7671	49
-Wheat	1955	16	2463	18	3476	22.2
-Maize	1976	16	1929	14	1937	12.3
-Rice	1038	9	1570	11	1216	7.8
-Others	511	4	696	5	1042	6.7

Cotton	993	8	518	4	241	1.5
Green fodders	2457	20	2389	17	2189	14
Sugar crops	297	2	455	3	883	5.6
Legumes	394	3	388	3	96	0.6
Oilseed crops	170	1	255	2	277	1.8
Vegetables	1176	10	1723	12	2123	13.6
Fruits	867	7	1088	8	1674	10.7
Other crops	347	3	451	3	2049	3
Total cropped area	12181	100	13925	100	15637	100
Agricultural area	6917.9		7812.7		9095.7	
Cropping intensity	1.76		1.78		1.72	

Source: Ministry of Agriculture and Land Reclamation, Department of Economic Affairs.

3. Horticultural Production with Focus on F&V

One of the most significant shifts in land use in Egypt's agriculture after liberalization that was applied in the early Nineties has been the expansion of the horticultural cultivations most of which has occurred in the new lands.

Area planted with fruits and vegetables (F&V) together amounted to 3.8 ml fed (1.6 ml ha) accounting for almost 24.3 percent of the overall cropped area of 15.6 ml fed (6.55 ml ha) in 2015.However, in terms of value, the share of F&V represent 36 per cent of the value of all crops produced in agriculture as whole. The area planted with fruits expanded steadily during the last two decades and reached about 1.7 million fed (0.7 ml ha) representing 44 percent of F&V area in 2015 (Table 3). Citrus and mangoes are the two dominant fruits crops occupying nearly 50 per cent of fruits area; they were planted in more than 534,000 (224370 ha) and 281,000 fed (118070 ha), respectively. Vegetables were planted on more than 2.1 million fed (0.9 ml ha) representing 56 per cent of the total F&V area in 2015. Egyptian farmers cultivate a wide array of vegetables, including tomatoes, cucumbers, potatoes, eggplants, lettuce and others. However, the most prevalent crop was tomatoes which occupied more than 468,500 fed (196850 ha) in 2015.

4. Production, Consumption, Exports and Imports of Major Agricultural Commodities

Table 4 provides data on production, consumption import, export, and self- sufficiency for the major agricultural commodities, wheat, rice, maize, sugar and edible oils during the last decade. Rice is the only major food crop with an exportable surplus, but that surplus was relatively small as it ranged between 3 to –13 percent in the last ten years. The large increases in rice production were matched with equally large jumps in consumption with no significant increases in exports. Recently, the GOE has banned rice exports in order to save water. For the other commodities, they are all imported with varying self-sufficiency. Edible oil has the lowest self-sufficiency ratio as local production of that commodity satisfies only about 23 percent of the total consumption.

Table 3: Cropping structure of F&V sector, 2015

Crop	Area (000, fed)	%	%
F&V (Total)	**3797**	**100.0**	
Fruits (Total)	**1674**	**44**	**100**
Citrus	534	14	31.9
Mangoes	281	7.4	16.8
Olive	227	6	13.6
Grapes	197	5.2	11.8
Apple	83.5	2.2	5.0
Banana	79.8	2	4.8
Fig	67	1.8	4.0
Peach	66	1.7	3.9
Pomegranate	58	1.5	3.5
Guava	36	0.9	2.2
Apricot	15.8	0.4	0.9
Pear	13	0.3	0.8
Others	15.9	14.4	0.9
Vegetables(Total):	**2123**	**56**	**100**
Tomatoes	468.5	12.3	22.1
Potatoes	437.3	11.5	20.6
Pulp of Water-Melon	223	5.9	10.5
Dry Beans	115	3	5.4
Eggplant	115.8	3	5.5
Pepper	97	2.5	4.6
Water - Melon(G.1)	81.5	2	3.8
Cantaloupe	66.4	1.7	3.1
Squash	59.3	1.6	2.8
Green Beans	59.3	1.6	2.8
Cucumber	55.6	1.5	2.6
Cabbage	46	1.2	2.2
Green Peas	41.8	1	2.0
Balady Water-Melon	30	0.8	1.4
Sweet-Potatoes	28.4	0.7	1.3
Artichoke	25.5	0.7	1.2
Strawberry	22.8	0.6	1.2
Others	253.8	30	12.0

Source: Collected and computed from: The Ministry of Agriculture and Land Reclamation, Department of Economic affairs

Table 4: Consumption, production, self-sufficiency, and per capita consumption of major commodities in Egypt, 2015.

Commodity	Consumption (million MT)	Production (million MT)	SSR* (%)	PCC** (kg)
Wheat	9.61	18.4	52.2	196.0
Maize	8.06	14.9	54.1	158.8
Rice	5.47	5.3	103.2	56.5
Total cereals	23.14	38.6	60.0	411.5
Legumes	0.27	0.6	45.0	6.4
Edible oils	0.16	0.7	22.9	7.5

Sugar	0.37	3.0	79.0	32.0
Vegetables	12.99	12.3	105.6	131.1
Fruits	15.10	14.0	107.9	149.3
Milk	5.25	6.6	79.5	70.4
Red meat	0.79	1.4	56.4	14.9
Poultry	1.29	1.4	92.1	14.9
Fish	1.52	1.8	84.4	19.2

*SSR=Self-sufficiency Ratio (production as a percentage of consumption)
**PCC=Per Capita Consumption
Source: Collected and computed from: The Ministry of Agriculture and Land Reclamation, Department of Economic affairs, Food Balance Sheet

III. CHARACTERISTICS OF THE TOMATO SECTOR

1. Tomato Production

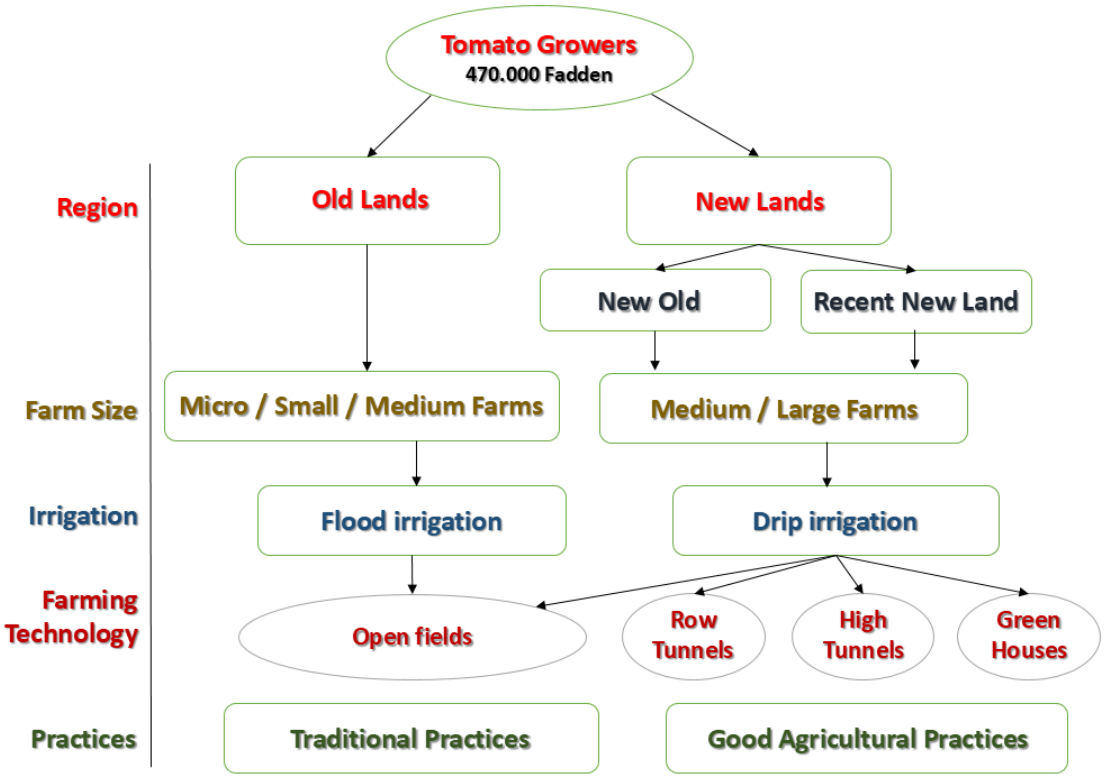
Tomato is the most geographically dispersed horticultural crop in Egypt and cultivated in all of the governorates. It is grown in all year round within three seasons, the winter, summer and "Nili" or fall season; the planting and harvesting dates of which are November – February, March –June, and July –October respectively.

Figure 1 portrays the main components of Egypt's tomato sector. As can be seen from this figure, tomato is produced in the two major geographical regions of Egyptian agriculture; the "Old Land" and the "New Land" as defined earlier. In the old land, most tomato production is achieved by small and medium- sized farms under open field conditions using flood irrigation. The "new lands" are the principal region in which winter production occurs. Different farming technologies are used in this region including open fields as well as plastic covered (either row or high tunnels), which is used extensively particularly by large investors who export tomato. In "Nubarya", which is a major tomato producing area in the "New Old Land", medium- sized farms are dominating, however, there is also number of quite large farms.

Tomato yield varies widely by region, variety, and season, technology of production, cultural practices, and type of farm. Yields under tunnel system and stalked cultivations are significantly higher. Generally, poor cultural practices are experienced by smallholder tomato producers. They do not have financial capabilities enough for optimal use of chemicals or tunnel systems. Poor transport and handling cause even more damages and more deterioration of quality. The need to produce tomatoes that withstands poor post-harvest handling practices has restricted farmers to a relatively limited number of varieties. These varieties are not acceptable in some potential export markets.

Growth in tomato production in Egypt is a combined result of growth in area cultivated in both old and new lands and yield per fed over the three seasons. During the period 2005-2016, total tomato production averaged 8.5 million MT annually and ranged between a lower limit of 7.7 million MT in 2015 and upper limit of 10.3 million MT in 2009 (Table 5 and Figure 2).Total production decreased with 0.5 percent annually. Cultivated area averaged 517 thousand fed (217 thousand ha) and ranged between 469,000 (197 thousand ha) and 600,000 fed (252 thousand ha) in 2015 and 2009 respectively. At the regional level, tomato production in the old land has been decreasing with 5.7 per cent annually during the said period, while, in the new land tomato production has been increasing with 8.3 per cent annually.

Figure 1: Components of Egypt's tomato sector.



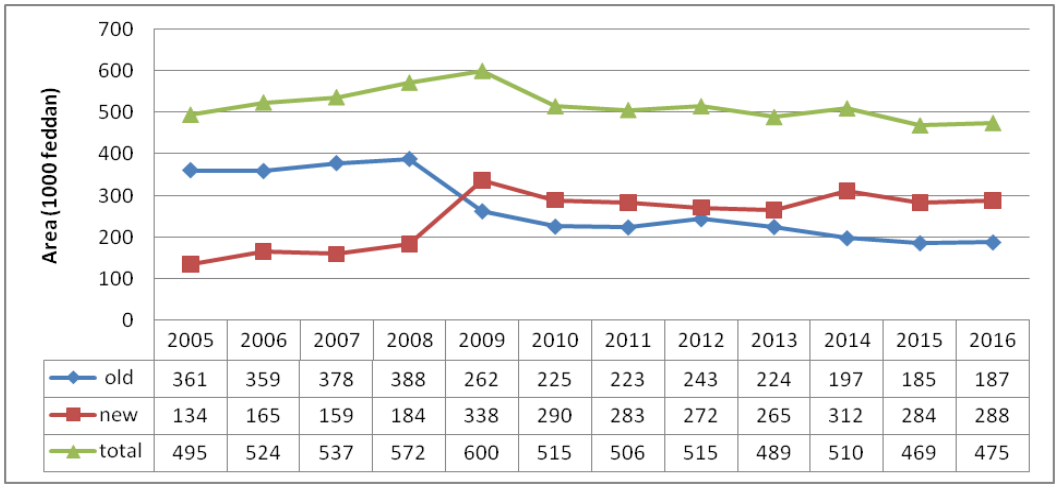
Source: Adopted by the Author.

Table 5: Tomato production by region, 2005-2016

Year	Old land			New land			Total (national)		
	Area (000,fed)	Yield (MT/fed)	Prod. (000,MT)	Area (000,fed)	Yield (MT/fed)	Prod. 000,MT	Area (000,fed)	Yield (MT/fed)	Prod. (000,MT)
2005	361	18.26	6594	134	13.38	1798	495	16.94	8391
2006	359	17.76	6381	165	13.33	2195	524	16.36	8576
2007	378	17.45	6602	159	12.82	2037	537	16.08	8639
2008	388	17.87	6932	184	12.35	2272	572	16.10	9204
2009	262	17.96	4707	338	16.51	5572	600	17.14	10279
2010	231	16.99	3932	284	16.26	4613	515	16.59	8546
2011	223	16.32	3632	283	15.61	4422	506	15.92	8054
2012	243	17.15	4165	272	16.18	4406	515	16.64	8571
2013	224	17.44	3903	265	16.48	4366	489	16.92	8269
2014	197	17.15	3385	312	15.63	4879	510	16.22	8265
2015	185	17.15	3165	284	16.07	4562	469	16.49	7727
2016	187	17.38	3254	288	16.28	4690	475	16.71	7943
Av[1].	270	17.49	4721	247	14.78	3651	517	16.52	8542
ARG	**(5.3%)**	**(0.4%)**	**(5.7%)**	**6.6%**	**1.6%**	**8.2%**	**(0.3%)**	**(0.1%)**	**(0.4%)**

Av[1]=Average
ARG =Annual rate of growth and figures between parentheses are negative
Source: Collected and computed from: Ministry of Agriculture and Land Reclamation, Department of Economic Affair

Figure 2: Tomato cultivated area by region, 2005-2016



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
old	361	359	378	388	262	225	223	243	224	197	185	187
new	134	165	159	184	338	290	283	272	265	312	284	288
total	495	524	537	572	600	515	506	515	489	510	469	475

Source: Ministry of Agriculture and Land Reclamation, Department of Economic Affairs.

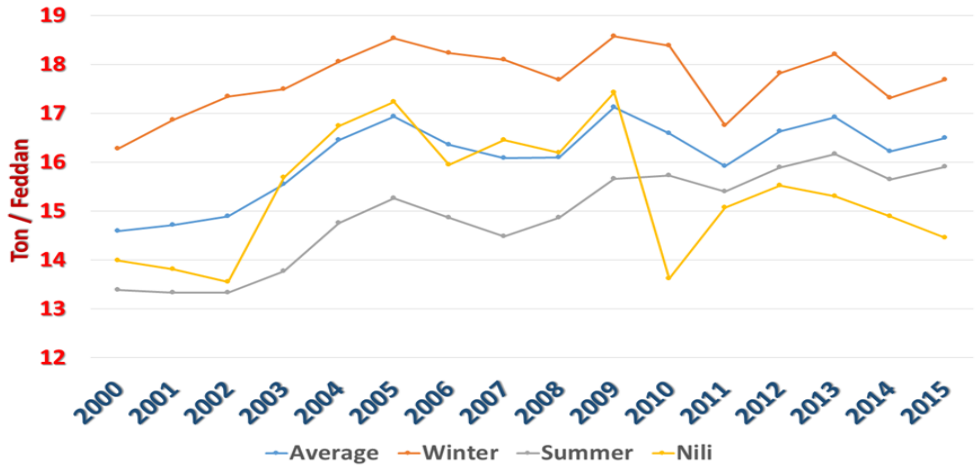
At the season level, as Table 6 shows, production of the summer season increased with higher rate (3.2 percent) compared to winter season production (1.4 percent).This is mainly attributed to the improvement in summer season yield resulting in 1.3 percent annual growth compared to only o.3 percent for winter season yield (Figure 3).

Table 6: Tomato production, cultivated area, and yield by season and growth rates between 2000 and 2015

Season	Production (000,MT)			Area (000,fed)			Yield (MT/fed)		
	2000	2015	A.G.R. %	2000	2015	A.G.R. %	2000	2015	A.G.R. %
Winter	2883	3308	1.38	177	187	1.12	16.27	17.68	0.26
Summer	2831	3851	3.17	211	242	1.85	13.39	15.91	1.29
Nili	1072	568	-3.95	77	39	-4.1	13.99	14.46	0.16
Total	6786	7727	1.53	465	468.5	0.8	14.59	16.49	0.73

Source: Computed from: Ministry of agriculture and Land Reclamation, Department of Economic Affairs, Bulletin of Agricultural Statistics, Different Issues

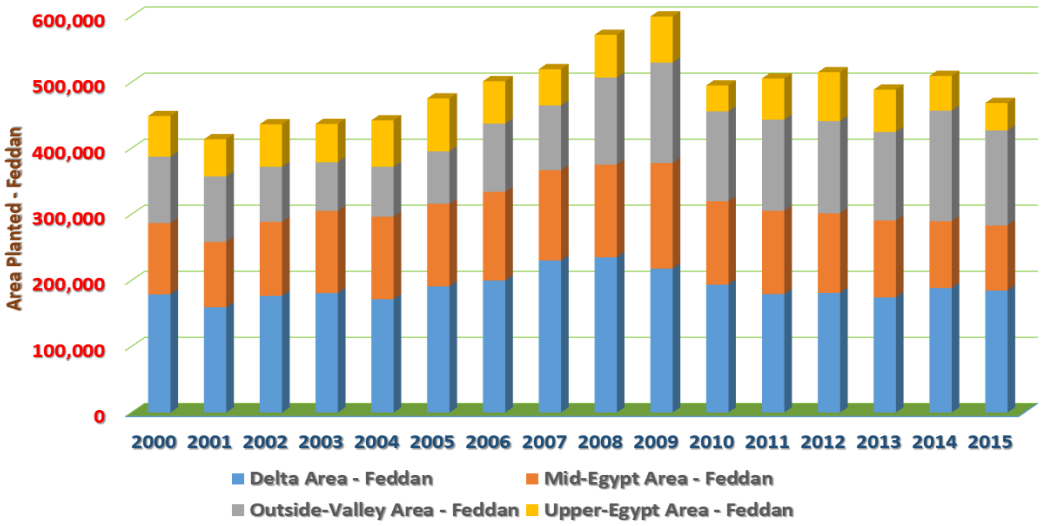
Figure 3: Tomato yield trend, by season, 2000-2015



Source: Computed from: Ministry of agriculture and Land Reclamation, Department of Economic Affairs, Bulletin of Agricultural Statistics, Different Issues.

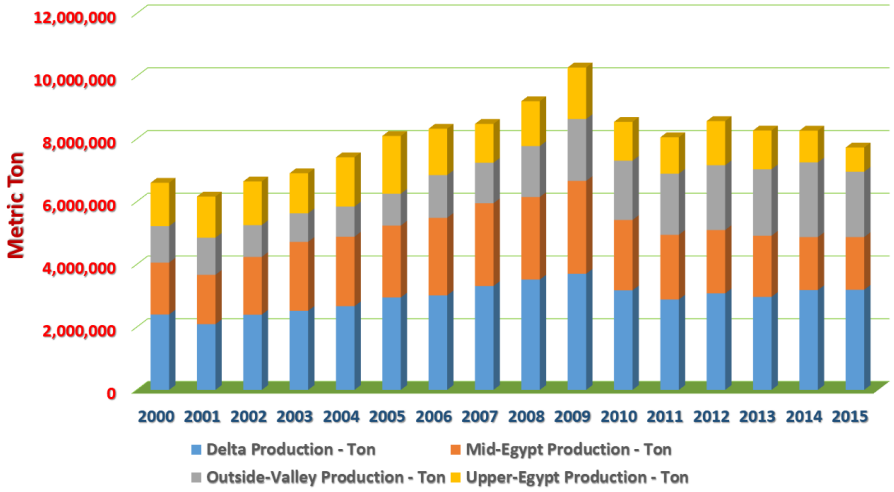
Figures 4 & 5 summarize trends of tomato cropped area and production respectively in Egypt by geographical areas. As new lands are brought into production, the amount of land devoted to production of tomatoes is also increasing. Many areas of the country are better suited than others to tomato production in terms of soil characteristics, water availability, proximity to market, etc. The determining factor in increased tomato production has been the availability of land and financial resources to develop the systems required to successfully cultivate the land. The production of tomatoes in the newer production areas has been of a higher technology than that of the traditional production areas in the "Old Land" such as the Delta. Figure 6 displays the seasonal tomato production trend (2000-2016).

Figure 4: Geographical distribution of tomato-planted area (2000-2015)



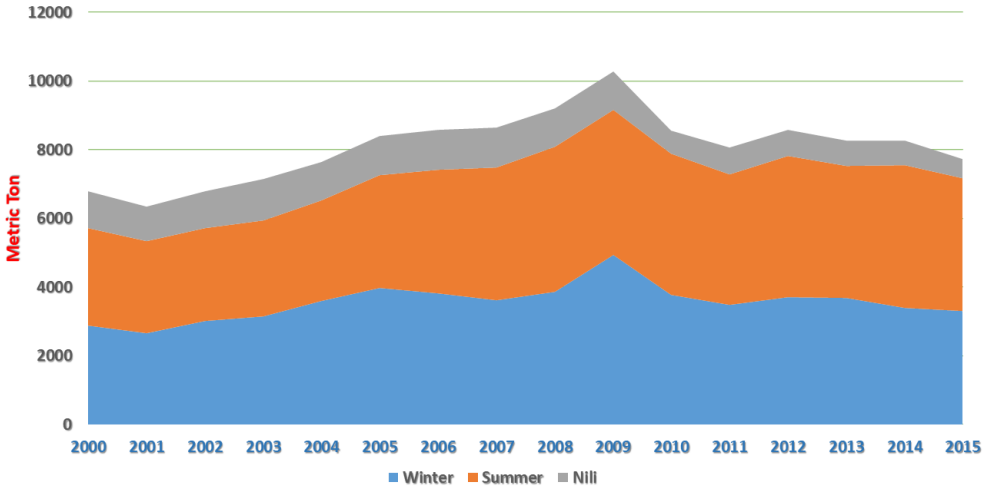
Source: Computed from: Ministry of Agriculture and Land Reclamation, Department of Economic Affairs, Bulletin of Agricultural Statistics, Different Issues

Figure 5: Geographical distribution of tomato production volume (2000-2015)



Source: Computed from: Ministry of agriculture and Land Reclamation, Department of Economic Affairs, Bulletin of Agricultural Statistics, Different Issues.

Figure 6: Seasonal tomato production trend (2000-2016)



Source: Computed from: Ministry of agriculture and Land Reclamation, Department of Economic Affairs, Bulletin of Agricultural Statistics, Different Issues.

In the global context, tomatoes are produced on all continents. Table 7 shows that India and China combined produce more than a quarter of the world tomatoes. The consumption in both countries is also very high. United States is the third largest producer of tomatoes but still imports tomatoes from Mexico as the demand for the product is high, domestically. Egypt is the 5th largest producer in the world with total production of about 8 million ton and 2.6% share in the world production. Turkey is the 4th largest producer in the world and at the same time one of the main regional competitor of Egypt in the Gulf countries market.

Table 7: The World top ten countries in tomato production in 2016

Rank	Country	Production (000,MT)
1	China	56423
2	India	18399
3	USA	13038
4	Turkey	12600
5	**Egypt**	**7943**
6	Italy	6438
7	Iran	6373
8	Spain	4672
9	Brazil	4168
10	Mexico	4047

Source: Food and Agriculture Organization (www.fao.org).

2. Tomato Processing

Tomato processing capabilities is very limited in Egypt. There is a small local industry producing sauces and there is some "cottage industry" production also. Tomato sauces are an important part of the diet of Egyptians but most consumers prepare their own sauces at home. Processing has been seen as an outlet for excess production or for tomatoes that are not acceptable in quality for the market. It is often seen as a way for growers to supplement income from their normal sales of a fresh product.
In principle, growers should plan their production and marketing strategies to supply product to: 1) domestic markets, 2) export markets, 3) a combination of these two 4) or processing.

Successful growers do not depend on sales of product outside the marketing program for which they produce for their profits. If a tomato grower cannot create sufficient income from his crop through a marketing strategy and needs to depend on selling his unmarketable product to processors, he is in the wrong business. Selling unmarketable production for processing is not a dependable and viable means of supplementing income.

Efficient production of a processing factory requires precisely programmed volumes of product of a certain, consistent quality raw materials to be delivered at a prescribed time. Therefore, processing systems are designed to operate at a pre-determined level of production.
The quality of tomatoes is critical for the processor to be able to meet and maintain his product specifications. Not all tomatoes are acceptable for processing of certain tomato products.

The costs of establishing a processing industry and developing a market are very high. It may be that the local market demand at present can support a start-up tomato processing industry, but it is unlikely. The economic feasibility for a tomato processing industry is likely to depend on development of regional markets for a client base to supplement the local sales base.

Tomato processors in Egypt are producing and marketing ketchup and a few other products and exporting very few quantities to Arab and African markets. However, they are using imported tomato concentrate rather than producing from Egyptian tomatoes. The companies determined that no high quality tomato concentrate was available in Egypt and that producing from imported concentrate was more economical than using Egyptian tomatoes.

There are 17 commercial factories that produce tomato products particularly paste and ketchup. Table 8 presents the locations as well as the actual and potential of tomato raw materials of these factories. It shows that 9 factories are concentrated in two sites; October City and Borg El-Arab City with 50 percent of the total daily capacity which amounts to 6300 MT of tomato raw materials. The total potential capacity for the 17 factories is 8050 MT a day, indicating that about 22 percent of the potential capacity is idle. With a number of 50 working days in average per year, the total annual capacity of tomato raw materials is estimated at nearly 300 thousand MT.

Extra-regional markets are very difficult to penetrate. With tomato products, taste preferences and the dominance of established brands are difficult factors to overcome. One way to enter the processing industry is to develop a joint-venture or encourage a manufacturer to locate in Egypt.
The ability of Egyptian growers to produce high yields at relatively low costs with production that can be extended over a 90-day period, as opposed to 50 days currently, makes the possibility for processing very promising. All production will be programmed as to volumes, timing and quality.

Table 8: Factories of tomato products, locations, actual and potential capacity

Name	Location	Region	Actual MT/day	Potential MT/day	Actual/Potential (%)
Heinz	October City	New land	550	600	91.7
Dohler	October City	New land	250	500	50.0
Almarwa	October City	New land	150	200	75.0
PG	Sadat City	New land	600	800	75.0
Al Ein	Sadat City	New land	600	800	75.0
Pedico Australia	Borg ElArab City	New land	200	600	33.3
Farag Allah	Borg Elarab City	New land	500	700	71.4
El Naggar	Borg El Arab City	New land	300	500	60.0
Tama Gut	Borg El Arab City	New land	150	250	75.0
Qaha	Qaha	Old land	300	700	42.9
Fedico	Esmaelya	Old land	150	200	75.0
MasrItalya	Damiatta	Old land	50	300	16,7
Almerghany	Badr City	New land	250	600	41.7
Shams	WadyElmalaak	New land	300	500	60.0
Elkhebra	BeniSweif	Old land	150	200	75.0
Elseid Foods	Qena	Old land	450	500	90.0
Alwady	Qena	Old land	150	300	50.0
Total			6300	8050	78.3

Source: Unpublished data provided by the processors who participated in the workshops.

Tomatoes are a product with high acid content, and that is why it must be carefully handled in home canning to prevent the growth of bacteria. Proper closing and sealing of containers and the use of proper containers is critical to prevent illness from eating contaminated tomatoes. The need for proper containers and control of canning method prevents many farm families from canning tomatoes for future consumption.

From the perspective of relative abundance of raw material, it is evident that tomatoes would seem to be the most likely choice. However, not all varieties suitable for fresh market sale are equally suitable for processing, and vice versa.

In fact, the processors of tomato usually select or breed varieties that satisfy their particular needs in terms of traits such as: planting and harvest dates, solid content, Brix level, color after processing, processing (as opposed to field) yield, target buyer or consumer, and so on. For that reason total production is a very crude indicator of processing potential.

With respect to Egypt' position as a supplier for preserved tomato vis-à-vis regional competitors , a trade data analysis of the unit values of exports for key processed food product-groups indicate that Egypt is positioned very much as a low cost/quality supplier for preserved tomatoes. By contrast, Egypt is a high cost/quality supplier of tomato ketchup and other tomato sauces. Overall, Egypt's strategy should be to seek to maintain its quality advantage in (relatively) high unit value exports, while seeking to raise the unit values (quality) of products for which Egypt is a low cost/quality supplier (IMC,2005).

3. Tomato Exports

In spite of the large production, Egypt's exports of tomato are relatively limited. Out of the 7.9 ml MT, tomato exports are about 75 thousand MT representing 0.9 % of the total production in 2016. With this quantity of exports, Egypt occupies the 19th position among the world top twenty exporter countries (Table 9). Egypt's tomato exports increased from 26104 MT in 2000 to 62617 MT in 2016 with a growth rate of 5.6% annually over the period 2000-2016.The main destination of these exports is the Gulf countries, Saudi Arabia in particular. Figure (7) portrays the fresh tomato exports trend. In the Middle East region, Egypt exports of tomato are well below those of Morocco, Jordan, and Turkey (Tables 9 and 10).

Table 9: The World top twenty countries of tomato exports in 2016

Rank	Country	Quantity of exports (000'.MT)
1	Mexico	1535
2	Netherlands	1014
3	Spain	1004
4	Jordan	612
5	Turkey	483
6	Morocco	458
7	Belgium	235
8	France	230
9	India	228
10	USA	212
11	China	182
12	China	181
13	Canada	162
14	Iran	121
15	Italy	108
16	Lithuania	108
17	Poland	105
18	Portugal	97
19	Egypt	75
20	Guatemala	71

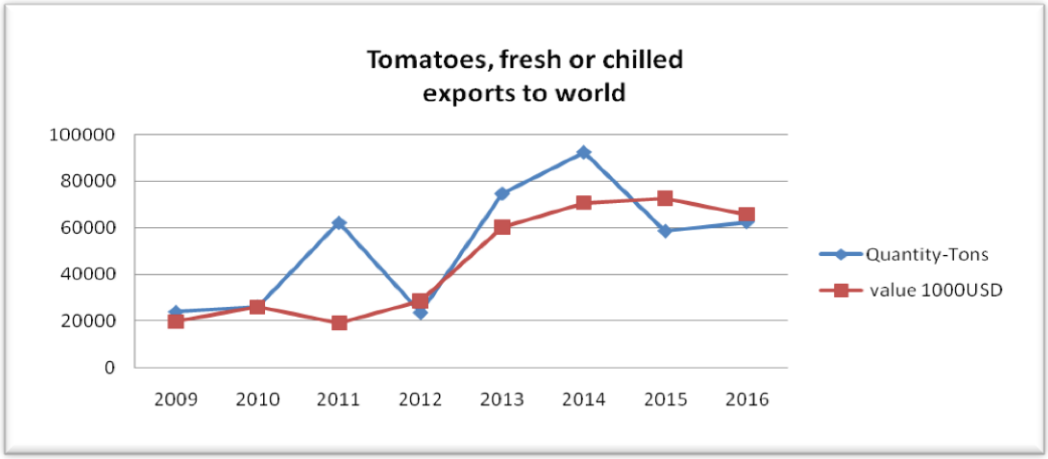
Source: Food and Agriculture Organization (www.fao.org).

Table 10: Comparison between Egypt and regional competitors

Country	Exports (ml. USD)	% to World	Rank to World
Morocco	509	6.1	4
Jordan	255	3.0	9
Turkey	240	2.9	10
Egypt	66	0.8	16

Source: Food and Agriculture Organization (www.fao.org).

Figure 7: Egypt's export trend of fresh tomato (2009-2016)



Source: www.trademap.org

Export destinations for fresh tomato

Egypt's export profile is generally concentrated not only in terms of commodities but also of markets. Egypt's tomato export profile is no exception. Generally, the Gulf countries are the largest market for the Egyptian exports of tomato with 78% share in 2016. As Tables 11, 12 and Figure 8 show, the Saudi Arabia was the most important destination for Egypt's exports of tomato with 54% share. Other importers include Turkey and Russia with shares of 8.6% and 4 %respectively in 2016. Saudi Arabia monthly imports records of fresh tomato as presented in Table 13 show that share of Egypt's exports in Saudi imports is relatively significant with respect to certain months. Egypt's fresh tomato represent more than 90 percent of Saudi imports in the months of June-September 2016.On the other hand, comparison of market composition Egypt's exports of fresh tomato during the last seven years indicates completely different composition. In 2010, the largest importer of Egypt's tomato was Syria with 61% share, while the Gulf countries imported only 12.7% of the total exports. Among the EU countries, Holland imported about 3000 MT representing 11.4% of the total in 2010, but imported only 775 MT representing 1.2 % in 2016. In this respect, Egypt's tomato exports declined to respond positively to relaxing time window offered them by the EU .In the EU-Egypt Preferences agreement that continued from 1977-2004 offered provided the Egyptian exports of fresh tomato unlimited quantity with zero tariff window in a two month period between February 1 to March 31.This window has been extended to four months from November 1 to March 31 in the context of the EU-Egypt Partnership Agreement signed in 2004.Once again, the window has been extended to

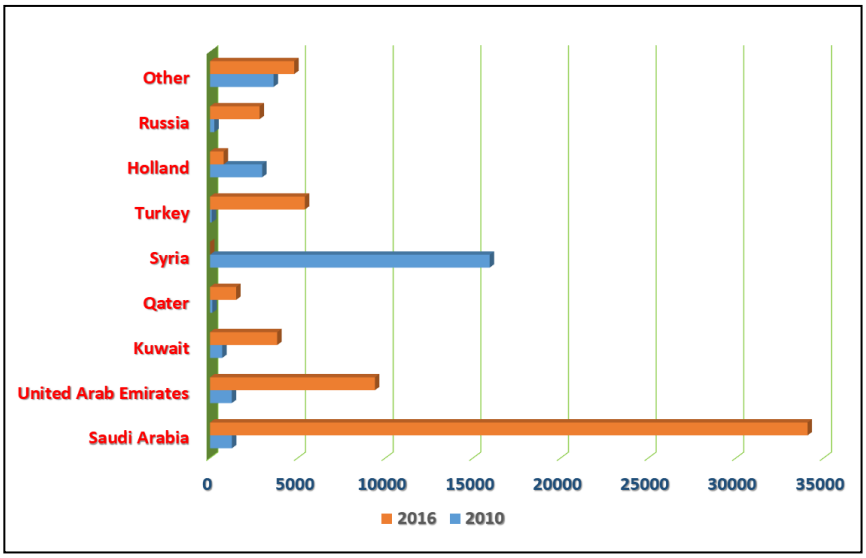
eight months starting from November 1 and ends on June 30 the within the New Partnership Agreement (Table 14).

Table 11: Export destinations for Egypt's fresh tomato exports

Country	2010		2016	
	Total (MT)	(%)	Total (MT)	(%)
Saudi Arabia	1247	4.78	34082	54.43
UA Emirates	1240	4.75	9404	15.02
Kuwait	694	2.66	3831	6.12
Qatar	129	0.49	1490	2.38
Syria	15952	61.11	0	0.00
Turkey	92	0.35	5409	8.64
Holland	2973	11.39	775	1.24
Russia	245	0.94	2824	4.51
Others	3624	13.88	4802	7.67
Total World	26104	100	62617	100

Source: www.trademap.org.

Figure 8: Exports of fresh tomato according to importing countries in 2010, 2016



Source: www.trademap.org

Table 12: Monthly fresh tomato exports from Egypt to the Gulf Countries and the EU in 2016

Region/ month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gulf	12203	2887	1412	79	795	9613	3640	7516	2248	1573	6504	24540
%	77.98	69.61	33.87	10.33	78.41	98.41	95.59	96.07	95.89	91.69	89.73	80.51
EU	551	403	26	4	0	0	0	108	0	0	418	1518
%	3.52	9.71	0.62	0.58	0.01	0.00	0.00	1.38	0.00	0.02	5.77	4.98
Other	2895	858	2731	679	219	155	168	199	96	142	326	4425
Total	15649	4148	4168	762	1014	9768	3808	7823	2344	1716	7248	30483

Source: Compiled and computed from COMTRADE

Table 13: Monthly exports of fresh tomato from Egypt to Saudi Arabia and share in the Saudi market, 2016

Item / month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Quantity (MT)	7326	2500	1385	52	728	8907	3576	7433	2234	1399	1638	6013
Share (%)	46.81	60.27	33.24	6.81	71.74	91.18	93.91	95.01	95.30	81.53	22.60	19.72
Value (1000$)	5376	2114	1220	36	584	7068	2566	5160	1694	1246	1438	5038
Unit value($)	733.9	845.5	880.4	689.5	802.8	793.5	717.5	694.2	758.1	890.9	877.7	837.8

Source: Compiled and computed from COMTRADE.

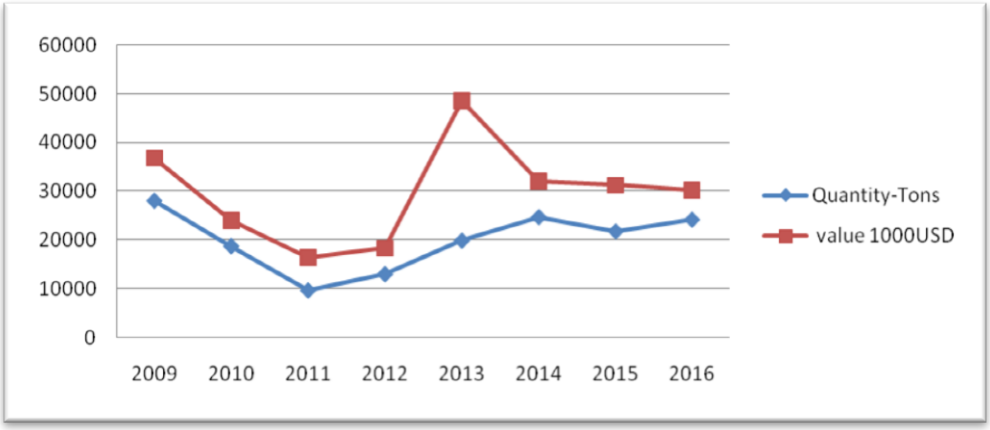
Table 14: Agricultural offers to Egypt, preferences in 1977-2004 and Partnership Agreement for fresh tomato

Agreement	Quantity	Duty	Calendar		O.Q.*
			From	To	
Preferences, 1977-2004	unlimited	0%	1/2	31/3	0%+34.70E CU
Partnership Agreement as of May, 2004	unlimited	0%	1/11	31/3	0%+34.70E CU
Partnership Agreement as of 2010	unlimited	0%	1/11	30/6	0%+34.70E CU

*O.Q = over quota
Source: EU-Egypt Partnership Agreement

With respect to Egypt's exports of tomato processed products, Figure 9 portrays the trend of quantity and value of exports of ketchup and other products in the period 2009-2016.Table 15 and Figure 10 show Egypt's exports of tomato products according to importing countries in 2010 and 2016**.**

Figure 9: Egypt export trend of tomato ketchup and other sauces



Source: www.trademap.org

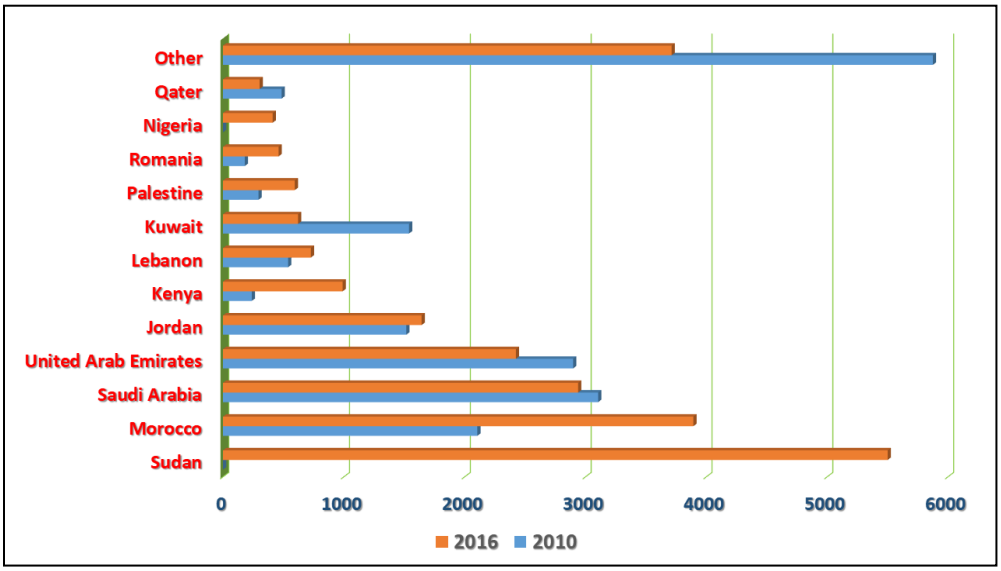
Table 15: Export destinations for tomato ketchup and other sauces

Country	2010		2016	
	(MT)	(%)	(MT)	(%)
Sudan	0	0.00	5501	22.71
Morocco	2105	11.21	3893	16.07
Saudi Arabia	3105	16.54	2939	12.13
UA Emirates	2898	15.43	2424	10.01
Jordan	1517	8.08	1644	6.79

Kenya	238	1.27	990	4.09
Lebanon	539	2.87	727	3.00
Kuwait	1540	8.20	621	2.56
Palestine	294	1.57	594	2.45
Romania	180	0.96	460	1.90
Nigeria	0	0.00	411	1.70
Qatar	485	2.58	303	1.25
Other	5875	31.29	3713	15.33
Total	18776	100	24220	100

Source: www.trademap.org

Figure 10: Egypt's exports of tomato products according to importing countries in 2010 and 2016

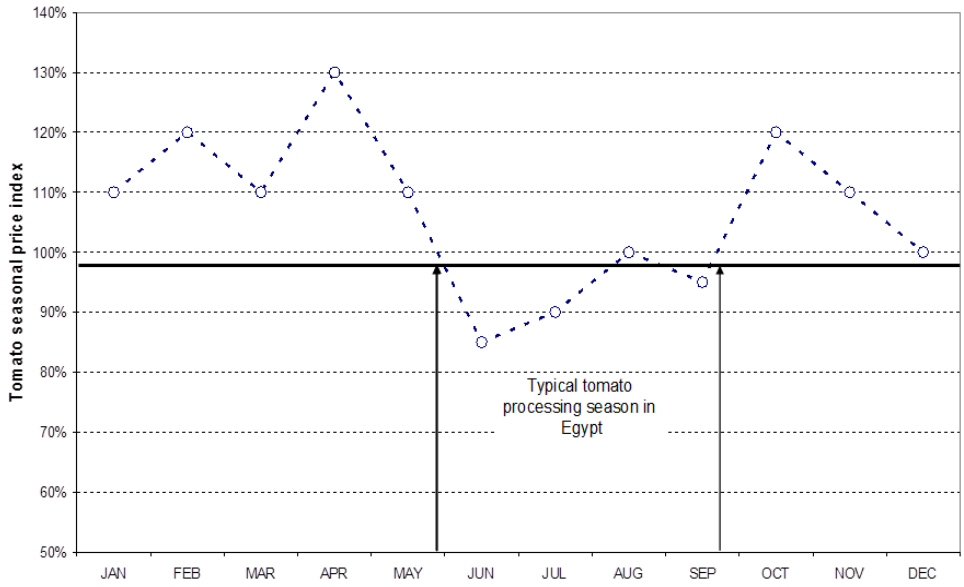


Source:www.trademap.org

4. Tomato Prices

Tomato market is characterized, generally, by two periods of low supply; in the two months of April and October. The first low supply period, i.e. in April, is due to the low temperatures in January- February which retard production. The second is due to the high temperatures that occur in July-August when the plants are setting fruit. Tomato fruit setting is best at a night-time temperature in the range of 15°C to 20°C, which is frequently exceeded in summer months. Also, pollen is physically damaged by high day-time temperatures, resulting in reduced fruit set. Figure 11 summarizes the monthly price index indicating two peaks of tomato prices in April and October matching the lowest flow of supply. The prices in the period of May-September are generally lower than the average price.

Figure 11: Monthly index for tomato prices



Source: Adopted from : USAID.2014. Agribusiness Linkages Global Development Alliance, Developing Egypt's Agribusiness Industry, Final Report, Cooperative Agreement No. 263-A-00-08-00013-00, Submitted February 23.

IV. IV.THE TOMATO VALUE CHAIN ANALYSIS

In this section, the current value chain in Egypt is analyzed. Analysis focuses both on the activities carried out in each stage and actors along the chain. Tomato losses being a major problem in the current chain will be addressed. Governance relationships will be examined systematically in each stage, so as to provide a better understanding of the different position each group of actors occupy along the chain and to examine the impact of their participation in the value chain on their margins and the degree of control over their activities. Also discussed are the marketing channels involved in the tomato value chain as well as experience Egypt has with respect to application of TVC.

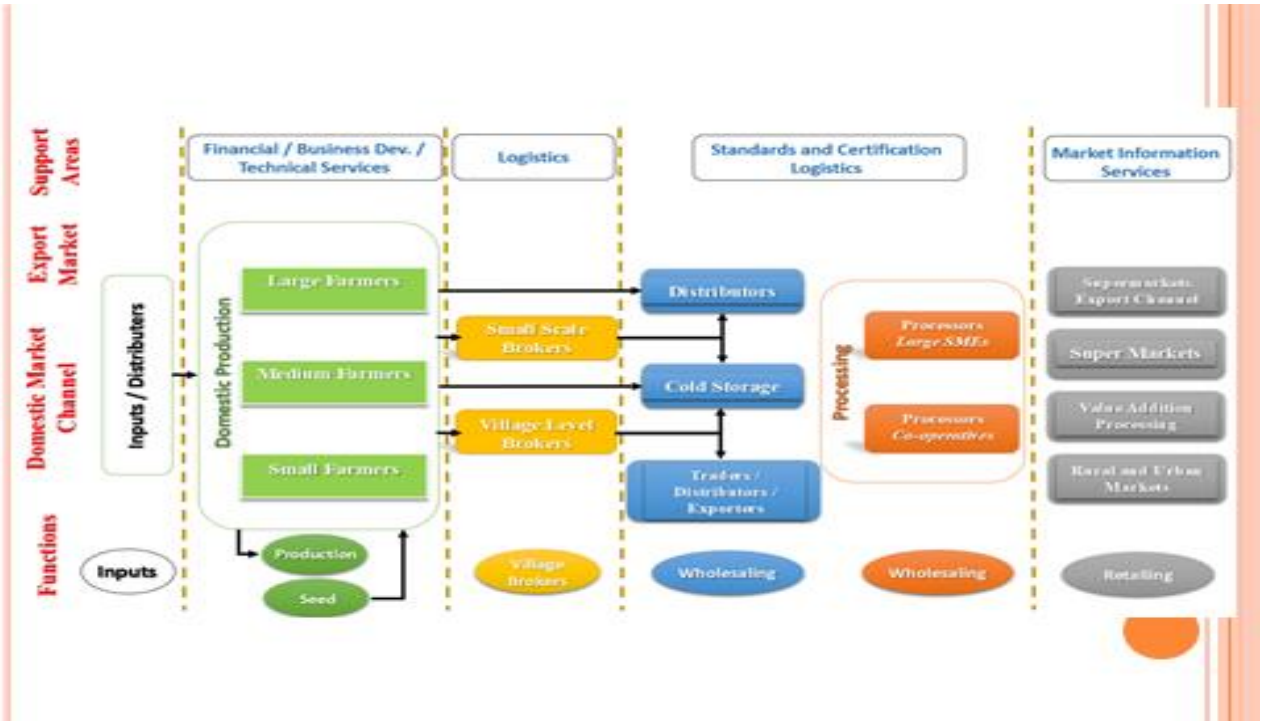
1. Tomato Value Chain Map

The tomato value chain (TVC) map for Egypt is portrayed in Figure 12. Five stages are identified for the chain: 1) Input supply **(**pre-production)**:** this stage includes the production and distribution of material inputs such as pesticides, fertilizers, seeds and seedlings utilized in the primary production, 2) Farm production**:** this stage concerned with primary tomato production and ends with the sale of the produce at the farm gate, 3) Post-harvesting: this stage includes operations of grading, packing (some done by PHCs) and transportation, 4) Processing**:** this stage involves the transformation of tomato as raw material into one or more of tomato products, 5) Distribution and marketing: the logistics concerned with the delivery of marketed tomato and tomato products to their final market destination.

In the context of the current TVC, traditional tomatoes are grown primarily for the domestic market, difficult to differentiate as value-added products, and normally sold as bulk. According to the most recent published data, total production of tomato amounts to 7,727,000 MT (2015), more than 90 per cent of which are produced by small and medium farmers. They sell their tomato produce after harvest to local traders and wholesalers. After leaving the farm the products are sold into local markets and into the four major wholesale markets serving the major cities[1)]. From the major wholesale markets they make their way to retail markets and vendors in the major cities and throughout the country through various levels of wholesalers. Exporters and large tomato processors purchase their requirements directly from farmers through contract growing arrangements or at harvest, or through independent buyers.

([1]) These four principal wholesale markets are: Obbour (in Cairo), Alexandria, Mansoura and Assyout.

Figure 12: A Map for Egypt's current tomato value chain



Source: Adopted by the Author from: UNDP, 2011.Baseline Investigation of Horticulture Value Chain in Upper Egypt, Final Report.

Tomato losses, according to the most accurate estimations, are as high as 2.7 ml MT annually (this will be discussed below in detail). The rest of the total production, *i.e.* 5 ml MT is distributed for three purposes; domestic fresh consumption, processing, and exports. An amount of 4.6 ml MT or 60 percent of the total production is directed to end consumers through different marketing channels. The remaining 400 thousand MT part of which is directed to processing factories as raw materials (300 thousand MT) while the other part, i.e. 100 thousand tons, is exported fresh to international markets

2. Value Chain Actors and Their Functions

The actors operating the chain activities are: growers, traders, wholesalers, purveyors, processors, retailers, exporters, input and service providers, sector support service providers. Below is discussion of characteristics and functions of these actors

a. Growers

There are over 150,000 tomato growers all over Egypt including small farmers. Producers can be characterized by five types: Small farmers, medium farmers, large farmers, corporate farmers, cooperatives and farmer Associations.
Smallholder farms (1-3 fed or 0.4-1.3 ha) produce approximately 90 per cent of tomato for the domestic market; medium-sized farms (3-5 fed or 1.3-2.1 ha) produce around 7 per cent, and large farms (5 fed or larger) account for 3 per cent of production. The

tomato supplied to the domestic market by large farms and some medium-sized farms are mainly export rejects or excess production for export (IFAD).

The majority of farmers market their produce either as standing crop (Kelala) or at the farm gate following harvest. The majority of small and medium size growers directly market their produce at the wholesale markets. Some large growers engage in direct bulk supply to downstream industries, traders and exporters. There are also few farmer cooperatives engaged into formal contract farming for various companies, including seed companies.
The activities involved in tomato production are uniform across regions (IFAD), as follows:

- Basic land preparation is carried out using tractors, and the remaining activities are carried out manually or using equipment drawn by animals.
- Seedlings are produced by smallholders or purchased through small nursery businesses.
- Planting and seeding are carried out manually.
- Irrigation is surface-based, mainly furrow irrigation
- Fertilizer-use efficiency under irrigation conditions is close to optimal among the majority of farmers; most smallholders use both mineral and organic fertilizers.
- Pest and disease control is practiced on tomato crop. While this should be accomplished in a balanced and environmentally responsible manner; most farmers are not aware of the harmful effects of chemicals. Weeding is carried out manually.
- Pre-harvest, harvest and on-farm post-harvest handling is rudimentary, and the room for improvement is considerable. Tomato crop is purchased on the root by traders and are harvested by traders. On-farm post-harvest handling consists basically of picking the crop and placing it directly into recycled bags (nylon or gunny bags) or in crates (made of palm wood). This method is not hygienic and creates ideal conditions for microbes to thrive. The shelf life of the produce is thereby reduced and the losses are enormous.

With respect to grower' share, smallholders receive the lowest profit margins in the value chain. This is due to high production costs, augmented by high input costs, poor yields, post-harvest losses, and a lack of economies of scale**.** The fragmented nature of production and poor organization at the farmer level means that bargaining power is reduced and primary traders are able to successfully purchase at lower prices. Primary traders have low overhead costs and thus make substantial profit**.** Secondary and tertiary traders suffer higher overhead costs and greater competition and consequentially see lower profits**.** Retailers, especially at the higher end of the market do grade produce to receive optimum prices and improve their profit margins significantly.

b. Traders

Traders play the most important role in the marketing of tomatoes in Egypt including the provision of credit to the farmers for crop production. This layer of the actors includes the Contractors. These operatives tend to purchase standing crops in advance or at harvest time for on- ward sale to commission agents or wholesale dealers. Contractors directly finance transactions from their own resources or from credit proceeds obtained from formal mechanisms or from informal credit supplied by commission agents.

Village traders and brokers operate at the early stages of the marketing chain. They act as collectors of small quantities of tomato produce at the village level and take the collected produce to wholesale markets or sell it to commission agents. The brokers almost always purchase produce directly from farmers. Their major contribution is to consolidate produce

from individual growers into large lots and transport them to the primary markets and to higher levels in the value chain.

Traders within a particular area operate as a cartel. They create an oligopolistic situation that enables them to set market prices for tomato produce. The total price mark-ups of traders amount to 32.8, 38 and 48.4 per cent for the three marketing levels (village, governorate and metropolitan), respectively, of which 16.5 per cent is profit. The profit margin is considered high particularly in light of the short duration of the investment: at most, three or four days depending on the marketing level. The transport margin is 30-50 per cent higher in Egypt relative to countries. The cost of packaging materials is relatively low because crates and bags are used several times before they become worn and are replaced.

c. Wholesalers

Supply/demand of tomato is reflected directly on the wholesale in domestic market. Whether traders get rid of the produce or sell it in a very low price to factories, farmers pay for it and traders also suffer from lower *commission* (it is always 7% if the production was sold for the farmer's favor).The principal function of wholesalers is to collect tomato produce from other dealers and distribute it to the end users in the marketing system. They purchase in bulk and directly supply processing factories, mills, traders and exporters. Wholesalers often work for traders and factories as agents. Wholesalers purchase in bulk and supply against contracts with different sources including, agribusinesses, traders and sub-wholesalers and retailers.

Sub-wholesalers are middlemen who sell to their parent markets or within the vicinity of these markets. These operatives usually purchase in small bulk from auction lots, purchased by wholesalers for onward resale to retailers. Primarily they target small retailers or individuals whose demands do not justify them to buy in bigger volumes in auction. It is also referred to a dealer who buys the products and sells on the floor of the wholesale market.

The mark-ups for wholesalers are 66.6, 81.0 and 110.0 per cent, respectively, for each of the three marketing levels; village, governorate and metropolitan. Losses at the three marketing levels represent 12, 18 and 30 per cent, respectively The 17.5 per cent profit margin (before paying rents on wholesale markets) is high considering that hardly any value has been added to the produce (4.3 per cent in sorting) and that wholesaler capital is only invested in the produce for a few days. This indicates that there is an oligopolistic collusion among wholesalers similar to the one found at the level of traders.

d. Purveyors

Purveyors buy from wholesale markets and supplying retailers and government institutions. For large supermarket chains and the hypermarkets, the produce is sorted and packed in cartons, trays with cellophane, or plastic bags. The average waste for the purveyor is 7.7 per cent; for packaging, the cost share is 17.0 and 27.3 per cent, respectively, for the governorate and metropolitan levels. Although purveyors add value to the produce by sorting and packaging, the actual profit – 5 per cent at the governorate level and 10 per cent at the metropolitan level is high.

e. Processors

Value addition includes on-farm harvesting, cleaning, grading and packing. Processing includes ketchup, paste, puree, drying, juice and canning. There are fewer than fifty medium or large value addition facilities available in Egypt for tomatoes. Most of these include tomato ketchup and few tomato paste facilities.

f. Retailers

Retailers make direct purchases at the wholesale markets. At the end of the marketing chain, the retailer buys from wholesalers and sub-divides produce lots into smaller quantities which are commensurate with consumer demand. Some retailers, particularly large shop keepers, procure from open auctions for subsequent resale to smaller retail players. Retailers usually buy from wholesalers on credit. Repayment is required within 1-3 days as the retail stock in liquidated. Retail markets include pushcart vendors, small retail and corner convenience stores, medium size retailers, supermarkets, hotels and restaurants.

Analyzing the tomato retail prices, a study by IFAD found that with an average retail price has been used for all retailers; however, prices at hypermarkets and large supermarket chains are around 10 per cent less than the prices at street stalls. It is estimated that modern retailers account for about 6 per cent of total tomato sales in the metropolitan area, amounting to around 60,000 tons annually (120 kilograms of tomatoes per day for each of the modern retail outlets) The Metro, Carrefour and Alfa supermarket chains have all expressed interest in dealing more directly with farmer associations and cooperatives. This represents an excellent opportunity for smallholders to become suppliers, if they are properly organized. In response to changes in consumer demand for higher quality products with a longer shelf life, the supermarkets are increasingly trying to source tomato delivered through cold chains.

g. Exporters

Tomato exporters include small, medium and large exporters, exporter groups and multinational supermarkets operating in Egypt. In the tomato sector it was estimated that there are over 150 medium and large exporters of other fresh produce who also deal in the export of tomatoes, which indicates the institutional capacity to increase tomato exports if cost-effective production can be further developed.

h. Input service providers

There are various input and service companies and individuals working in Egypt with domestic and foreign links including seed and seedlings suppliers, importers, contract seed growers and buyers from the domestic market. These also include wholesalers, fertilizer and pesticides dealers, agricultural equipment rental providers, and those providing tractors, laser levellers, planters, harvesters and irrigation to small farmers and cooperative farmers. The following are the most prominent private and public input service providers:

Private-sector input service providers

- ***Crop Life Egypt***: Crop Life Egypt is an association consisting of importers and distributors of pesticides and agrochemicals. The objective is to achieve a transparent and fair system of pesticide registration and import licensing. The association is active in advocating for policy change. The product testing that a proper registration system requires is critical for maintaining a supply of safe and effective pesticides for Egyptian farmers.

Multinationals with large research and development budgets for new product developments have a financial interest in registration that prevents the import of low-cost, unsafe and ineffective pesticides. Import licenses of registered products are granted annually by the Ministry of Agriculture and Land Reclamation.

The main problem faced by Crop Life is the lack of transparency in the process, which often results in arbitrary volume allocations to members, government entities (the Egyptian Borsa and the formulators operated by the military), and the five largest Egyptian formulators.

- ***Egyptian Association of Traders of Seeds and Agricultural Pesticides (EATSAP):*** The Egyptian Association of Traders of Seeds and Agricultural Pesticides is a small association that offers representation for the 4,000 pesticide dealers in Egypt. The association's objective is to improve the business environment for pesticide dealers. The association participates in the certification of dealers.

- ***Egyptian Seed Association (ESA):*** The Egyptian Seed Association was established in 1998 to help achieve a more integrated and efficient seed industry by representing, protecting and serving the interests of members. Members include seed companies, plant breeders, multiplication and production companies, distributors and traders. The association has made successful efforts to facilitate, accelerate and lower the cost of vegetable seed importation and registration; guarantee the rights of plant breeders, work towards the enactment of the Seed Law of1997, and push intellectual property rights legislation through Parliament.

i. Sector support service providers

Local and international certification bodies catering to the export (sector include both private and government extension services, logistics, dry (or cold) storage providers, GAP consultation service and R&D services. Also included are Government and private sector's training services and education and capacity building Institutes.

Public-sector support service providers

Ministry of Agriculture and Land Reclamation:
The main responsibility of the Ministry of Agriculture and Land Reclamation (MALR) focuses on providing supporting services for the agricultural production in general and tomato sector in particular. The most important of these services are as follows:

(i) Agricultural Extension and advisory services: provided by the Department of Services;
(ii) Agricultural Research and Development (R&D): provided by the Agricultural Research Center in general and the Horticulture Research Institute (HRI) in particular;
(iii) Agricultural information: provided by the Economic Department
(iv) Technical inspection and licensing agricultural import and export shipments: provided by the Agricultural Quarantine.

Ministry of Supply and Home Trade (MSHT):
The functions of the MSHT that are related to the Fruits and Vegetables in general and Tomato value Chain in particular are as follows:

(i) Establishment of and supervising wholesale markets for F&V either at the central or governorate and district levels;
(ii) Managing small size retail shops called cooperatives for consumers

Ministry of Trade and Industry (MOTI):
The Ministry of Trade and Industry takes the responsibility of the following:
(i) Design and implement trade policy including agricultural trade policy;
(ii) Provide services related to registration and the Certificate of Inspection for Exports to Egypt: by General Organization for Export and Import Control (GOEIC);
(iii) Provide technical support services for the Egyptian food industries through Industrial Modernization Center (IMC);
(iv) Provide international market information and export opportunities for exporters through International Trade Point (ITP) located inside Egypt and Commercial Representatives.

Union of Producers and Exporters of Horticultural Crops (UPEHC):
The union is a semi-governmental organization, supervised by the Ministry of Agriculture and Land Reclamation. The union's objectives are to:
- develop the cultivation of horticultural crops in a scientific manner;
- increase the area under horticulture production;
- develop and increase Egypt's exports of horticultural crops; and to:
- provide marketing and technical services to its members.

Private-sector service providers:

A number of professional entities and associations have developed over the past decade. They are steadily improving their performance both in providing direct services to members (technical training, Global GAP training, management training, organic certifications, and HACCP and International Organization for Standardization 9000 and 22000) and in lobbying for better conditions. Among other results are the following: (i) the cold-storage platform at Cairo airport and at Luxor airport); (ii) changes in the regulations on imports of planting materials to allow for the use of imported planting materials in the production of export crops, thereby reducing the time needed from two years to two weeks; and (iii) removal of the import tax on second-hand refrigerated trucks. The most important professional associations are described below.

The Agricultural Export Council (AEC)
The Agricultural Export Council (AEC) is the supreme counsel or entity to the Minister of Trade and Industry for the Agriculture Sector. The Council is the official platform to raise and submit the strategic suggestions, regulatory policies including obstacles towards the development of the Sector to the Minister of Trade and Industry. Other objectives of the Council are to (i) raise awareness and competitiveness for producers and exporters and (ii) work on eliminating obstacles that hinder the agriculture export development. The council focuses on members' interests in policy decisions and advocacy with the government of Egypt with the objective to increase the Agriculture investments.

Horticultural Export Improvement Association (HEIA): The Horticultural Export Improvement Association (HEIA) is a driven industry association established to support Egyptian exporters with the objective of exporting high-quality fresh and processed horticultural products. HEIA is composed of more than 150 large growers and exporters of

fresh horticultural products and is currently expanding into processed food. Members also include input suppliers, suppliers of packaging materials, transporters, freight-forwarding companies, and cold-storage facility providers. It has a quality control unit that offers direct technical assistance to member growers and shippers, but also sells its services, at lower rates, to non-member producers who wish to sell to members.

HEIA has an active policy advocacy committee. Its newsletter highlights policy constraints, and policy issues are brought to the attention of the Minister of Foreign Trade (MOTI) during regularly scheduled monthly meetings. One noteworthy example of advocacy has involved the association's efforts to establish the perishables cold-storage terminal at Cairo airport. The association has organized the commodity councils on table grapes, strawberries, melons, mangoes, green beans, cut flowers, nurseries, organic agriculture, and food processing. It also provides technical assistance to members and non-members.

Egyptian Centre of Organic Agriculture (ECOA): The Egyptian Centre of Organic Agriculture is accredited to certification bodies in Europe and the United States. In addition to organic certification, it also provides Global GAP, Hazard Analysis and Critical Control Point (HACCP) and International Organization for Standardization certifications.

3. The Marketing Channels Involved in the Current Tomato Value Chain

a. Direct sales from grower to village consumers:

This is mainly done by small producers who sell their produce directly to local consumers. Usually, the farmer uses the village retail market where the villagers shop, however, only small quantities usually are traded through this channel. Small farmers particularly prefer this type of market to secure the immediate cash income. In this case, no intermediaries are involved, no transport costs are paid, and usually sales are at or close to retail prices.

There are no facilities at this market and produce is sold from handcarts or on the ground. In larger villages, where some local retailers exist, produce is sold to them by farmers at a lower price, but higher than the usual wholesale prices.

b. On-farm sales from growers to local traders:

These sales could be done by one or more of three ways; "Kelala", sales from grower to local trader, and "Shalayesh", as discussed in the following:

(i)***"Kelala"***:Kelala is a kind of informal forward contracting, agreed upon between tomato grower and local trader before harvest (or before planting at the beginning of the season). The trader assumes responsibility for the tomato's harvests and handles it from the field to the market. Usually this trader sells the produce to wholesale markets or to processors depending on his trade connections. Some traders provide informal credit in the form of advances to farmers. Although this informal credit involves a rather high commission (about10-40% from the sales value), it is popular for middle- sized farmers, since no written arrangements needed, What needed is only the personal oral promise of the parties involved, reflecting thus more flexibility. In this type of sale, the grower gets the lowest returns; however, it is commonly used by new farmers, or farmers who lack market knowledge, financial means and other facilities (e.g. storage, transportation). In

these cases farmer does not have any influence on price, and he just accepts what the trader offers. “Kelala” method is also used by big corporate farms (about 20% of agro-industrial farms).

(ii)**Farm-gate sales from grower to local traders**: This selling is done immediately after harvesting. This is a slightly better way if compared to the "kelala" in the sense that the farmer can obtain a better price, if more than one trader exists in the village, competing with each other. This system suits farmers whom do not have any marketing capacity or necessary facilities (storage, transportation) or substantial quantity to trade sell directly to wholesalers. These local traders often buy and move the sales to whichever of the major wholesale markets that are paying the highest price. This step used to be based on speculations, but now with the cell-phone availability it is more precise. Traders have their own transportation means and some of them have storage places. In this type of sales (as well as the "kelala" system) no product quality specifications are required. Quality plays only some role in determining the procurement (farm-gate) price.

(iii) ***“Shalayehs”&“Shawader”*:** these are informal markets on the main roads sides , in locations close to the farms and outside/nearby the wholesale markets. Producers gather their produce in these places and negotiate with the traders. Sometimes a kind of informal auction takes place to determine the price.

c. Commercial scale:

The large-size growers do have the necessary storage and handling capacity and are able to sell directly to wholesalers and make higher returns. The large grower harvests, packs and transports his produce to the market and the wholesaler acts as a commission broker. Sorting and grading facilities (as well as cooling facilities) seem to be on demand from some wholesalers, necessary to serve market requirements, especially on the part of certain clients (processors, exporters, supermarkets).

Some other channels are identified at the commercial scale and could be categorized as follows:

A Commission agent or broker/purveyor “Simsar” is used by processors, exporters, food chains, Hypermarkets, and hotels, to secure in advance (in most cases) the necessary quantity of products / raw materials necessary for their operations. It is usually based on a contract farming agreement according to which the broker provides the product specifications, sorts, grades packs and transports the products from the field to the exporter's or processor's shops. In this situation, the farmer may receive some advance finance and/or some inputs. The grower does not have any influence on the price since prices (especially in the export cases) are stated by the processor or exporter.

***Sales from large grower to processors and/or exporters*:** In this case, tomato processors and exporters make direct contracts, mainly with large farmers in order to secure the quantity and quality of produce required for their business activities. Furthermore, some large farms, who are themselves exporters, may collect produce by contract farming from neighbouring smaller farmers, to increase the volume of the quantities exported. In any of the cases described above, exact product specifications and quality, as well as price is clearly defined in the contract. Processors /exporters are in general highly involved in post-harvest handling, coordinating sorting & grading and providing packing/packaging and refrigerated transport. Larger exporters, mainly, provide advice and some extension services to contracted farmers. Often, farmers receive advance payments from processors /

buyers when a contract is signed. Some also may receive some inputs. This is an informal form of credit that small-medium size farmers receive and sure it has an impact to the cost of farmer on the agreed purchase price. In addition, the lack of market information leaves the farmer in a weak bargaining position, when negotiating his contract agreement with the other party.

Small and medium-sized producers' **associations/*groups*** in some cases; either hey deliver their produce to a wholesaler, processor, exporter, or to the local (village) or deliver it to district level cooperatives. Local cooperatives operate in most of the cases as local handlers (some of them are also involved in processing activities), whereas district and special purpose cooperatives (e.g. marketing cooperatives) may act as wholesalers supplying the food processing industry and/or be engaged in export activities either by having contract agreements with export companies and organizations. In several cases cooperatives may provide producers with better purchase prices as compared to local traders, however due to the fact that the financial position of cooperatives is weak they cannot provide farmers with any kind of advance credit or inputs.

Domestic market structure

Tomato produce can be found in all markets throughout the country. The market structure may be divided into the geographical hierarchy shown in Table 16.

Table 16: Tomato domestic market structure

Geographical hierarchy	Actor
Villages	Traders, transporters
	Village markets, wholesalers
	Small home stalls
	Street stalls
Governorate towns and cities	Traders, transporters
	Wholesale markets
	Purveyors, transporters
	Street stalls
	Small grocery stores
	Modern grocery stores
	Supermarket chains
Metropolitan	Traders, transporters
	Wholesale markets
	Street stalls
	Purveyors, transporters
	Small grocery stores
	Modern grocery convenience stores
	Supermarket chains
	Hyper markets

Source: Compiled by the Author.

4. Governance Relationships between Actors

a. Growers and agro-input suppliers

In the input markets, there is little number of suppliers in the supply side facing large number of growers in the demand side. Thus, the competition among input suppliers is limited, leaving smallholders with little choice regarding the range of inputs and prices. The small quantities of inputs purchased by individual smallholders are insufficient to allow the smallholders to bargain for better prices or make purchases directly from wholesalers. Unless the growers are organized and represented by an association, the way is opened for retailers of input to coordinate and control the relationship between the two parties.

b. Growers and traders

The traditional fresh tomato value chain is rather simple and quality requirements on traditional markets are also low. With this, traders and wholesalers have little incentive to establish specific relationships with smallholders who, in many cases, rely on traders as the main source of market information, and financial support (UNDP, 2011).

This situation leaves most smallholders at the mercy of the wholesalers, since wholesalers alone determine whether and when they buy, how much they will purchase and at what price, particularly if the produce of smallholders is tied up in credit. If a smallholder rejects an offer, this involves the risk of not selling anything if no other trader appears. With such oligopolistic collusion among traders, it may be concluded that the governance of the relationship is coordinated and controlled by traders.

c. Growers and exporters

Farmers' problem with exportation is that they have to send their production to the collection centers, which takes only the first grade (15-20% of the product). They have to find another way for selling the rest in this long process and vulnerable product.

d. Growers and retailers

In some cases, supermarkets or hypermarkets, as modern retailers, have a strong relationship with growers, particularly large ones for sourcing tomato produce and having the advantage of securing continuous supplies all over the year. However, agreeing on the crop specifications (quality) and price remains the main problem in dealing with growers/traders/retailers (UNDP, 2011).

e. Traders, purveyors and wholesalers

Governance among traders, purveyors and wholesalers is coordinated and controlled by the wholesalers.

f. Purveyor and retailers

The governance relationship between purveyors and retailers is market coordinated. However, the control over the relationship the two parties depends on the retailer sophistication, that is, in the case of non-modern retailers; the control is in the hands of the purveyors and in the case of modern retailers, the control is more balanced because modern retailers possess the knowledge and the capacity to buy directly from wholesale markets.

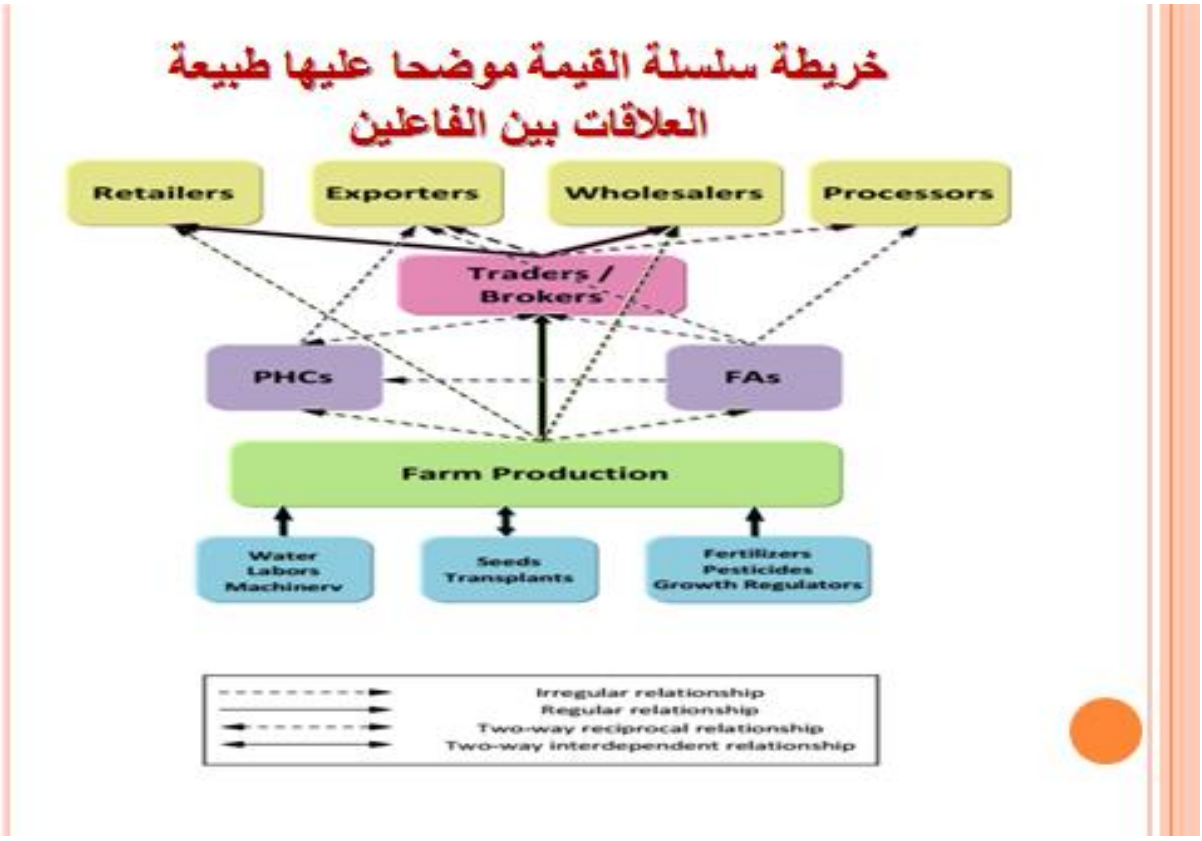
Table 17 and Figure 13 identify the types of relationships that are dominant among actors along the chain as discussed above. In the map, the activities are listed vertically, starting with suppliers of agriculture inputs and material at the bottom and ending with final consumers at the top.

Table 17: Types of relationships between actors of tomato value chain

From/to	FAs	PHC	Trader	Wholesaler	Processor	Exporter	Retailer
Farmer	. 1	1	2	1			1
FA		1	1			1	1
PHCs			3			1	
Trader				2	1	1	2

1= Irregular relationship
2=Regular relationship
3=Two-way reciprocal relationship
4=Two-way interdependent relationship
Source: UNDP, 2011. Baseline Investigation of Horticulture Value Chain in Upper Egypt, Final Report

Figure 13: Relationships between actors of the tomato value chain



Source: UNDP, 2011. Baseline Investigation of Horticulture Value Chain in Upper Egypt, Final Report

5. Previous Experience in Tomato and Horticultural Value Chains

a. The Agribusiness Linkages Global Development Alliance (GDA) project:

This project is funded by USAID launched on March 6, 2008 and ended June 30, 2013. The GDA had a significant and sustainable impact on Egypt's tomato value chain, not the least of which was changing attitudes and habits of farmers and other key actors. Over the project period, 6,284 farmers were trained in good agricultural practices (GAP) and 1,462 women were trained in responsible use of pesticides and first aid for rural communities. A total of 7,746 individuals were trained.

The project has the following objectives:
Objective 1: Smallholder production of processing varietals of tomatoes increased to 2000 tons per day by Year 3 and 3000 tons per day by Year 5.With this achievement, the GDA demonstrated that suitable varieties of tomatoes can be made available to the processing sector for at least 250 days annually, compared to the pre-project processing season of 90–100 days. In addition, production reached more than 4,700 MT of processing and dual-purpose tomatoes per day during the last year of the project.

Objective 2: Annual per capita incomes from tomatoes increased by an average of USD 921 (per fed) for 3000 participating farmers cultivating 10,000 fed by Year 5 (a total net return of $1091 per fed of tomatoes).As a result, the total net return per fed of tomatoes increased from the pre-project baseline of USD 170 (2007) to USD 3,007 during the winter 2011/12 season and USD 1,189 during the summer 2012 season (the large difference is attributed to the wide divergence in tomato prices between the two seasons).

Prior to the Agribusiness Linkages GDA project, Egypt's processed tomato sector suffered from critical structural weaknesses that inhibited growth and restricted Egyptian processors to local and regional markets. In fact, Egypt was a net importer of tomato paste, despite the fact that it is the 5th largest producer of tomatoes worldwide. Through a value chain approach, the GDA project overhauled Egypt's processing tomato industry. At every link in the value chain, ACDI / VOCA applied carefully designed interventions to overcome structural weaknesses and strengthen local actors (USAID, 2014).

b. Agricultural Exports and Rural Incomes Project

This is a four-year USD 57.3 million project funded by USAID and launched in 2003 .The overall goal of the project is to increase on-farm and agribusiness jobs that will raise rural household incomes. Increased rural incomes will be accomplished by strengthening the competitiveness of Egypt's horticulture and livestock sectors in the global economy by expanding the access of farmers and agribusiness firms to knowledge, technology, markets, and institutions that are key ingredients for success. As a part of the project, CARE Egypt is working under a grant to improve horticulture marketing in seven governorates in Upper Egypt (Aswan, BeniSuef, Fayoum, Giza, Luxor, Qena and Sohag). The goal is to enhance rural household incomes through smallholder horticulture activities. They are working with four subcontractors: University of California–Davis, the Nile Valley Group, ACDI/VOCA and Environmental Quality International.

c. The IFAD-funded West Noubaria Rural Development Project (WNRDP):

The goal is to enhance the livelihoods of the target population through increased and sustainable economic activity and greater social self-reliance. Through the project, farmer associations have been established and successfully linked to Agro food Egypt or the production of organic potatoes.

d. The Small and Medium-Sized Enterprise Promotion Programme for Fruits and Vegetable Processing in Egypt:

This is a four-year USD 7 million project funded by the German Agency for Technical Cooperation. It was launched in early 2006 to assist processers in upgrading their production methods and applying international standards, including HACCP and International Organization for Standardization 22000, thereby enabling better penetration for Egyptian processed foods on the international market. The project supplements the activities of the USAID Agricultural Exports and Rural Incomes Project and the IFAD Upper Egypt Rural Development Project.

V. V.PROBLEMS OF TOMATO VALUE CHAIN

1. Overview

In light of the above discussion concerning the structure and of the current tomato value chain and involved governance relationships between actors, it is clear that the tomato value chain is fragmented with tiered systems and weak linkages. The growers, particularly the small and medium sized, are viewed as the weakest node in the chain. The flow of grower from production areas to the end market is weak. The fragmentation of the value chain and tiered trading system means that growers are disconnected with the end market which limit their ability to acquire fair share in consumer price. As such, fragmentation in the traditional value chain creates a situation of inefficiency vicious circle which would maintain poor performance of tomato sector unless a proper intervention is implemented. The first part of the circle is the inefficiency of tomato production which lead to inefficiencies in higher parts namely processing, export, and retail sectors which in turn impact negatively on producers.

Such weak position of growers is a combined result of a number of problems and constraints. These problems include: farm fragmentation, improper cultivars, backward technologies, tremendous physical and economic losses, instable and unpredictable income for tomato crop, and very low growers share in consumer prices

With no means to access value addition or trade at higher levels of the chain, the producer remains with low returns for the product. The producer cannot move up the value chain due to a lack of supporting services that augment weak horizontal and vertical linkages.

Box 1: The current value chain inefficiencies

The current value chain includes considerable inefficiencies at its different stages. Important indications of these inefficiencies include: i) high losses which is estimated by 30-40 percent of the total production, ii) low percentage of tomato production allocated as raw materials for processing, thus low production of processed tomato products, iii) low percentage of tomato production devoted to exports, iv) inequality of actors 'shares, and iv) low level of the total value of the chain.

2. Determinants of Value Chain' Performance

In this section, analysis of the tomato value chain is done by identifying its main determinants that contribute, positively or negatively, to performance. For analytical convenience, these performance drivers can be considered under the following broad themes;

a. Access to finance

The lack of formal financial services constrains players across the value chain. Financial products for farmers and for traders, processors, and retailers are critical for more competitive and efficient chain. Finance is critical to facilitate economies of scale and to improve the quality of goods. The lack of accessible formal finance at the manufacturing

level of the chain prevents investment in value addition activities. Even with respect to informal finance, if available, it is of high risk and often leads to debt problems

b. Access to information

Access to information regarding the characteristics of the end-market is a key missing link in the value chain. Many farmers are not aware of the end market let alone what the specifications of produce may be. If the chain is to prove competitive the effective flow of information must be enabled**.**

c. Government policy

Attitude of Government policy towards the agricultural sector plays a critical role in determining the performance and efficiency of any agricultural crop value chain. Such role includes agricultural laws and legislations, regulatory frameworks, institutions, investments, rural infrastructure, public-private partnership, and support services etc.

d. Dialogue

The existence of a national level association for horticultural products is important to promote dialogue between stakeholders of horticultural value chains. The same could be said at each crop level. The national specific crop organization should assemble professionals and other chain stakeholders. A lack of dialogue at the crop prevents a sector strategy being formulated, weakens the chain coordination, and contributes to deeper fragmentation in the value chain.

e. Transport services

The nature of transport services at the domestic level has an impact on the value chain. In the same way as the trading system of the tomato value chain, transport tends to be fragmented and dominated by informal, small-scale players. These characteristics prevent efficient bulking and larger deliveries of produce to the market. Inefficient transport services is a limiting factor for the VC performance not only in terms of cost effectiveness but also in terms of negative impact on the quality, and hence end value, of produce. Quality of produce is lowered due to poor packing and protection coupled with improper uploading of the produce meaning high rates of damage occurs. Also, at the export level, slow and expensive transport routes constrain the capability to deliver fresh and high quality produce.

f. Technologies

Technologies are essential determinants of the tomato value chain performance at all its stages including production, processing and distribution. Technologies refer to the methods, processes, facilities and equipment used in chain operations as well as those used in research and development. This theme also includes consideration of technology adaptability and adoption patterns.

g. Market structure

Market structure refers to whether buyers and sellers at each stage of the value chain are concentrated or not or whether they are oligopolies or monopolies. This has a large impact on chain performance and the performance of individual firms and business operations.

h. Chain coordination

Chain coordination determines the harmonization of the physical, financial and information flows along the value chain. Good coordination will enhance value chain performance. For example, when consumer or buyer preferences are known accurately on a timely basis, this tends to enhance production and processing responses. Direct linkages to demanding consumers can often serve to improve production quality, seasonal response, product features and varieties planted. Coordination tends to occur, but is not automatic and can be improved by encouraging value chain actors to meet and coordinate.

Vertical linkages

Vertical linkages are defined as the links between at different levels of value chains, for example the producer and the trader.

There are usually vertical linkages in the value chains in terms of buying and selling relationships and the role that each actor plays. However, these links are purely market interactions and when considering non-market interactions vertical linkages are extremely weak in tomato value chain. Vertical linkages are the flow of information and services between different levels of the value chain and are crucial to improving the efficiency and competiveness of the chain.-market. Examples of poor vertical linkages include inadequate flows of market information, a lack of services distributed from higher levels of the chain, a lack of finance down the chain and a lack of mutually beneficial relationships between players. The main reason for poor vertical linkages is the lack of effective supporting services.

Horizontal linkages

Horizontal linkages are relationships between the players performing the same function in the value chain, for example the individual smallholder farmers. Strong horizontal links in a value chain, especially at lower levels, may give economies of scale, improve product quality and/or create opportunities for accessing value addition. The impact of these elements can vastly improve the livelihoods of the poor involved in the value chain, especially those at the production level.

i. Managing business operations

Managing business operations is necessary at every stage along the value chain if individual firms are to allocate resources efficiently, respond to consumer needs and adapt to market changes.

j. Inputs

Inputs directly affect performance, deeming it necessary to determine the availability and cost of inputs such as land, labor and capital at every stage in the value chain.

k. Product demand

Product demand drives the entire value chain and serves as the entry point for analysis. Value chains cannot exist if demand does not exist. Demand begins a domino-like set of communications rippling through the actors of the value chain.

3. Problems along the Chain' Stages

a. Problems in pre-production stage

Agro-inputs needed for tomato production include equipment and machinery, seeds and seedlings, chemical fertilizers, organic fertilizers, pesticides, irrigation water. Egyptian tomato producers suffer from problems related to these inputs particularly in terms of availability, accessibility and quality .The insufficiency of quality inputs, especially if coupled with poor access to them due to high prices, is a major bottleneck facing tomato producers particularly stallholders who usually suffer from limited financial capabilities. Following are detailed discussion of these problems:

Lack of access to quality seeds and seedlings

Due to lack of limited government budget allocated to the Agricultural Research center and consequently to the Horticultural Research Institute (HRI), very little efforts have been made on the improvement of tomato crop. Therefore, very few local varieties are available for cultivation and most of them are selections from introduced seed and absolutely no local hybrid variety have been brought to the market. Focus on one traditional variety of tomato with narrow choices of varieties which results in low productivity, excessive supply, price spikes, and market instability

The insufficient supply of certified quality seeds: for multiplication and cultivation results directly in lower tomato productivity. Better seeds are needed in order to get higher yield and reduce unit cost. Seeds need to match the seasonal and daylight requirements and have high resistance against locally prevalent diseases as curl virus and other diseases are often epidemic in some seasons. New varieties are not being developed in the research facilities, meaning over-reliance on imported hybrid seed are available. Not all of these seeds are suitable for Egypt market. For example, some have a very high water content with low shelf life and are unsuitable for longer distance shipping**.**

Lack of nurseries: Poor quality or wrong types of seedlings create tremendous inefficiencies and problems along the stages of tomato value chain. Improper cultivars affect negatively the gains of all actors. This problem is pertained mainly to small farmers either because they do not have access to labelled seedlings or they cannot afford buying them or they do not have specific marketing objective of tomato farming.

The seedlings are not categorized based on their origins in order to allow the grower to choose the seedlings needed. Insufficient supply of certified quality seeds for multiplication and cultivation which results directly in lower production.

Farmers either grew their seedlings in the open field or brought them in from the nearest city. Seedlings grown in the open field or transported over long distances are usually weaker; they have a lower survivability rate after transplantation and produce lower average yields. This is one of the primary reasons that farmers regularly experience up to 40 percent seedling failure after transplantation. Moreover, one runs the risk of transporting pests from one area to another, potentially introducing new pests and/or viruses to a growing region (USAID, 2014). Another significant problem that affects nurseries and smallholder farmers is the lack of access to quality inputs such as fertilizers and pesticides. This has negative impact on productivity.

Fertilizers

Many fertilizers are adulterated or ‘mislabelled’, containing less of the active ingredients (nitrogen, phosphorous and potassium) than claimed on the label. The fertilizer contains

substantially less NPK (nitrogen, phosphorous and potassium) than the package label stated.

Pesticides

Significant part of the available pesticides are adulterated, fraudulent (produced 'under the stairs') and even illegal, containing active ingredients that are not registered for use on crops resulting in yield losses as well as ineffective cost. Considerable part of marketed pesticides is fake having no effective substance, however illegally have brand label. It is sold at a very low price may be as low as 10 percent of the legal brand**.**

Input-quality control

The quality of the available inputs is not monitored as much as they should be, and thus their quality and effectiveness cannot be guaranteed**.** Most Egyptian producers, particularly those in the Upper Egypt suffer from lack of quality inputs because too often the only inputs available to them are below standard or, in the case of pesticides, produced illegally "under the stairs."

b. Problems in Production Stage

Landholdings fragmentation

Land fragmentation is a chronic problem in the Egyptian agriculture and is becoming worse-off over time as the farming population increasing with almost 2 percent annually, while the agricultural area will be almost unchanged. This problem is reflected on both farm size and grown crop holdings. With respect to tomato, according to 2009/2010 agricultural census data presented in Table 18, the total number of tomato holdings is 283197 holding (this the sum of winter, summer, and nili (fall) tomato holdings, thus not the number of tomato growers).The vast majority (84%) of these holdings, or 237871 holding exist in the old land and 16 % or 45326 holding exist in the new land. Total tomato cropped area is approximately 419 thousand fed (176 thousand ha), 52.7 % of which is grown in the old land and 47.3% exist in the new land. Small tomato holdings are dominant in the old land, while large holdings are dominant in the new land.

Table 18: Distribution of holdings and areas of tomato by farm size in old land, new land, and total Egypt

Holding Class (fed)	Old land				New land				Total Egypt			
	holdings		Area		holdings		Area		holdings		Area	
	No.	%	(fed)	%	No.	%	(fed)	%	No.	%	(fed)	%
L.t.1	49174	20.8	14366	6.5	632	1.4	203	0.1	49806	17.6	14569	3.5
1-	54466	22.9	26975	12.2	2022	4.5	1606	0.8	56488	19.9	28581	6.8
2-	43790	18.4	29670	13.4	4801	10.6	5500	2.8	48591	17.2	35170	8.4
3-	26928	11.3	22860	10.3	2836	6.3	3648	1.8	29764	10.5	26508	6.3
4-	13342	5.6	13929	6.3	2765	6.1	4578	2.3	16107	5.7	18507	4.4
5-	19489	8.2	24749	11.2	13360	29.5	29973	15.1	32849	11.6	54722	13.5
7-	9726	4.1	15670	7.1	3306	7.3	8155	4.1	13032	4.6	23825	5.7
10-	10407	4.4	22235	10.1	6099	13.5	15937	8.0	16506	5.8	38172	9.1
15-	4114	1.7	11530	5.2	2686	5.9	9472	4.8	6800	2.4	21002	5.0
20-	3426	1.4	13290	6.0	3026	6.7	13270	6.8	6452	2.3	26560	6.3
30-	1909	0.8	753	0.3	1689	3.7	9791	4.9	3598	1.3	10544	2.5
50-	850	0.4	8421	3.8	989	1.8	10201	5.1	1839	0.6	18622	4.4
100-	226	0.1	4373	2.0	867	1.9	24583	12.4	1093	0.4	28956	6.9
500-	14	0	1042	0.5	112	0.2	9509	4.7	126	0.04	10551	2.5
1000-	12	0	1224	0.6	136	0.3	51946	26.2	148	0.05	53170	12.7
Total	**237871**	**100**	**221086**	**100**	**45326**	**100**	**198384**	**100**	**283197**	**100**	**419470**	**100**

Source: Collected and computed from: Ministry of Agricultural and Land Reclamation, the Agricultural Census for the year 2009/2010.

Box 2: Effects of fragmentation on the agricultural system

Due to land fragmentation and dominance of smallholdings, the agriculture system is underdeveloped and fragmented with poor farming practices, low yields, and small-scale production. Small producers, due to lack of other options, are required to sell their produce through municipal wholesale markets. In general, producers tend to gradually improve their production technology, while maintaining their relatively traditional post-harvest practices. Their production is largely supply-driven, while the current marketing system does not induce improvements with regard to produce quality.

Lack of good agriculture practices (GAP)

Lack of good agricultural practices (GAP) in tomato cultivations results in lower yield (per fed), higher losses, and lower quality of produce. This is to a great extent true for small-scale and medium producers who dominate the sector. In contrast, large farmers have no problem with the application of GAP. For a variety of technical, economic**,** and institutional reasons all of which due to economies of scale, a small or medium farmer cannot individually afford the application of GAP.A major reason why the GAP are not widely applied is the lack of investment in the tomato and marketing infrastructure**.** Also, fee for Global GAP Certificate is at least LE 25000 which is far beyond small producer' financial capacity.

In the contrary to smallholder growers, large farmers, farmers' associations/cooperatives, and corporations have no problem with applying GAP in tomato production either for the purpose of export where the certified application of the Global Gap is a must, or for the domestic market purposes making higher returns.

Lack of advanced farming technologies

Due to lack of access to finance particularly for small producers, the tomato sector lacks use of green houses and other more modern technologies and method for growing tomatoes such as protected cultivations and stalked tomato. As in the case of GAP, large farmers, farmers' associations/cooperatives, and corporations usually have no problems with finance, thus are able to invest in these intensive capital modern technologies.

Box 3: Problems at the tomato producer level

In brief, problems at the producer level are as follows:

- Insufficient technical advice and extension services to the farmer with respect to good agricultural practices;
- Lack of guaranteed inputs and basic packaging materials;
- No product grading due to poor or absence of sorting and packing facilities during harvesting;
- Lack of proper storage at the producer level shortens product life and increases postharvest losses;
- Financial dependence of the producer and lack of access to bank credit weakens in several ways his bargaining power toward traders and in price determination in general;

- Due to farmers‟ lack of market knowledge, market information and lack of growers 'collective action, traders have dominant position over farmers;
- Low return for the tomato grower

- Lack of skills and knowledge on the part of farmers with respect to formal contract agreements, resulting in lack of contracting or disputes in several cases;
- Lack of basic business understanding of the grower;
- Tomato growers bear the burden of all post-harvest handling losses;

c. Problems in Post-harvest Stage

Besides the lack of good agricultural practices, one of the largest problems of the tomato value chain is the poor post-harvest handling. A major quality constraint as well as losses problem in this stage is the lack of adequate post-harvest facilities including cooling and packing sheds, refrigerated transport, and cold storage. High post-harvest tomato losses are due to poor logistics such as cold store chains, refrigerated transport system, and air cargo space, combined as well as lack of knowledge of the post- harvest handling of perishable products from the farm to factory to ports

Cold chain: Besides low yields pursuant to poor cultivar selection or availability, the lack of a cold chain is reported to cost the agricultural sector LE4 billion annually. When one removes the life support system from a fruit or vegetable, e.g., harvest the produce, it starts the rotting process immediately. Applying this for tomato, the rule of thumb in the produce business is that for every hour that the ambient field temperature is not reduced to impose a false dormancy, you lose a day of shelf life. This applies to processors as well. The “field to factory" time frame is as important to the processor as to the tomato exporter, as it means higher yields, less waste and lower conversion costs (CIDA,2010).

Box 4: Problems at the post-harvest level

In brief, problems at the post-harvest level are as follows:

- Poor sorting & grading process, affecting the quality classification of products brought to the market.
- Poor transportation cold facilities affects product quality and increase damages
- Refrigerated transportation is not used in several cases between the farm and stores of processors and exporters stores
- Lack of cooling facilities affects the regularity of market supply, increase produce losses, and lower its quality
- Poor transportation and handling means for both producer and trader
- Poor sanitary conditions and poor handling affecting the quality of the produce
- Informal transaction
- Speculative sale prices not based on any market information and forces

Problems at the wholesale level:

- Producer bears all the cost of damage even for poor handling at the wholesale level
- High commission of the wholesaler vis-à-vis the services provided
- Low level of facilities (stalls) in most wholesale markets (e.g. no cooling) at the governorate level
- Wholesale markets do not provide basic services such as market information, proper transportation, sufficient waste collection, product inspection services, etc.
- In many cases wholesalers are in collusion to control prices
- Conflict resolving mechanisms in most cases are in favor of the wholesaler
- Few cooperatives operate in wholesale markets
- Lack of knowledge and skills on the part of cooperatives to develop wholesaler function and cooperatives are incompetent to develop this business opportunity

Unorganized processing sector

The majority of the companies operating in the sector are classified as micro, small and medium-sized (MSMEs).These enterprises are not organized and therefore cannot benefit from economies of scale and export marketing. Their products are generally of poor quality.

Idle capacity

Processing capacity of tomato is not fully exploited. At the same time, products such as tomato paste/puree have high potential demand in both the domestic retail market and international market.

Inappropriate, inconsistent supply of raw material inputs

Generally there are bottlenecks in the supplier network for processing industry. The use of local raw materials on a commercial scale is hampered by an inappropriate and inconsistent supply of raw material to the industries due in part to the lack of contract farming and a very weak relation between growers and processors. This is one of the most critical impediments to growth of Egypt's processing food sector. The varieties of tomato grown by farmers are more suitable for fresh markets than for processing. The tomato sector is one of the most horticultural sectors suffering from inappropriateness of grown varieties for processing.

The tomato factories have, in many times, failed to secure stable supplies for their needs of tomato raw materials as a result of their inability to organize the production of farmers. The tomato paste factories mostly rely on random tomato oversupply situations to operate rather than long term contractual programs with tomato producers. Because of this problem among others, the number of working days in factories is only 50 days a year which can be potentially increased to 90 days in the case the supply of raw material are prolonged and secured.

Varieties grown are inappropriate for processing

Traditional tomato varieties grown in Egypt have low total soluble solids, so the conversion ratio for tomatoes to paste utilizing traditional varieties is more than seven to one (seven tons of tomato producing one ton of paste), and can even reach as much as ten to one. This

increases the operating costs for processors and makes it quite difficult for Egyptian tomato processors to compete in international markets. As well, utilizing traditional tomato varieties, processors face a tough challenge maintaining a consistent color profile for the finished products. This showed up on the supermarket shelf, where ten bottles of tomato ketchup could have ten different shades of red.

High costs of raw materials

The costs of the raw materials are too high, and even hard to get when demand often exceeds supply.

Processing inefficiencies

The tomato paste factories are experiencing difficulties as they cannot produce at competitive prices. The companies use imported tomato concentrate rather than producing from Egyptian tomatoes. No high quality tomato concentrate is available in Egypt and producing from imported concentrate is more economical than using Egyptian tomatoes.

Lack of livelihood opportunities

Processing sector suffers from lack of livelihood opportunities in higher value added activities which results in high losses of unmarketable production as well as missing employment and income opportunities for rural people.

Box 6: Problems facing tomato processors

In brief, problems facing tomato processors are :

- There are bottlenecks in the supplier network for processing industry
- Inappropriate, inconsistent supply of raw material inputs
- Lack of market knowledge, market information and collective action in processing sector;
- Poor business practices;
- Lack of access to finance for MSMEs;
- Poor cold chain facilities*;*
- Lack of quality control and poor enforcement;
- Lack of knowledge and skills on HACCP, traceability, sanitation and GMP);

Con.

- International Sanitary and Phyto-sanitary measures (SPS) are becoming severer which bring increasing pressure on producers (chemical residues) and processors;
- Lack of technical assistance to improve processors' performance;
- Administrative and bureaucratic burdens (especially lack of transparency in the customs regulations in imported items) and a very long clearing time required due to all the bureaucratic requirements placed on companies, which has made enterprises/industry segments relying on the imported inputs uncompetitive;
- There is increasing competitive threat from regional competitors such as Turkey and Jordan;
- Due to the inability of the majority of companies to invest in research there is a low level of innovation within the sector and, therefore, a lack of new products.

d. Problems in Marketing and Distribution Stage

Problems of marketing of fresh tomato

Lack of market choices domestically and dependence on monopolistic traders result in lower bargaining power of producers and lower price for their produce particularly during gluts. The monopolistic power of traders is caused by the situation where there are few wholesale traders in the face of more than two hundred thousand producers**.** Such power is augmented by lack of organized market linkages and communication. This leads to potentially erratic supply where a bad season is followed by reduced production, albeit benefitting those farmers taking the risk of growing the same crop despite losses in previous season**.** Little knowledge and information of market opportunities domestically and internationally result in tremendous physical and economic losses incurred by the different actors of the chain. Scarcity of knowledge and information available for tomato markets could be explained by the weak institutional setting of the tomato sector either at the public or private levels**.**

Problems of exporting of fresh tomato

In light of the absence long-term export strategy in Egypt, the private sector has no strong incentive to invest in appropriate marketing facilities, equipment, etc**.** The emphasis of exporters, in particular those using road transport, appears to be on bulk shipments of low quality produce, packed in a traditional way by a variety of domestic producers for an undefined market. Shipments to the region, including the Gulf States, are customarily sold through local commission agents, without any forward sales agreements regarding quality, quantity, or price. Exporters are accustomed to respond to the oversupply situation in the domestic market rather than specific requirements of well-defined target markets.

Problems of marketing of processed tomato products

- Tomato processors produce and market ketchup and export very few quantities to Arab and African markets.
- The low competitiveness of tomato products, in the international markets in particular, is a combined result of all the problems and constraints stated in the sections above**.**
- Weak domestic market and underdeveloped distribution channels, such as supermarkets and hypermarkets.

4. Problem of Tomato Losses through Value Chain Stages

One of the main problems that hamper the efficiency of the tomato value chain is the high losses of the tomato along the chain. Estimates of losses range between 30 to 60 percent of the total production. This study will apply 35.7 percent losses as this has been proved by previous studies. With a total production of 7.7 ml MT, applying such estimate results in 2.7 million MT annually as losses (Table 19).
Most waste/losses occur along the chain as follows:

- ***General stage of Tomato losses****:* The reasons of tomato losses could be related to earlier stages mainly: governmental strategy and unpredictable supply/demand.
- ***Input supply stage (pre-production)****:* Supplies and suppliers are seen to have a hand in tomato losses in the pre-harvest or post-harvest stages. The main factors were found to be: pesticides, varieties, information/knowledge, labor, financing and fertilization.

- ***Production stage***: There are losses in tomato quality and quantity in both pre-harvest and post- harvest stages. The main factors could be categorized in: plant protection reasons, weather reasons, irrigation reasons, fertilization reasons, initial reasons, information reasons, plant care reasons, un-recommended practices as well as some other reasons. A study by Rageh based on field questionnaire estimates losses in the production stage by 9.2 per cent. In fact, this estimate may be explained not only by practices within production stage but also by the factors related to input supply stage.
- ***Harvest stage***: Significant amount of tomato losses due to fruit damage occur in this stage. Some of tomato losses that appear in this stage are the result of production stage like infected fruit, sun-burnet, cracked fruit due to thirst and recent irrigation and delay harvest; yet, most of other damage are due to carelessness causes. Farmers do their best to manipulate this kind of losses by refraining to grade the production, sell the production on its plants, topping the crates … etc.
- ***Transportation stage:*** There are some damage occur directly during transportation. In general, drivers do not pay for this damage, yet more likely farmers do. The wholesale trader needs to receive intact crates in the market especially when selling for the farmer's favor. Un-noticeable damage in tomato quality can also occur when transportation is delayed either in picking up the load or on the road to market. Retailers might be the most vulnerable category to losses occurs during transportation.
- ***Wholesale stage:*** Usually losses do not appear in the post-harvest losses statistics although it can reach a significant number. Rational planning before season, or the interference of the government would provide good chance to organize an alliance within the platform especially that this situation involves many players like farmers, wholesale traders, exporters, factories, supermarkets, and restaurants. Losses in this stage, and may be together with post-harvest stage, are estimated at 11.8 per cent.
- ***Retailing stage***: There are no statistics indicating market shares of supermarkets, restaurants, vegetable shops and wondering retailers. However, all damage and infected tomato is disposed in this stage. Losses at small retailers losses vary according to the grade, but it can reach 14.7 % according to some estimates. Customer's behaviour or habits, the way the tomato exposed at the retailer, and time the produce stay to be sold are all reasons of that high losses. Changing customer's behaviour, diet pattern or bio-products demands an alliance of another kind of value network that includes mass media, companies, supermarkets, customer associations … etc.
- ***Exportation stage:*** International market has good potential to absorb more production, especially with the competitive advantage of Egyptian tomato abroad. Farmers' problem with exportation is that they have to send their production to the collection centers, which takes only the first grade (15-20% of the product). They have to find another way for selling the rest in this long process and vulnerable product.

Table 19 Losses along the current tomato value chain

Marketing channel	Quantity produced (000,MT)	Quantity of losses		Quantity net losses	
		(000,MT)	%	(000,MT)	%
Farmer-wholesaler-retailer-consumer	7204	2572	95.1	4632	92.2
Large farmer-exporter-	141	50	1.8	91	1.8

intl.market					
Farmer-wholesaler-retailer-consumer	255	55	2.0	200	4.0
Farmer-wholesaler-processor-intl.market	127	27	1.0	100	2.0
Total	7727	2704	100.0	5024	100.0

Source : Author's own calculations

5. Problem of Lack of Coordination in Tomato Value Chain

The tomato value chain in Egypt suffers from serious lack of coordination –whether horizontally or vertically -resulting in lack of integration at the decision-making level and fragmented chain. Poor cooperation between stakeholders at the local, governorate, region and sector levels result in serious problems for the chain such as random production, bottlenecks, price fluctuations, unmet demand, high losses etc.

Lack of horizontal coordination

On the production side, horizontal linkages are usually strengthened through the formation of farmer associations or cooperatives. However, the majority of the tomato growers; between 150,000-200,000, are without representative organizations/associations that could coordinate among them on one side and between them and other actors of the chain on the other side. The main barriers to forming strong links between producers are the existing levels of mistrust between farmers. The nature of production and entrenched cultural practices do not facilitate the organization or collaboration of individual farmers into a group dynamic. Individuals have different production timings and financial requirements as well as the mistrust between farmers that inhibit the formation of groups or associations

At the agricultural sector level, there are about 4700 agricultural cooperatives, but they are all, with few exceptions, multipurpose cooperatives and serve mainly the traditional crops. Very few associations or cooperatives are for horticultural products such as potatoes. In addition, most of these associations are mostly governed by large producers and exporters.

Where lack of agricultural cooperation exists, small farmers could not benefit from the advantages of economies of scale that could be achieved by the cooperative. Since the mid-Sixties and until two years ago, there had been the old Law Agricultural Cooperation which was more conforming with the centrally-controlled economy. Recently, a new law conforming to market economy has been issued; however, it has not been enforced yet.

At the trading level and above, there is also a clear lack of horizontal coordination. There is only the Chamber of Commerce which is a private entity representing the whole community of traders at the national level. No chamber exists for tomato traders or even for horticultural crops in general.

Lack of vertical coordination

There is no mechanism for promoting the interests of the sector. While there is the Agricultural Export Council (AEC), there are no tomato specific organizations in a form of board/council, cooperative, association.

6. Problems Related to Enabling Environment

a. Weak institutional setting with unclear, ambiguous or outdated regulatory framework

Even though the Egyptian agriculture has been liberalized, most of agricultural laws and legislations issued in the era of centrally-controlled economy are still unchanged or partially modified and still applied in the currently adopted market economy. Institutional setting of Egypt' agriculture is weak due to lack of policies, laws, farmers' organizations, research and development, commodity boards, market regulations. Enabling environment with respect to tomato value chain is no exception.

b. Lack of government policy on horticultural production

The Egyptian agricultural sector has been subject to historic policy entailing bias against it and in favour of non-agricultural sectors. Further, many structural problems are related to the absence of a national marketing strategy, weak interaction between the public and private sector, and lack of regulatory framework to support the fruit and vegetables. There is generally a lack of government policy on horticultural production including tomato production. This is reflected clearly in lack of a master plan for horticulture investment, insufficient incentives for investors, lack of extension training services, insufficient infrastructure, lack of market information, and unidentified investment zones; all are factors hindering investors to work in tomato sector in Egypt

Government monitoring of horticultural production is poor and tomato production is not excluded. This prevents harvest forecasting and planning for the sector. There is no effort as yet to generate standards or regulations for the horticultural sector and thus quality control is still loose.

c. Lack of Dialogue

There is no national level board for tomato to promote dialogue between actors. Such board should assemble tomato professionals as well as other chain stakeholders. The lack of dialogue does not allow formulating sector strategy and create a wide gap between production and market levels which contribute to deeper fragmentation in the value chain.

In this context, the Union of Producers and Exporters of Horticultural Crops (UPEHC), mentioned earlier, is the case indicating the GOE involvement in professional associations. However, the Government's support for the UPEHC is viewed as a conflict of interest because the union is perceived as a government apex institution for all private horticulture professional associations, as well as for farmers, processors and exporters. This may confuse the activities of purely membership-based associations. The Government should either make the union part of the Ministry of Agriculture and Land Reclamation or provide purely hands-off support that cannot be misconstrued as a means of controlling professional associations

d. Lack of transportation

Air cargo-handling: The framework for horticultural cargo-handling at Cairo International Airport has reached its limit in export volume. Moreover, stakeholders believe that airfreight is 30-50 per cent more expensive than at airports in competing countries. Only one company is licensed to handle horticultural produce. This is believed to be the main cause of the relatively high freight costs. Another limiting factor is the restriction on the hiring of cargo planes directly by exporters.

7. Problems Related to Supporting Services

Supporting services provided to the value chain actors; producers, traders, processors, exporters, and input providers are very weak. Growers and other stakeholders receive very little services, information, extension and training, and support resulting in low skills and low productivity

a. Poor extension service

During the period of government-controlled economy, agricultural extension services were efficient in transferring the latest research findings to farmers. But with the implementation of liberalization policy in agriculture since the late Eighties, agricultural extension services have been, to a great extent, neglected until now. However, a restructuring process in extension services has only recently been undertaken with the aim of responding to the demand for specific advisory services related to non-traditional high-value crops. The public extension services would take a considerable amount of time to be sufficiently responsive to provide the advisory services needed in the horticulture sector. However, some examples show that the system is capable of delivering results if the work is carried out in conjunction with large farms, private companies, or development agencies and, particularly, smallholders if organized into farmer associations.

By and large, tomato small landholders in Egypt continue to farm the ways inherited from old days. Even when they have access to modern equipment, they hold onto traditional habits with regard to fertilization (e.g., poorly treated manure), irrigation (e.g., flooding) and other cultivation practices. To a great extent, this is due to the fact that they simply have not been taught otherwise, and they lack information on improved practices and technologies that will benefit their farming operations. Even agricultural extension agents are poorly trained and informed. During the last decade, agricultural training and extension services have suffered from lack of government budgets and absence of coordination**.**

b. Lack of Agricultural research and development

Planning in agricultural research is dominated by a top-down approach with little participation of farmers. The main research focus is on the so called "strategic crops" for food security; wheat, rice, cotton, maize and sugarcane. The results in terms of higher yields have been notable particularly for cereal crops. However, since the end of central planning by the late 1980s, there has been a shift to a more export- oriented production system involving high-value crops. This requires knowledge of cultivars, varieties, pre- and post-harvest technology, market information and economic analysis regarding the returns to various investments. Unfortunately this information is not

readily available, particularly among smallholders. The research institutions are only in their infancy in addressing these issues.

Horticultural Research Institute (HRI) affiliated to the Agricultural Research Center (ARC) has the responsibility of developing and approval of the release of new varieties as well as conducting research on pest and disease control and other tomato-related farming practices. In the recent years, the ARC and thus the HRI suffers from lack of government funds allocated to R&D. Developing and releasing new varieties can be a lengthy process and this has limited the efficiency of the tomato value chain to date.

c. Lack of information

Lack of information is one of the main constraining factors to the tomato value chain. Due to the many trading levels, and the fragmentation of value chain actors, information is disjointed and lost down the chain. In particular the lack of market knowledge at the producer level prevents efforts to increase the efficiency of the chain**.** Even the officially issued agricultural data concerning tomato production, particularly with respect to yield and costs of production, were suspected by the tomato professional participating in the workshop that they do not reflect accurately the reality. Both reported yield per feddan and costs of production are very much lower than actual ones.

d. Lack of access to finance

Small farmers usually suffer from limited financial capabilities. This fact leads to two consequences. On one side, there is under-investment in farming inputs like pesticides and fertilizers leading to low yields and poor quality produce. On the other side, farmers are often forced to sell their produce in advance to the middlemen. The price that they get is normally much lower than the price at which a middleman sells the produce in turn, with the upside. Lack of credit for farm inputs and a credit system that does not cater to the needs of small farmers for high quality inputs, further limits supply expansion**.** Financing is almost not available as banks often hesitate to finance perishable products.

VI. INTERVENTIONS FOR TOMATO VALUE CHAIN UPGRADING

Based on the above analysis and discussions throughout the previous chapters particularly the last one dealing with the problems and constraints pertaining to the tomato value chain, specific interventions are proposed for improving and upgrading the chain. Proposed interventions will be dealt with on two levels. First, are interventions along the chain' stages; second, are cross-cutting and tomato sector-wide interventions.

1. Upgrading TVC in Relation to Development Goals

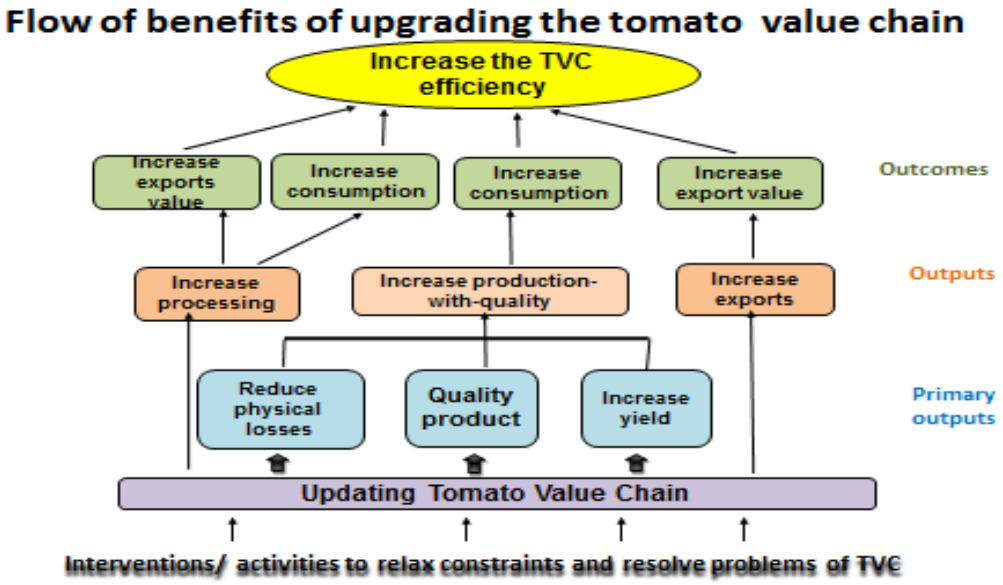
In principle, Egypt has the "basic factor conditions" that are typically inherited rather than created, for comparative advantages in tomatoes production. Egypt offers good agro-climatic conditions that are appropriate for tomatoes production around the year. Proximity to the GCC, EU and the African countries means less expensive logistics and quicker time to market.

However, Egypt has yet to build competitive advantages out of these comparative advantages. For example, the industry has not yet developed sufficiently advanced production, harvesting, post harvesting and packing sectors which are necessary to become globally competitive.

It is believed that these interventions will improve the conditions in the tomato value chain, create more income and pro-poor growth and hopefully make the sector more competitive. More specifically, two top development goals can be achieved as a result of efficient tomato value chain (TVC) ,as portrayed in Figure 14, 1) Increase the total value of the chain and maximizing the contribution of the tomato sector to the Gross Domestic Product, 2) Increase participation of small actors, i.e. the majority of farmers, processors, and traders, and integrate them to the agribusiness sector with improved and social conditions and combat poverty and this related to social equity.

Enhancing the efficiency of tomato value chain, would result in achieving four development specific objectives benefiting the agricultural economy as well as 'actors' in the chain: (i) Increasing tomato production through both increasing the productivity and reducing losses to a minimum, with improved quality of produce, and more regularity and continuity of supply, (ii) Increasing tomato processing and value added, and (iii) achieving high levels of exports of fresh and processed tomatoes.

Figure 14: Flow of benefits of up grading tomato value chain



2. Key Interventions

The efficiency of tomato value chain can be improved in a holistic, effective and lasting manner. The salient intervention should be one that looks *to stimulate movement from high volume, low quality, and low profit production to targeted, high quality, high value produce.*

There are many interventions that can be selected with the objective of updating the tomato value chain and are necessarily related to solving the problems facing the chain as well as relaxing the constraints that hinder the increase in the chain performance and achievement of its development goals.

Undoubtedly the selection among interventions to achieve the said objectives is a complex issue. However, a number of criteria can be identified as the basis for selecting and prioritizing the package of interventions. These criteria include technical feasibility, cost-effectiveness, collective action principle, number of actors benefited, multi-objective problem solving, and time dimension. Appropriateness of the "Enabling Environment" and the high level of supporting services increase the selection scope of interventions, and vice versa. Weak Enabling Environment and lack of support services will not only narrow the selection scope but also lessen the opportunity for interventions to succeed.

Box 7: Key interventions for tomato chain upgrading

In accordance with the above criteria, key interventions can be identified: (i) Improved coordination, by both strong horizon linkages through Farmers Associations and strong vertical linkages through Contracting Agriculture, (ii) improved enabling environment, (iii) Strong support services, and (iv) Introducing of advanced production technologies with appropriate varieties and Global GAP.

3. Interventions along the Chain Stages

a. Pre-production stage

Nurseries and seedlings

Establish new nurseries: New nurseries should be established by associations in regions that suffer from lack of seedling production facilities.

Working with seedling suppliers for raising survival rate: Currently the survival rate of seedlings after transplantation from the nursery to the field was about 60 percent in average. Training to seedling nurseries countrywide should be provided, introducing improved tomato seed varieties and instructing managers and laborers in best practices and technologies for tomato seedling production. The seedling survival rate could be improved to almost 95 percent after transplantation

Pilots and demonstration models: Overall, the option of introducing new varieties of tomato and new production methods, such as organic farming, to meet market demand and market trends, should be explored. Pilots and demonstration models should be launched to test new species and research and refine methods that introduce farmers in practical ways, with a view to increasing their awareness and confidence to engage in new ideas.

Pesticides

Qualified pesticides: Provide farmers with lists of qualified pesticides suppliers (meaning that their products had been tested), as well as lists of the agrochemicals that are registered for use in Egypt on tomatoes.

Trained pesticide applicators: Pesticide applicators are to be trained in the basics of integrated pest management, responsible use of pesticides and pesticide application techniques. The latter would be a practical course for applicators to learn how to calibrate and operate the sprayer, read and understand the package label, prepare the agrochemical and water mixture, put on and take off the personal protective gear, handle and dispose of the agrochemicals, etc.

Technical support and training: As a result of technical support and training, farmers will be able to rationalize their use of pesticides. The right pesticides have to be put into the hands of the farmers, enabling them to more successfully control the ***Tuta absoluta*** pest that had been ravaging tomato crops since 2010. Farmers will be able to reduce their overall use of pesticides if they apply the right chemical from the start.

Fertilizers

Qualified fertilizers: Provide farmers with lists of qualified fertilizers suppliers (meaning that their products had been tested),as well as lists of the agrochemicals that are registered for application on tomatoes.

b. Production stage

Tomato production is challenged by the lack of knowledge in production techniques, poor quality fruit and poor cooperation between the value chain players. Concerning planting and growing, the tomato growers for a variety of reasons stick to traditional methods and varieties. They are not aware of the diversity of today's market demands and focus only on producing traditional types of tomato.

Varieties and product differentiation
Small and medium-sized growers are usually reluctant to develop their activities away from traditional methods because of the uncertainty concerning costs and market demand. Hence, there is a need for assessing and documenting the demand and at the same time demonstrate the method and profitability of changing practices and product types.

As growers and the whole production system in Egypt tends to focus on few traditional varieties of tomato, options for increasing income and reaching new markets through product differentiation needs to be explored.

There are many varieties other than traditional ones that are also in high demand such as cherry tomatoes, industrial tomato varieties (for tomato paste manufacturing), as well as organic tomatoes at premium prices. Yet, these types are currently not produced as the growers do not seem to be aware of the market opportunities or market access is constrained.

Sun-dried tomatoes: One product that sees very high international demand is sundried tomatoes.

Tomato paste: There is huge demand for tomato paste internationally and even in the domestic market there are opportunities; Egypt currently imports over 20,000 tons of its tomato paste, so promoting local produce on the domestic market may offer good marketing opportunities.

Organic tomatoes: Organic farming generally has huge potential, and organic tomato specifically has a huge market. There is some organic growing going on in Egypt but the mechanisms for control and certification are not in place. So even if some producers label their products 'organic' this is not certified and there are reportedly a great number of producers that take advantage of the lack of controls and falsely sell their products labelled as organic. An initiative should be launched for such certification, possibly through a farmers' association or a standards and control board.

Increase quality of fresh produce*:* Generally, production is characterized by low-tech and traditional methods of growing tomatoes. Hence, to boost the sector there is a need for technological upgrading and introduction of higher yielding methods
Upgrading production methods should increase yield and improve the quality whereby the produce should also become more price competitive. Options for transfer of advanced technology include:

Introduction of good agricultural practices (GAP) with advanced production technologies*:* Growing tomato under protected agriculture such as plastic tunnels, green houses and vertical cultivation (stalked tomato) practice have higher productivity than those of open fields, especially if they are used on high quality varieties coupled with training of lead farmers and knowledge agents . Such technologies are powerful source of adding value to the chain and could result in an increase of productivity per unit area on average by as much as 300% and a decrease of production costs on average by 20% , a twofold to fourfold increase in revenue per unit area, and an increase in employment (protected cultivation approaches are more job intensive than open field approaches).It should be noticed however that these advanced technologies in general are capital-intensive

which makes then unaffordable for small and medium-sized farmers. In this case however, they can attain them through collective action, farmers associations and contracting agriculture.

Box 8: Interventions for improved tomato varieties and seedlings:

Interventions for improved tomato varieties and seedlings:

- An initiative is needed to ensure the supply of adequate seedlings to tomato growers in each governorate, including the production of special seedlings for green houses;
- Establish a central nursery and experimental fields
- Support the governmental nursery to produce special seedlings for greenhouses;
- Establish nurseries that sell plants for farmers at a reasonable price as a business development service, preferably private sector-led or through a business association, Farmers association or a cooperative;
- Use of proper varieties that are appropriate for the area and are marketable locally and internationally. These must also be clearly identifiable as produced for fresh or processing markets;
- Ensure correctly labelled seedlings and provision of appropriate varieties of tomato, including those for green houses;
- Only strictly controlled use of pesticides and fertilizers, permitted internationally;

Con.

- Develop and deliver a scientifically-based integrated training and extension program covering all stages of tomato production, harvesting and post-harvest processes;
- Training for workers on applications of modern agricultural techniques, ranging from planting, to proper harvesting and/or processing, in order to attain the high quality production that meets national and international specifications;
- Farmers need better crop husbandry training for better production as there are no technicians with the adequate know-how to provide appropriate extension services.

c. Post-harvest handling

Farmers need to be trained on the correct method of packing tomatoes. The packs should be plastic cages, not cages made from palm wood as mentioned above. The correct method is to avoid nesting and not to put contaminated, infected or scratched fruits and not to put more than the capacity of the cage

Growers should be provided with advisory services on proper manner for storing tomatoes preferably using cooling facilities to protect it from damage, especially in conditions of high temperature and exposure to sunlight.

With respect to uploading and transportation, workers should be trained on the correct method of how to upload and transport the crop in order to maintain high specifications of tomato fruits.

Investment in picking, grading, packaging, cold storage, and equipment are needed to ensure proper handling of products and preserving its quality during its stay in the storage.

The enormous amount of losses during the post-harvesting stage (about 21 percent of total production noting that losses in the retail level is not included),could be avoided, at least to a significant extent, if there were necessary storing (cool storage) and pre-cooling facilities close to the production area. The Government of Egypt should develop a tax-incentive package that encourages businesses to invest in cold-chains for horticultural produce.

Processing stage

There is significant idle capacity in Egypt's tomato processing factories due to an increasingly sustained lack of tomatoes from the farmers at an affordable price. Currently, in the low supply periods, farmers may be able to get far higher prices than the factory can economically pay. There should however be a possibility of increasing production and through more effective methods be able to supply tomatoes to the factory at a competitive price. Hence, there seems to be plenty of unfulfilled demand domestically that suggests a need for more stable and efficient production to ensure prices are competitive.

There are many options for smaller businesses to enter into manufacturing of various tomato products including paste, sundried tomatoes and juice. A market assessment should be made to assess business opportunities for higher value adding businesses in the tomato value chain.

Advanced technology in the areas of picking, grading, cooling, storage, packaging, processing, and transporting could be transferred through the following:

a. Providing the paste factories with the high quality raw materials required to maintain a high quality product at every stage until it reaches the consumer;
b. Maintain highest sanitation conditions inside and outside the Packaging Centers, Paste Factories, and Sun Drying Sites through installing appropriate systems and training specialized staff;
c. Installing proper systems and following appropriate measures and practices to insure fulfilling all production and value adding requirements;
d. Acquiring certificates and licenses that attest to the conformity of the products and the production practices to the requirements;
e. Training technical staff that are able to prepare the product within the required specifications, efficiency, and at minimum costs; and
f. Continuous consultation and co-ordination with the buyers, importers, and the parties involved in order to stay informed about the pre-set conditions, specifications, and standards that precede the preparation processes for marketing locally and for export marketing.

d. Distribution and marketing stage

Pump more investments to improve transportation infrastructure and facilities for export markets, including increased availability of air cargo spaces, reduced air freight costs, and development of sea freight and port capacity

4. Interventions for Improved Chain Coordination

Coordination, at both the horizontal and vertical levels, is critical to the integrity of the tomato value chain. The two levels coordination will be achieved as follows:

a. Stronger horizontal linkages

- *Stronger organization at the farmer level through Farmer Associations and Co-operatives*
- *Organization and coordination at trader level*
- *Basic value addition activities at producer level (correct selection of varieties , GAP , PHH, grading)*

Tomato Farmers' Associations (TFAs)
Farmer associations play a critical, supportive role in the value chain, particularly where farmers can't easily access inputs, markets and services on their own. The FAs work on the use of collective action and let their members benefit from economies of scale both in supplying inputs with most of related problems solved, and in linking farmers to actors in higher levels (processors, exporters, wholesalers and retailers).

Associations can provide guaranteed inputs (with certificates of analyses) in bulk, at discounted prices; pool community resources to obtain equipment that is too expensive for a single farmer to purchase; communicate on behalf of members with government officials; and aggregate crops in order to access markets that require volume. Training and support may be provided by MALR to associations to strengthen their capacity to provide these critical services.

There is very little cooperation and exchange of information between tomato growers. Bringing the farmers together to develop the sector, work together on developing new technologies, new markets and new products could result in great benefits. Similarly on the input side, cooperation for purchasing in bulk increases bargaining power or creating joint businesses to supply goods and services they lack with competitive prices, which is a great lever for development of the sector. Also, advantages to farmers could be realized by working together to enter into dialogue with government and advocate for changes and assistance. Currently, there is however little sense of initiative towards joint efforts. Therefore, launching an initiative to sensitize growers to the concept of collective action having a business association, working together, usefulness of cooperatives and advocacy work is recommended. This would hopefully lead to further cooperation, strengthened bargaining positions and empowerment of the farmers.

Box 9: Main functions of Tomato Farmers Associations

Tomato Farmers Associations can be linked with suppliers of quality inputs such as fertilizers, pesticides, and packaging materials. Other facilities could be provided to associations, nursery tunnels, and critical cold-chain components, including a collection center, cold trucks, a pre-cooling unit and cold storage units. These facilities aim to demonstrate the potential for resolving critical weaknesses in the value chain by providing facilities directly to the farmers through their associations.

As well, these facilities enable the associations to generate income, thus contributing to their sustainability and, most importantly, they enable tomato growers to tap into higher-value market opportunities.
It should be noted, however, that addressing farmer association is a significant challenge that must be approached in a long term, strategic manner. Once groups are formed, it is again a slow process before they will have the capacity to begin to take steps towards value addition. In the Egyptian context, to strengthen the role of farmer associations in the value addition, considerable institutional reforms should be done.

b. Stronger vertical linkages

- *Non-market linkages to be strengthened by initiatives such as Tomato Board*
- *Market and non- market linkages direct between producer and market through contract agreements*

- *Efficient flow of goods and services up and down chain*
- *Improved Support Services*

Contract Agriculture
Contracting agriculture has become, in developing countries, an increasingly common mechanism for linking farmers associations to input suppliers, particularly where missing markets or imperfect markets (e.g. credit, market information, and technical production knowledge) do not permit a reliable supply of produce in quantity or quality. Also, this kind of contracts is an organizational arrangement that link producers on one side to processors and exporters on the other side allowing those two groups to participate in and exert some contractual control over the production process without owning or operating farms.

Farmer associations or group of growers appear to be good starting points for contract farming. Cultivation is carried out by individual independent growers who enter into contracts with buyers or by farmer associations that enter into joint and mutual liability contracts with processors or exporters.

In various combinations, these contracts permit exporters to influence production technology and respond to missing or incomplete markets without having to operate or expand their own production.

The requirement of standard compliance, particularly for exports to Europe plays a role in the expansion of contract farming. Many European importers have begun to exclude smallholders who supply exporters independently because of the logistical difficulty in administering Global GAP auditing among thousands of small producers who are geographically dispersed over large areas. However, if the smallholders are vertically integrated with exporters, many supermarkets will accept the

Contract enforcement: The Egyptian judicial system functions extremely slow, and court cases can often remain in the system for several years, making it financially impossible for smallholders to file court cases of any sort. This situation is well known to any party who does not wish to honor a contract. Therefore, written contracts between two parties often favor the economically strongest party, making smallholders hesitant to enter into contract-farming arrangements. New institutional arrangements should be developed

aiming to enforce disputes between farmer associations and other chain actors. Such institutions would contribute significantly to the rapid development of contract farming and the establishment of farmer associations.

5. Improved Enabling Environment

As has been mentioned, upgrading the tomato value chain should be holistic such that all components of the chain must be addressed if a sustainable outcome is to be achieved. Interventions at one level alone cannot upgrade a chain. It is often the case that the producer level is targeted but the trading level is excluded. Trading in tomato value chains is the vital link between production and the market and requires attention.

Horticulture Development Organization of Egypt (HODOE):One method to tackle the challenge of the sector wide approach, that is clearly necessary, is through the establishment of an institution such as Horticulture Development Organization of Egypt (HODOE). This institution ideally would link market demands and research services with agro-dealers, traders and producers through technological developments. Again, it is the long term capacity building approach using existing players that is the critical strategy.

National strategy for tomato sector: GOE should come up with national marketing strategy for tomato and support the sector with legislation and facilitation on better service delivery of applied research and extension institutions; support and capacity building of associations.
There should be a ***master plan for tomato investment*** including sufficient incentives for investors, extension training services, sufficient infrastructure, market information, and identified investment zones.

Tomato Professional Board (TPB):One of the important organizations that should be created in the process of tomato value chain upgrading is Professional Tomato Board (PTB).This includes all the representatives of the 'actors' at all stages of the chain as well as of stakeholders, especially the Ministries of Agriculture and Land Reclamation, and Trade and industry.
Donor coordination in the field of tomato value chain is also important in order to capitalize on the experience obtained in the area of value chain.

Modernized sector-wide varietal map is an important element of adding value to the chain and solve many problems at the levels of production, processing and exportation. Growing processing varieties with sufficient supplies for the factories needs, either current or future expansion, add great value to the chain at all levels. Non-traditional varieties such as Cherry, organic tomatoes and tomatoes-on-vine add much to the total value for the chain.

***Investment incentive system*:** To reduce the enormous post-harvest losses tomato produce, the Government of Egypt should develop a tax-incentive package that encourages businesses to invest in cold-chains for horticultural and tomato produce.

6. Improved Supporting Services

With no means to access value addition or trade at higher levels of the chain the producer remains with low returns for the product. The producer cannot move up the value chain due to a lack of supporting services that augment weak horizontal and vertical linkages.

a. Extension services

At the production level, simple extension services could go a long way towards improving the quality and yields achieved by smallholders in particular. Currently, farmers are using incorrect inputs, poor storage methods and grading to a limited extent. If these elements were improved then greater returns for produce could be seen
Extension services can be strengthened providing training and information, such as:

- Target farmers to improve production methods in terms of quantity and quality;
- Training in agricultural processing;
- Awareness on the effectiveness of agro-agriculture;
- Integrated field management training;
- Publication of brochures and leaflets with information on climate and environmental changes, diseases and market needs;
- Support in the form of technical assistance for organizational development;
- Creating awareness about entrepreneurial training options;
- Provide training on pilot entrepreneurial experience for farmers and producers in small tomato industries

b. Research and development (R&D):

The Government should establish a competitive grant to support public-private research partnerships for the development of new varieties and new post-harvest techniques and testing, and to modify and adapt small drip-fertigation systems able to cater for tomato and other horticultural crops on small plots.

c. Information service

A market information delivery and dissemination should be developed through a user-friendly marketing information system and packaging collected information into extension messages on economic returns, where to sell and quality control.
Conduct an information campaign on access to technical assistance and funding, a tomato data set should be including the data needed to be gathered, such as the following:

- Farmers
- Crops produced
- Land profile (incl. traceability codes, results and water and soil analyses, etc.)
- Production groups (associations)
- Buyers/processors
- Greenhouse nurseries
- Specialists/consultants
- Suppliers (e.g., pesticides, agricultural machinery, irrigation equipment, etc.)
- Training/events
- Loans
- Forward contracts
- Seasonal data

- Tomato prices at different levels

d. Financing

Financing institutions and funds should be encouraged to facilitate farmers' access to loans-Access to finance at all levels:

a. Small and medium sized tomato producers: Development efforts in providing financial services should include the financing of:
   - Production inputs;
   - Row and high tunnels;
   - Drip-irrigation equipment suitable for a smallholder;
   - field packaging–charcoal cold-storage sheds, and
   - Pre-cooling and refrigerated transport for larger farmer associations and cooperatives.

b. Small and medium-sized enterprises: Development efforts to provide financial services for small and medium-sized enterprises should focus particularly on start-ups and the expansion of small and medium-sized enterprises for investments such as:
   - Refrigerated cold-chains;
   - Processing facilities;
   - Facilities producing packaging materials;
   - Professional nurseries; and
   - Business development services.

e. Transportation and marketing infrastructure

Seaport upgrading: If the port of Alexandria is to keep up with the increased refrigerated sea- container freight, it needs to be upgraded. With the expected increase in production and exports of tomato produce from Upper Egypt, it will become attractive to use the Red Sea ports; however, if this is to happen, the capacity of the ports in handling refrigerated sea-containers also needs to be upgraded.

7. Summary of Interventions for Tomato Value Chain Upgrading

The efficiency of tomato value chain can be improved in a holistic, effective and lasting manner. The salient intervention should be one that looks *to stimulate movement from high volume, low quality, and low profit production to targeted, high quality, high value produce.*

The flow chart in Figure 15 outlines how such a 'value chain upgrading' process may occur and the necessary forces needed to facilitate the process. Table 20 summarizes the interventions in a matrix.

The upgrading process of tomato value chain should start with the government to come up with a national strategy for tomato sector and support the sector with legislation and facilitation on better service delivery of applied research and extension institutions. To improve tomatoes productivity, good agriculture practices (GAP) through farmers' capacity building, creating an effective and efficient flow of information, training and knowledge. Introduction of advanced technologies and mechanization in farming practices and postharvest is a must for having efficient value chain. Organizational structure of tomato

sector should be reformulated in such a way to ensure tomato value chain integrity. Equally important, for efficient tomato value chain, is improved chain coordination; horizontal through TFAs and vertical through contracting farming. Donor coordination in the field of tomato value chain should also be considered

Figure 15: Key components of upgrading process

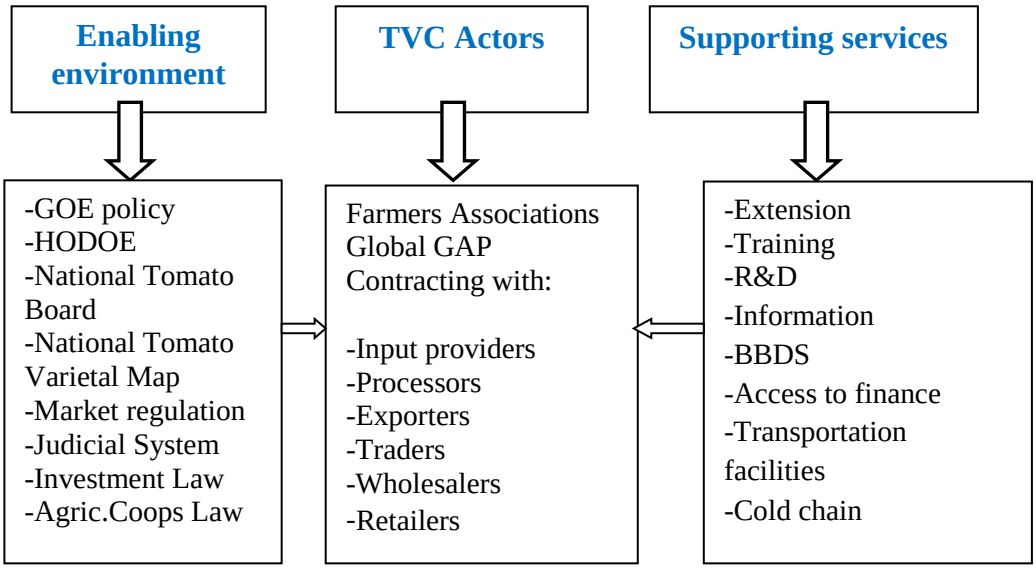


Table 20: Matrix of interventions for upgrading the tomato value chain

Problem	Interventions / activities	Roles/Responsibility	Outcome/Impact
I. Pre-production			
Random tomato varietal cropping structure	Introducing the «Varietal Map» mechanism taking into account the conditions of the different production areas with respect to climate, soil and water, and allocating areas for producing both processing varieties and export varieties. Enforcement of the Varietal Map will be through the horizontal and vertical coordination mechanisms of the TVC.	The Horticulture Research Institute (HRI) affiliated to the Agricultural Research center (ARC) will bear the main responsibility of setting the Varietal Map in coordination with the National Council of Tomato	The tomato sector is well organized in terms of varieties

Lack of local seeds for tomatoes and total reliance on imported seeds	Develop local tomato seeds through an active R &D program Control of imported seeds	Horticulture Research Institute (HRI)	Reduce reliance on imported seeds
	Implement an initiative to ensure that appropriate seedlings are provided to tomato growers at the governorate and local levels, including seedlings for green houses. Establish central nurseries and experimental fields Support nurseries for the production of special seedlings for green houses Establish nurseries that sell seedlings to farmers at a reasonable price as a business development service, preferably led by private sector or driven by farmers' Association. Use appropriate varieties suitable for each region and be marketable locally and internationally. These cultivations should clearly targeted either for fresh tomato markets or for processed product markets	Ministry of Agriculture and Land Reclamation (MALR) HRI Business Development association	Make appropriate seedlings available for growers at different locations and for different targets; processing, fresh tomato for domestic and international markets
Poor packing and packaging materials	Replace plastic crate for crate made from palm wood that contribute to substantial tomato losses, which reaches more than one third of the produce	Business development association Institutional arrangement	Reduce substantially tomato losses along the value chain

	Replacement could be done gradually until it is completed during a certain period. This procedure is economically feasible as the difference in the number of times of use is much higher than the price difference.		
Poor pesticide quality and widespread fraud in manufacturing and trade	Tighten control over the import, manufacture and trade of pesticides: through and tighten the penalties for the crime of cheating pesticides up to the extent of withdrawal of licenses. Farmers' Associations (FAs) are better able to avoid becoming a victim of cheating than an individual farmer Prepare list of registered companies as well as a list of Labelled pesticides varieties and provide them to farmers' organizations as well as non-member farmers The existence of an active FA help farmers to overcome their problems with inputs suppliers.	Ministry of Agriculture and Land Reclamation(MALR) through the Ministerial Committee for Pesticides , coordinating with tomato institutions such as NTC , HRI and FAs	Save significant reduction of the produce, thus increase yield per fed
II. Production			
Dominance of traditional agricultural practices being a major cause of reduction in tomato production	Disseminate Good Agricultural Practices (GAP) replacing traditional practices in tomato cultivations. These are the most important interventions to increase value chain performance, but they are the most difficult to implement because	Ministry of Agriculture and Land Reclamation (MALR)	Increase yield in terms of quantity and quality Accordance with local and international specifications gains for all actors Considerable

in both quantity and quality, especially between the small and medium sized farmers	they involve a radical change in farmers behavior, especially small ones. Train farmers in the application of modern agricultural technologies covering the whole range of farming operations starting with the selection of suitable varieties and land preparation, irrigation, fertilization, pest and weed control till harvest.		improvement in TVC performance
Misuse of pesticides and chemical fertilizers, causing the problem of chemical residues in fruits	Strict control on the use of pesticides and fertilizers internationally permitted. Educating farmers on the correct way to use pesticides Train applicators to spraying pesticides	Efficient extension officers of the MALR	Reduce chemical residues and raise product quality
III. Post-harvest			
Poor packing methods	Train farmers on the correct method of packing tomatoes. The packs should be plastic cages, not "gareed" cages as mentioned above. The correct method is to avoid nesting and not to put contaminated, infected or scratched fruits and not to put more than the capacity of the cage	Efficient extension officers of the MALR Subject matter specialists	Reduce physical losses
Poor uploading, storage, and transportation services	Provide growers with advisory services on proper storage tomatoes in a proper manner not to be damaged, especially in		Reduce physical losses

	conditions of high temperature and exposure to sunlight, preferably using cooling facilities		
IV. Processing			
Lack of raw materials of processing varieties and insufficient quantities enforce factories to use non-processing varieties which adversely affects conversion transaction rate and the efficiency of the industry	Allocate areas for growing processing varieties and produce sufficient quantities for factories .This could be done in the context of the proposed map.	FAs and processors	-Increase efficiency of processing -Make use of idle capacity -Increase production of ketchup and paste
Inconsistent supply of raw materials to factories compared to their needs, which causes confusion in the production plans of the factories and the occurrence of idle energies in many cases	Use "Contract Farming" mechanism to link growers of processing varieties to processors to ensure that the supply of raw materials is consistent with the needs of factories in order for these factories to continue to use local raw materials on a commercial scale	FAs and processors	Increase efficiency of processing Make use of idle capacity Increase production of ketchup and paste
V. Export			

Lack of transportation services and export facilities	Pump more investments to improve transportation infrastructure and facilities for export markets, including increased availability of air cargo spaces, reduced air freight costs, and development of sea freight and port capacity	Public-private partnership (PPP)	Reduce cost of transportation for exports
Enabling environment			
Weak institutional setting of agriculture	Strengthen institutional setting with focus on resolving the problems and constraints that have been identified as obstacles to the effective functioning of the tomato value chain. Develop business services, including collection and dissemination of market information, enhancement of the flow of knowledge, and assistance in such areas as technology upgrading, quality management and training; and Creation of an enabling environment for private sector development; Infrastructure for the application of accreditation systems - Food quality standards, hygiene, safety and social and environmental standards that may be demanded by markets or buyers.		
The absence of a government	The government role is very important to support the value chain for tomatoes ,		

policy towards tomatoes	especially for public services such as agricultural extension, research and development as well as investment in basic infrastructure		
Supporting services			
Weak extension services	Strengthen extension services: providing training and information, such as: Target farmers to improve production methods in terms of quantity and quality Training in agricultural processing Awareness on the effectiveness of agro-agriculture Integrated field management training Publication of brochures and leaflets with information on climate and environmental changes, diseases and market needs Support in the form of technical assistance for organizational development Creating awareness about entrepreneurial training options Provide training on pilot entrepreneurial experience for farmers and producers in small tomato industries Information campaign on access to technical assistance and funding Assist financing institutions and funds to facilitate farmers' access to loans		

VII. PLAN OF ACTION FOR UPGRADING TOMATO VALUE CHAIN

Upgrading the tomato value chain is not the same procedure as solving the problem on one-time basis at one of the value chains levels. In other words, the whole value chain-levels should be dealt with as an integrated body.
The proposed intervention intends to help all value chain members – input suppliers, growers and producers, collectors and traders, processors, retails outlets and exporters – to upgrade their production, increase the level of value addition and comply with technical regulations, codes of good practices and conformity standards required by destination markets, thereby facilitating their access to those markets. Enterprises in the tomato sector will thus generate higher aggregate value and offer more equitable shares for the chain actors.

The proposed plan will be implemented through the engagement of relevant line ministries: Ministry of Agriculture and Land Reclamation and Ministry of Trade and Industry as well as the private sector and civil society organizations.
This section displays the proposed action plan for upgrading the tomato value chain in Egypt. It describes the suggested ways of interventions implementation taking into consideration the unity of the chain. The plan will be implemented on three levels ; Level1 encompasses the interventions and activities that are related to the tomato sector and enabling environment; Level 2 deals with the interventions and activities to be implemented on a pilot area level; and Level 3 in which the plan will be implemented country-wide. Also in this section, special interventions and activities for chain coordination and losses are addressed.

1. Level 1: Interventions and Activities at Tomato Sector Level, Enabling Environment, and Supporting Services

Tomato value chain upgrading should be inclusive and implemented on the whole tomato sector level. It is necessary, therefore, to start the upgrading process with the sector level appropriate institutional reforms and policy measures and procedures. Proposed institutional and policy interventions at this level focus mainly on enabling environment and strengthening supporting services for the chain upgrading. In this context, a wide variety of interventions and activities have to be implemented. Following are the most important of these interventions and activities accompanied by suggested executive procedure and responsibility.

Activity1: Set governmental policy for tomato sector.
Execution: The Ministry of Agriculture and Land Reclamation to propose the policy to the Government to approve;

Activity2: Establish a commodity board called "Tomato Professional Board (TPB), which assembles representatives for all players in the TVC and will have role of managing the chain, linking market demands and research services with agro-dealers, traders and producers through technological developments such as Exchange of Agricultural Commodities of Egypt (EACE) or the emerging E-technology

Execution: The Ministry of Agriculture and Land Reclamation in consultation with the Ministry of Trade and Industry (to recommend tomato processing representatives) and the Ministry of Supply and Home Trade (to recommend tomato traders and exporters);

Activity3: Qualify the UPEHC as a semi-governmental body to take the role of providing support the Plan of Action for Tomato Value Chain upgrading specifically in terms of collecting basic information of tomato sector, growers registration and training, mobilizing the sector resources, as well as designing national tomato varietal map with the cooperation of the Horticultural Research Institute (HRI) of the Agricultural Research Center (ARC);
Execution: The Ministry of Agriculture and Land Reclamation

Activity4: Mobilize resources for the implementation of the Plan of Action for Tomato Value Chain Upgrading.
Execution: The Ministry of Agriculture and Land Reclamation in cooperation with the other concerned ministries (specifically the Ministry of Trade and Industry, the Ministry of Supply and Home Trade, and the Ministry of Transportation) as well as the proposed National Tomato Board);

Activity5: Register tomato growers with basic information (location, size, type of farming technology...etc).
***Execution*:** The Ministry of Agriculture and Land Reclamation (the Department of Economic Affairs Sector);

Activity6: Design *tomato varietal map* covering the whole tomato sector
Execution: The Horticultural Research Center (HRI) affiliated to the Agricultural Research Center (ARC) based on the proposed tomato policy and in consultation with the proposed Tomato Professional Board;

Activity7: Issue laws and procedures that motivate private investment in the areas of tomato marketing infrastructure such as cold chain facilities and post-harvest centers, tomato green houses, and nurseries.
Execution: The GOE upon the proposition of the Ministry of Finance in consultation with the propose National Tomato Board.

2. Level 2: Interventions and Activities at the Chain Stages Level

It is proposed that the suggested interventions for the PATVCU should be applied in a pilot area before extending them to other areas of tomato cultivations. The best areas are Esna District (Upper Egypt), and Noubarya (West Delta). These two areas have witnessed the implementation of number of donors-supported projects and initiatives concerning some horticultural crops (including tomato) value chains upgrading.

Intervention 1: Organize smallholders production

Activity1: Organize tomato growers in groups for value chain.
Execution: The Union of Producers and Exporters of Horticultural Crops (UPEHC) affiliated to the Ministry of Agricultural and Land Reclamation. Because this first step is critical for the whole process, there should be a "seed money" available for it. The seed money may be financed by public budget or by the agricultural cooperative system or through donors' grants;

Activity2: Provide tomato growers training in Global GAP.
Execution: Private training centers and university specialized units

Activity: Establish Tomato Growers' Associations.
Execution: Based on the growers groups that are formed at the first step, Tomato farmers associations will be established either under the Agricultural Cooperation Law or under the Law of Civil Organization s.

Activity3: Link Tomato Growers 'Associations to actors at the higher levels of the chain, namely, processors, traders, supermarkets, hotels, restaurants, and exporters in order to secure the vertical coordination of the chain.

Execution: Linkages could be arranged through the contracting parties themselves with administrative and legal assistance from the proposed Tomato Professional Board (NTB).In addition, the Contracting Agriculture Unit established within the Ministry of Agriculture and Land Reclamation will play an effective role in encouraging the use of such linkage mechanism.

Activity4: Establish a network of demonstration tomato farms and model farms to strengthen the extension support service
Execution: The extension service provided by the Ministry of Agriculture and land Reclamation to Tomato Growers' Associations

Intervention 2: Organizing Growers' Marketing & Sales

Activity1: Provide growers production planning services and orientation sessions to farmers on marketing of tomato and quality standards of different buyers
Execution: Private training centers and university specialized training units

Intervention 3: Strengthening Business Linkages / Logistics Services

Activity1: Facilitate tomato grower's access to Hybrid seedlings improvement.
Execution: the Horticultural Research Institute (HRI) in cooperation with Tomato Grower's Associations and private nurseries;

Activity2: Train and certify operators and applicators
Execution: Private training agents and extension service providers

Activity3: Support Global GAP Certification
Execution: The Global GAP certification body with the assistance of HEIA and the TPB;

Activity4: Conduct joint orientation/training sessions with exporters, input suppliers, traders, food processors, supermarkets …etc.
***Execution*:** Private training agencies and other training providers such as university special units in cooperation subject matter specialists provided by the Ministry of Agricultural and Land Reclamation.

Intervention 4: Capacity Building Training and Associations' Support

Activity1: Enhance Tomato Growers' Associations capacities to serve the tomato farming communities in the marketing areas, forward contracting and access to inputs.
Execution: Private training agencies and other training providers such as university special units;

Activity2: Develop and deliver a scientifically-based integrated training and extension program covering all stages of tomato production, harvesting and post-harvest processes.
Execution: Private training agencies and other training providers such as university special units in cooperation subject matter specialists provided by the Ministry of Agricultural and Land Reclamation.

Intervention 5: Monitoring and Evaluation (M&E)

Activity1: Collect data and information at the chain's different levels and conduct performance and reporting analysis.
Execution: Private agency or university specialized unit upon the request of the National Tomato Board.

3. Level 3: Interventions and Activities Country-wide

At that level, interventions are extended to other areas of tomato cultivations in the country. Interventions will be elaborated and reformulated considering the Monitoring and Evaluation (M&E) performance for Level 2 (Pilot area).

4. Specific Actions for Improved Chain Coordination and Losses Reduction

a. Actions for improved chain coordination

Actions for improved horizontal coordination:

Tomato Farmer Associations (TFAs):
Tomato growers should be organized in groups to be nuclear for TFAs After gaining the initial experience of working as a group, development efforts should assist in forming independent, registered farmer associations and cooperatives specialized in tomato.
Functions of TFAs and contribution to coordination:

- Facilitate the Global GAP logistical problems as auditing and certification but also facilitating
- To integrate vertically with exporters and to have access to bank credit.
- Provide facilities to associations, nursery tunnels, and critical cold-chain components, including a collection center, cold trucks, a pre-cooling unit and cold storage units. These facilities aim to resolve critical weaknesses in the value chain by providing facilities directly to the farmers through their associations. In addition, they enable the associations to generate income, and most importantly, they enable farmers to tap into higher-value market opportunities.
- Training and support may be provided by the Ministry of Agriculture and Land Reclamation (MALR) to Farmers 'Associations to strengthen their capacity to provide services to their members.

Processing SMEs:
Establish associations and clusters for the SMEs in tomato processing sector aiming to enhance the performance of SME clusters by improving the efficiency, quality. Build the capacity of local support institutions and improving SMEs cluster governance.

Actions for improved vertical coordination

Two main instruments will be used for coordinating the tomato value chain vertically; the Tomato Professional Tomato (TPB), proposed in the last section, and the Contracting Agriculture.

The Tomato Professional Board (TPB): This Board will contribute to coordinating the TVC for deeper integration through the following functions:

- Managing the whole chain,
- linking market demands and research services with processors, traders and producers,
- Communicate on behalf of members with government officials over the Tomato Value Chain issues, and;
- Promoting dialogue between stakeholders of tomato value chain. Improved dialogue assists in formulating the sector strategy.

Contracting Agriculture:

- Use "Contract Agriculture" mechanism to link growers of processing varieties to processors to ensure that the supply of raw materials is consistent with the needs of factories in order for these factories to continue to use local raw materials on a commercial scale.
- Link Tomato Farmers 'Associations with suppliers of quality inputs such as fertilizers, pesticides, and packaging materials. Through contracting linkages, associations can provide guaranteed inputs (with certificates of analyses) in bulk, at discounted prices; pool community resources to obtain equipment that is too expensive for a single farmer to purchase; and aggregate produce in order to access markets that require larger volumes.
- Link Farmers' Associations with higher levels of the chain actors such as exporters, wholesalers and retailers (supermarkets, restaurants, hotels, etc.)

b. Actions for chain losses' reduction

As has been mentioned earlier, tomato physical losses in the current chain are estimated by 35.8 percent of the total tomato production. This estimate is the sum of losses percentages in the three main stages of the chain; production, post-harvest, and retail being 9.2, 11.8, and 14.7 percent respectively. The Plan of Action for Tomato Value Chain Upgrading is expected to reduce the total losses percentage to 15 percent. Actions and activities that will contribute to such reduction are as follows:

Policy and market regulation: Set governmental strategy and more predictable supply/demand in order to avoid oversupply. Rational planning before season or the interference of the government would provide good chance to organize tomato production especially that this situation involves many players including farmers, wholesale traders, exporters, factories, supermarkets, and restaurants. The proposed tomato varietal map could be an effective instrument in regulating tomato market. This intervention is the responsibility of the GOE through the concerned ministries such as the Ministry of

Agriculture and Land Reclamation, the Ministry of Trade and Supply, and the Ministry of Supply and Home Trade, with consultation with concerned tomato-related organizations.

Quality inputs: tomato losses could be reduced depending on the availability of quality pesticides, fertilizers, and varieties as well as information/knowledge, labor, and financing. Linking tomato producers to input suppliers through Contracting Agriculture is a successful mechanism for provision of quality-guaranteed inputs.

Good agricultural Practices (GAP): Provide training and advisory services for tomato growers in Good agricultural Practices .plant protection, weather, irrigation, fertilization, information, plant care. Some of tomato losses production stage like infected fruit, sun-burnet, cracked fruit due to thirst and recent irrigation and delay harvest; Farmers do their best to manipulate this kind of losses by refraining to grade the production, sell the production on its plants, topping the crates … etc. Such training and advisory services could be provided by either the Ministry of Agriculture or Land Reclamation (the Union of Producers and Exporters of Horticultural Crops) or through private sector agencies.

Grading and storing: Train farmers on product grading and sorting. This could be conducted by private sector training centers.

- ***Packing materials***: Provide basic packaging materials during the harvest. The packs should be plastic cages, not cages made from palm wood as mentioned above. Private sector and business development companies, supported by relevant government motivations, could implement the generalization of plastic cages.
- ***Packing methods***: Train farmers and awareness on the correct method of packing tomatoes. The correct method is to avoid nesting and not to put contaminated, infected or scratched fruits and not to put more than the capacity of the cage. Training and awareness could be conducted by private sector training centers paid by the producers.
- ***Storage***: Provide growers with advisory services on proper manner storage in which tomatoes should not to be damaged, especially in conditions of high temperature and exposure to sunlight, preferably using cooling facilities. Proper storage at the producer level lengthens product life and decrease post-harvest losses. Advisory services could be provided by private sector subject matter specialists paid by the producers.
- ***Uploading and Transportation****:* Provide advisory services for farmers on uploading and transportation of tomato from the farm to market. The produce should be transported with no delay either in picking up the load or on the road to market. With this, un-noticeable damage in tomato quality can be avoided. In general, drivers do not pay for this damage, yet more likely farmers do.
- ***Storing facilities***: Establish necessary storing (cool storage) and pre-cooling facilities close to the production. Private sector investors could be motivated by certain tax exemptions to invest in such area
- ***Investment in handling facilities***: Invest in picking, grading, packaging, cold storage and equipment needed to ensure proper handling of products and preserving its quality during its stay in the storage. The Government of Egypt should develop a tax-incentive package that encourages businesses to invest in cold-chains for tomato.
- ***Wholesaling****:* i) Improve the marketing services provided at the existing central wholesale markets with respect to grading, sorting, cooling, and storage This could be done by motivating the wholesale traders to invest in cooling and storage units

inside the wholesale markets. ii) Moreover, a wholesale market should be established at each governorate and main production areas in order to shorten transportation distances and periods which reduce losses. This could be achieved either by the Ministry of Local Development or by the private sector motivated by a tax-incentive package.

- ***Retailing****:* All damage and infected tomato is disposed in this stage. Losses at small retailers vary according to the grade. Customer's behavior or habits, the way the tomato exposed at the retailer, and time the produce stay to be sold Changing customer's behavior, diet pattern or bio-products demands an alliance of another kind of value network that includes mass media, companies, supermarkets, customer associations … etc.
- ***Exportation***: Resolve farmers' problem with exportation. They have to send their production to the collection centers, which takes only the first grade (15-20% of the produce), while they have to find another way for selling the rest in this long process and vulnerable product. This could be resolved through relevant contracts

VIII. EVALUATION TOMATO VALUE CHAIN UPGRADING

In this section, the tomato value chain upgrading is evaluated through three issues .These issues are: (i) the outputs generated by the upgrading at the end of the plan, (ii) the value addition resulting from the upgrading, and (iii) the distributional effects of the chain upgrading.

1. Outputs of Upgrading the Tomato Value Chain

The proposed upgrading of the Tomato Value Chain would result in three major outputs; (i) increase in tomato production,(ii) reduction in physical losses, and (iii) improvement in the produce quality. With these outputs achieved, there will be improvements in tomato exports; fresh and processed, value added, and actors' incomes. These will be discussed below:

(i) ***Tomato production***: Interventions and activities related to pre-and post-production stages will result in significant increase in tomato productivity. The use of certified quality pesticides, fertilizers, and seeds/ seedlings as well as the application of Global GAP with improved support services would result in significant increase in tomato yields. This increase could be estimated by 50% from the current yield, i.e., from 16 to 24 tons/fed on average with a growth rate of 8.4% annually during a 5-year period. Assuming the current tomato area; i.e. 469,000 fed, will be maintained, the total tomato production would reach 11,6 ml tons at the end of the plan (Table 21).

(ii) ***Tomato losses reduction***: As a result of improving the varieties, picking and packing methods, packing materials, pre-cooling facilities and transportation, tomato losses will be reduced from 35% to 15%.Therefore, the total losses will be 1.7 ml tons annually compared to current 2.7 ml tons (with lower production).About 1.3 ml tons or 77 percent of total losses occur in marketing channel of farmer-wholesaler-retailer-consumer. The rest of losses; 0.4 ml tons or 23 percent occur in the other three channels

(iii) ***Tomato sales through different marketing channels:*** Total sales, which is the production net losses, amounts to 9.9 ml tons annually. This will be distributed among four marketing channels. The share of domestic consumption of fresh tomato, through the channel: farmer-wholesaler-retailer-consumer is about 7.55 ml tons or 76 percent. Quantity of tomato raw materials sold to processing factories is 2 ml tons or 20.2 percent, through the channel: farmer-wholesaler-processor. The remaining 0.3 ml tons, go to international market as fresh exports.

(iv) ***Fresh exports***: fresh tomatoes export volume will increase from 91 to 300 thousand tons, with a growth rate of 30% per year. International market has a good potential to absorb more production, especially with the competitive advantage of Egyptian tomato abroad.

(v) ***Tomato processing***: As per the abovementioned, 2 ml tons or fifth of the total tomato production (without any losses) will be absorbed by processing factories as raw materials. This amount is five times greater than the amount of raw materials used

today in tomato processing. Upgrading the tomato value chain, with the tomato sector efficiency raised, will assist in achieving the tomatoes industry's target. In this regard, development efforts in the processing sector supported by the chain upgrading will contribute in raising the capacity of the processing factories.it is expected that the conversion ratio will be reduced from 6.5:1 to 4:1). The current idle capacity will be utilized, in addition to the investment sector expansion. Resolving the problem of raw materials, working days in factories will be extended from 50 to 90 days a year. Applying the conversion rate of 4:1, the 2 ml tons will produce 500,000 tons of ketchup and paste annually compared to current 60,000 tons.

(vi) ***Sales of processed tomato products***: The ketchup and paste production are to be sold via both domestic and international markets; sales to the two markets will be 200,000 and 300,000 tons respectively.

Table 21: Estimates of economic returns of upgrading tomato value chain

Marketing Channel	Quantity produced (000,mt)	Losses (000,mt)	Raw materials (000, mt)	Net Quantity (000,mt)	Unit value (LE/mt)	Gross value	
						(LE/ml)	%
Farmer Wholesaler Retailer consumer	8884	1333		7551	4500	33980	68.1
Large farmer Exporter intl. market	353	53		300	13615	4085	8.2
Farmer-wholesaler-retailer-consumer	941	141	800	200	14775	2955	5.9
Farmer-wholesaler-processor-intl market	1412	212	1200	300	29550	8865	17.8
Total	**11590**	**1739**	**2000**			**49885**	**100.0**

Source : The Author's own calculations

2. Value Addition

The value addition is the increase in the total value of the end outputs as a result of the improved mechanisms used in upgrading the tomato value chain. Thus, the value addition refers to the change in the sales total value at the end markets between the current and upgraded chains.

As mentioned beforehand, the sales course includes fresh tomato via both domestic and international markets in addition to processed tomato products via other markets. The said different sales are valued at the same prices that are currently dominant. Table 22 exhibits the results concerning the expected added value due to the improved chain. It shows that the total value of sales at the end of the plan for upgraded value chain is about LE 50 billion compared to current value of LE 23 billion which means that the overall added value is LE 27 billion annually.

Furthermore, the structure of output of upgraded chain will be significantly different from that of current value chain. The high value adding outputs (especially processed products and exports either fresh or processed) will have higher share in the upgraded chain compared to the output of the current chain. In the contrary, the share of fresh sales in the domestic market will be lower. The sales added value will increase from LE 2.4 billion (contributing 10.4% to the value chain) to LE 16 billion (contributing 34% to the value chain). Contribution of fresh sales for domestic consumption will decrease from approximately 90% at the base line to 68% at the end of the upgrading plan; even though the value of these sales will increase to LE 34 billion from LE 21 billion.

Table 22: The value added due to updating tomato value chain

Marketing channel	Value of current sales		Value of sales under upgraded TVC		Value added Of upgrading	
	Ml LE	%	Ml LE	%	Ml LE	(%)
Farmer-wholesaler-retailer-consumer	20844	89.6	33980	68.1	13136	63.0
Large farmer Exporter intl. market	1239	5.3	4085	8.2	2846	229.7
Farmer Wholesaler processor retailer consumer	600	2.6	2955	5.9	2355	392.5
Farmer Wholesaler processor intl. market	591	2,5	8865	17.8	8274	1400.0
Total	**23274**	**100.0**	**49885**	**100.0**	**26611**	**114.3**

Source: Calculated by the Author

3. Income and Distributional Effects of TVC Upgrading

The chain players, in general, will be able to gain higher profits due to TVC upgrading but with varying degrees. The actors of small and medium size, particularly farmers and processing MSMEs will have increased incomes with higher shares of the total value of the upgraded chain compared to current one. In the current chain, small and medium farmers have the lowest share of the total end-markets value. But under the upgraded chain they have much higher incomes due to significant increase in yield; 50 percent in average; with a slight increase in costs of production. The yield increase will be mainly due to use of improved varieties and enhanced agricultural practices as well as the losses reduction.

The processors' profits will increase as a consequence of cultivating the appropriate processing verities and ensuring regular supply of raw material tomatoes for extended period of working days to factories at reasonable prices throughout the year, all achieved through contract farming linking processors to tomato farmers associations. Additionally, growers of processing varieties will have the opportunity to make higher profits. The exporters, as well, will make higher incomes due to increased exportation and markets diversification. With respect to traders, they will be impacted by upgrading process in different ways depending on the type and function of trader. For village and local traders and brokers, large number of them maybe, partially or totally, replaced by the tomato growers associations particularly in the cases these are linked to the higher levels of actors. The wholesalers will, most probably, continue maintaining their existence but with less control with respect to coordination and price determination due to the direct link between growers associations from one side, and processors, exporter, and modern retailer series from the other side. Furthermore, under the upgraded efficient tomato value chain, the wholesalers and traders will have to reduce their margins and provide improved marketing services in order to maintain reasonable share in the marketed produce.

IX. CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

To conclude, Tomato Value Chain (TVC) as featured by its current overall situation is inefficient in terms of major indicators particularly with respect to quality and losses of tomato produce reflected on performance of exports and processing.

Box 10: Reasons behind inefficiencies of current tomato value chain

The tomato value chain in Egypt is fragmented with tiered systems and weak linkages. One major feature of this fragmentation is that tomato growers are disconnected with the end market which limits their ability to acquire fair share in consumer price. Such weak position of growers is a combined result of a number of problems and constraints. These problems include: farm fragmentation, improper cultivars, backward technologies, tremendous physical and economic losses, instable and unpredictable income for tomato crop, and very low growers share in consumer prices

Main reasons behind tomato value chain (TVC) inefficiency are fragmented production, lack of farmers 'Associations (FAs), lack of technologies, lack of coordination, lack of supporting services such as extension, R&D, information, and finance. The producer cannot move up the value chain due to a lack of supporting services that augment weak horizontal and vertical linkages.

Combating with the above bottlenecks and implementing strategic measures of competiveness along the tomato value chain will be vital in transforming tomato subsistence production to market oriented and commercial production. Therefore, the government is recommended to partner with private sector, financial institutions through public-private partnership initiatives to enable farmers afford quality inputs through appropriate programs such as bulk purchasing and local manufacturing; to invest in road infrastructure development that will promote private investment in all areas of agriculture and facilitate linkage of tomato production to processing sector; to identify successful models of public-private partnerships (PPP) and business to business (B2B) alliance to raise value chain competitiveness and scale; to invest in transport infrastructure corridors to link high potential production zones and major market areas within and across the regions, to develop quality management, certification services system and harmonize standards, norms and grades across governorate and national markets; to create partnership opportunities for small scale infrastructure investment in rural areas such as post-harvest and other market related infrastructure to integrate smallholder farmers into local and export value chains; to seek stronger partnerships between leading agribusiness in the governorate with small enterprises and farmers in the governorate to promote strong technology and market links in existing and emerging value chains; to eliminate regulatory and administrative barriers and disincentives impeding or raising the unit cost of the movement of tomato across local and cross-border markets; and to encourage private investment in production, quality grading, packing, storage, processing and market-related infrastructure to accelerate integration of smallholder farmers into value chains.

2. Recommendations

The study recommends that the GOE adopts the Plan of Action for Tomato Value Chain Upgrading (PATVCU), as outlined in this report, in a context of Public-Private Partnership (PPP). The proposed plan will be implemented through the engagement of relevant line ministries: Ministry of Agriculture and Land reclamation, Ministry of Trade and Industry and the Ministry of Supply and Home Trade as well as the private sector and civil society organizations.

The main elements of this plan are as follows:

- The need for a strategy and integrated policy for the tomato sector in the context of a comprehensive strategy for horticulture sector;
- Develop and modernize the institutional structure of the governmental and private bodies related to tomato;
- Design and enforce a national-wide varietal map for tomato production that reflects the objectives of tomato sector policy. This map takes into consideration all economic and geographic factors that affect tomato production and marketing;
- Establish regions specializing in the production of tomatoes either oriented to export or oriented to processing;
- Cultivate export varieties which has increasing demand such as organic and cherry;
- Specify a geographic area as Pilot Area to apply the proposed interventions for tomato value chain upgrading as an initial stage before nation-wide generalization. The pilot area is recommended to include Esna District (Upper Egypt) from as well as Nubarya (West Delta- Egypt). The interventions and activities include :
- Educate and assist tomato growers to establish Tomato Farmers Associations
- Assist Tomato Farmers 'Associations linked to processors , traders, and exporters through contracts
- Improve the performance of support services, i.e. extension and training for farmers and workers, R&D, information, demand and field studies, business development , and access to finance
- Coordinate between production centers and exporting windows an processing factories through use of contracting agriculture as a successful mechanism in linking tomato growers or their associations to exporters and processors.

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