

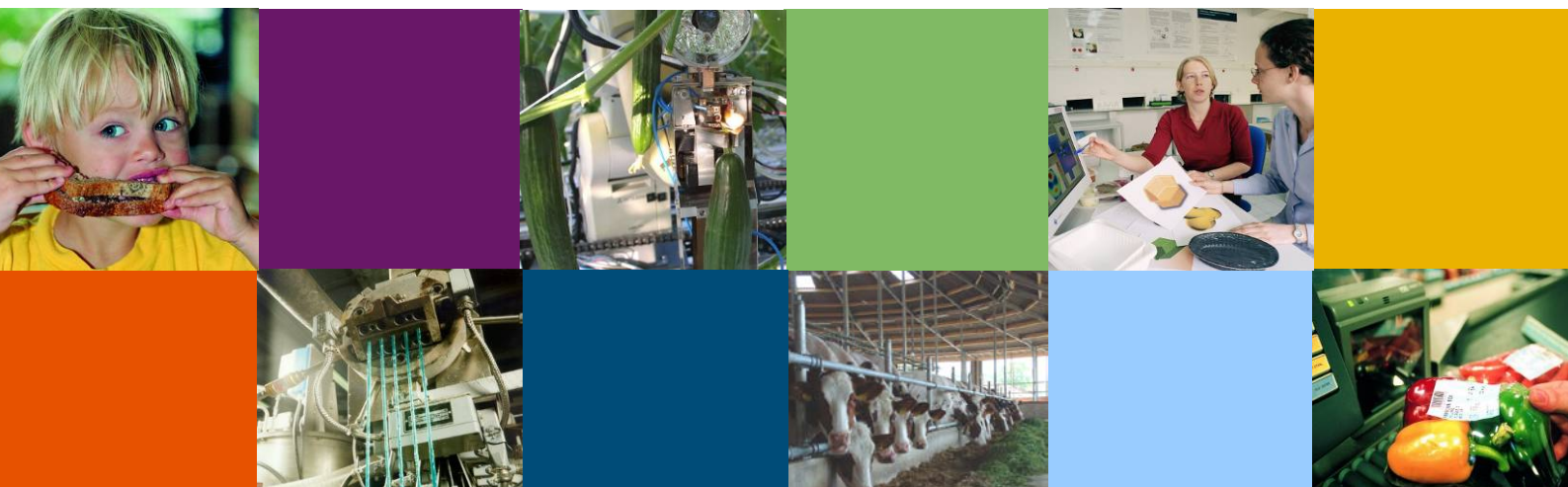


Metropolitan food supply in Egypt

Hydroponics production of leafy vegetables

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Report 1548



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| Title | Metropolitan food supply in Egypt. Hydroponics production of leafy vegetables |
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| Number | Food & Biobased Research number 1548 |
| ISBN-number | 978-94-6257-403-8 |
| Date of publication | February 2015 |
| Confidentiality | No |
| OPD code | OPD code |
| Approved by | Nicole Koenderink |

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Summary

This study incorporates the follow up activities of the two earlier missions of Wageningen UR/ Food & Biobased Research (FBR) to Egypt, the exploration mission of 2013 (Broek and Boerrigter, 2014a) and the commitment mission of 2014 (Broek, Boerrigter and Waldhauer, 2014b), targeting the improvement of food security in Egypt in general and the reduction of post-harvest losses in particular.

The activities have the following objectives:

- Support the longer term cooperation within the Egyptian agribusiness sector as well as with their Dutch counterparts by contributing to the preparation and official launch of the Agrologistics forum Egypt;
- Facilitate in the set-up of pilots by providing further insight into a pilot around hydroponics production in Egypt.

Agrologistics forum

The Agrologistics Forum was officially launched on November 25, 2014 in Cairo and has the following goals:

- 1) Exchange knowledge and good practice between various players in the agrologistics field;
- 2) Identify cooperation potential between Egyptian and Dutch parties;
- 3) Facilitate in finding funding for identified pilots and projects.

Pilot hydroponics production

The business case for a pilot of high-tech hydroponics production in a closed system in the area of El Gouna/ Hurghada comes to a financially interesting result of a factor 2 -3 variation between the current local price and the cost for producing locally in a high-tech system. In other words, there is a business potential for hydroponics production in Egypt. However, the Egyptian parties involved considered the price variation as too high for their business interests to set the products with a correspondingly increased price into the market. Modified pilot scenarios should be investigated in order to come other interesting set-ups and then involve interested business partners. Possible changes in the scenario could be the switch to a low-tech solution or the change of the geographic area.

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Acknowledgements

This project was initiated and funded by the Netherlands Embassy in Cairo and we wish to express our gratefulness to Joost Geijer, Head of the Economic Department and Agricultural Counsellor, Marwa Hussein, Senior Policy Advisor, and Renske de Haan, Assistant Economic Cluster, for the excellent local support whenever necessary and the arrangement of necessary meetings with local experts. We wish to further extend our appreciation to the Netherlands Embassy in Cairo for the provision of their facilities, which made our meetings smooth and efficient. Finally, we wish to thank everyone who has thought along this research, shared their thoughts and helped us shape and sharpen our own ideas.

1 Introduction

1.1 Background

Worldwide we observe the parallel trends of a significantly increasing world population and of strong urbanization resulting in changes in the consumption pattern for food, namely increasing demand for fruit and vegetables, meat and fish, milk products, fruit juices, soft drinks, beer, wine and spirits as well as higher standards regarding food safety, freshness, taste and fashion in food (UNFPH, 2008; IFPRI, 2008). These developments can also be observed in Egypt with the explosive growth of the total population and significant enlargements of urban centers and in parallel growing demand for fresh food of high quality and taste (Dawoud, 2013). First local initiatives answer to these demands, especially catering to the upper class of the Egyptian society who has both awareness of the problem and enough wealth to pay for more expensive products. However, these developments are too slow to solve the problem in the near future and thus the problem is only increasing. The Netherlands on the other hand has significant experience and expertise worldwide in the production of fresh fruit and vegetables and on how to transform this production into successful business models. Therefore the agricultural office of the Dutch Embassy in Egypt in close cooperation with DGAGRO of the Dutch Ministry of Economic Affairs has been developing a program on agrologistics in Egypt since June 2012. The program is targeting the improvement of food security in Egypt in general and the reduction of post-harvest losses in particular as major gains in securing food supply of the population are expected in this area.

Within the mentioned program of the Dutch Embassy two field visits of experts of Wageningen UR/ Food & Biobased Research took place. The exploration mission in 2013 showed great enthusiasm and openness among Egyptians entrepreneurs to take up new ideas and explore opportunities and resulted in the identification of possible opportunities and further actions for strengthening the food supply chain in Cairo in particular and Egypt in general (Figure 1).

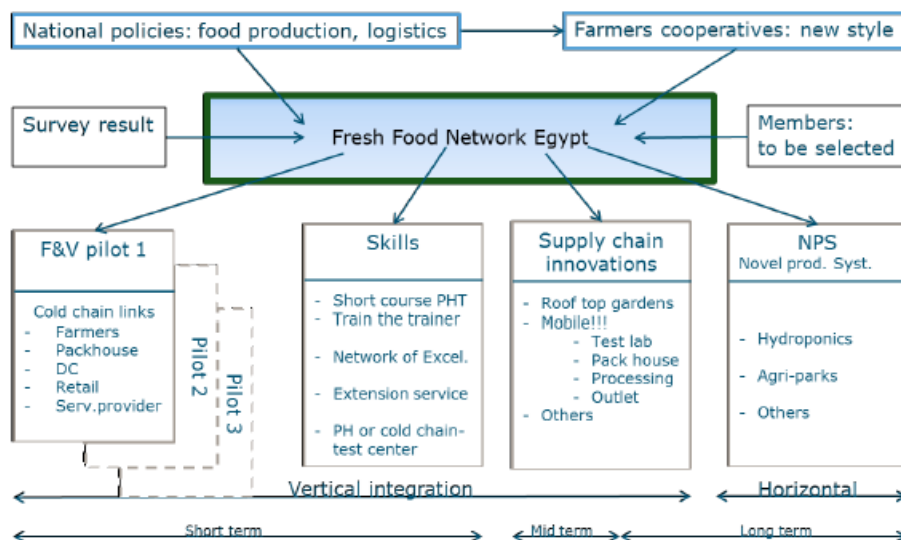


Figure 1: Output of the quick scan inventory aiming for food supply chain improvements in Cairo (Broek and Boerrigter, 2014a)

The commitment mission in September 2014 took those ideas a step further, investigated the commitment of Egyptian parties regarding a number of these opportunities and led to the identification of a number of concrete follow-up activities in order to give further specification and form to the first ideas on the following three areas:

1. Cooperation on the longer term within a fresh food network in Egypt (the ‘Agrologistics Forum Egypt’)
2. Skills development on post-harvest technology
3. Set up of pilots

1.2 Objectives, deliverables and scope

This study incorporates activities regarding areas 1 and 3 of the above mentioned areas and consequently has the following objectives:

- Support the longer term cooperation within the Egyptian agribusiness sector as well as with their Dutch counterparts by contributing to the preparation and official launch of the Agrologistics forum Egypt;
- Facilitate in the set up of pilots by providing further insight into a pilot around high-tech hydroponics production in Egypt.

The study resulted in the following deliverables:

- A presentation during the launch of the Agrologistics Forum Egypt on November 25, 2014 in Cairo (see chapter 2);
- A high-level business case on high-tech hydroponics production of leafy vegetables in Egypt (see chapter 3).

The activities regarding the pilot have the following scope:

- Product group: leafy vegetables¹
- Geographic area: El Gouna with possible extension to Hurghada as neighboring community²

1.3 Report outline

Chapter 2 summarizes the activities and results regarding the Agrologistics Forum Egypt performed within this project. Chapter 3 summarizes the findings regarding the hydroponics pilot and presents conclusions and gives further recommendations for possible next steps.

¹ Based on current information leafy vegetables is the most suitable product group for hydroponics production, which is the reason for this scoping decision.

² During the earlier mission a first group of interested parties was identified in El Gouna, which is the reason for this scoping decision.

2 Agrologistics forum

The Dutch Ministry of Economic Affairs, DG AGRO, in close co-operation with the agricultural office of the Embassy of the Netherlands in Cairo has been developing a program on agrologistics in Egypt since June 2012. The starting point of the program is that the linkage between agri-food and logistics is very important with respect to building efficient agri-chains. The successful set-up of efficient agri-chain concepts is a major contribution to the success of the Netherlands as, besides the United States, the world's biggest agri-food exporter. One of the



central initiatives that was proposed as a result of the exploration mission was the set-up of a fresh food network. This initiative was started by the Embassy of the Netherlands and led to the official launch of the Agrologistics Forum on November 25, 2014 at the American University in Cairo.

Figure 2: Official launch of the Agrologistics Platform Egypt

The platform has the following goals:

- 1) Exchange knowledge and good practice between various players in the agrologistics field;
- 2) Identify cooperation potential between Egyptian and Dutch parties;
- 3) Facilitate in finding funding for identified pilots and projects.

The event targeting Egyptian as well as Dutch parties was very well received with estimated around 100 participants, mainly from Egypt, covering the agricultural and logistics industry, governmental institutions, NGOs and knowledge institutions. Key notes were given by:

- H.E Mr. Gerard Steeghs, Ambassador of the Netherlands to Egypt;
- H.E Adel Tawfiq El-Beltagy, Minister of Agriculture and Land Reclamation, and
- Dr. Abla M. Adb El Latif, Policy Advisor at the Ministry of Industry and Foreign Trade and Professor of Economics at the American University of Cairo.



Figure 3: Official launch of the Agrologistics Platform Egypt

3 Pilot study high-tech hydroponics production

This study focuses on a high-tech hydroponics solution which takes place in entirely closed production units using exclusively artificial light. This concept offers several significant advantages compared to traditional agriculture as well as to traditional hydroponics, which makes it particularly interesting for the Egyptian situation. Production under fully controlled conditions increases the productivity; the production can take place year round and in rolling cycles, so that crops in any status of growth are available making it possible to harvest fresh produce literally every day. The quality of the products is extremely high and waste before consumption is therefore much smaller than usual. Furthermore, the products are safe as they are not only grown in closed production systems but also do not need to be rinsed with possibly contaminated water before consumption. Further interesting points in particular in countries like Egypt are the low usage of water and soil for production. A ‘special feature’ is the fact that artificial light can be used to influence the shape and colour of the growing product, which can be an extra selling point towards high end restaurants and hotels.

The following possible pilot set-ups were identified:

Table 1: Possible hydroponics pilot set ups

| Target group | Channel | Location for pilot | Consortium partners |
|--|---------------------------------|--|--|
| High-end tourist segment | Hotels | El Gouna Sharm el-Sheikh Cairo | Hydroponics technical expert Grower Hotels |
| Egyptian upper class | Restaurants Retail | Cairo area | Hydroponics technical expert Grower Restaurants Retailers |
| Gulf countries (export) | Restaurants Hotels Retail | TBD based on energy and water price and energy stability | Hydroponics technical expert Grower Exporter Hotels Restaurants Retailers |
| Proof of concept for Southern emerging countries | n/a | TBD based on energy and water price and energy stability | Hydroponics technical expert Grower |

The project team decided to further work on a pilot targeting the high-end tourist market in El Gouna. The Sawiris Foundation for Environmental Development and the related Orascom Hotels & Development running the El Gouna resort showed interest in new food production systems contributing to their ambition to make El Gouna Africa’s first CO2 neutral city and to

their work on environmental programs, in particular the Green Star Initiative.³ The investigated system fits to this ambition. In this scenario production would take place in El Gouna mainly for El Gouna itself but Hurghada as a neighbouring community could be included in order to increase the volume and thus reach higher economies of scale. For both locations combined, a tourist population of almost 60,000 persons could be targeted.

The Dutch consortium calculated the cost per piece for the hydroponics products in order to determine the financial viability of the pilot. Besides exploitation and operational cost the following corrections can be taken into account in the calculation in order to increase the comparability between the current price and the production cost in the new production system:

- Correction of transportation cost as currently the products need to be transported from the Cairo area to the Red Sea area whereas in the pilot scenario production would take place at the same location as consumption;
- Correction for waste as currently, delivery only takes place every 3 days, which leads to waste due to necessary storage;
- Correction for waste due to lower quality of traditionally grown products as compared to hydroponics products and thus higher waste in the kitchen when preparing the meals.

For the investigated production system the cost per piece in the closed system amounts to about 2 to 3 times the current average sourcing price for high-value products.⁴ Considering this price variation it is important to bear in mind that the calculations are based on the current price for local quality. Export quality has a higher price and thus the variation would be even lower. Furthermore it has to be taken into account that this calculation includes the necessary initial investment in the production system. When excluding this upfront investment cost the production cost in this system is at a competitive level.



Figure 4: Hydroponics production of lettuce (Fruit Logistica Berlin 2015)

With a resulting factor 2 - 3 increase the business case can be considered financially interesting, and earlier experience in other markets shows that a corresponding price increase can be accepted. In other words, it can be stated that there is potential in the Egyptian market for larger-scale hydroponics production. The Dutch consortium presented this outcome to the Egyptian parties who were highly interested in the product and the strong advantages in terms of quality,

³ <http://www.greenstarhotel.org>

⁴ For confidentiality reasons the detailed calculation as well as the precise figures cannot be included in this report.

safety and an innovation and sustainability aspect were seen as extremely attractive in this pilot scenario. However, they also considered a factor 2 -3 price increase as too much in their respective situation and market to take this entrepreneurial risk to choose for the new production system. The pilot set-up should be modified in order to come to other interesting scenarios.

The following modified scenarios are possible in order to set up the pilot with the investigated production system. These should be studied in more detail to offer a stronger quantitative basis and subsequently use this data to involve interested business partners and form a pilot consortium.

1) Stay with the current parties and come to lower price variation:

This could be reached by opting for a low-tech solution, e.g. not choosing for a closed production system but instead setting up a more traditional hydroponics production farm. Financially this would lead to a significantly lower investment, thus a shorter ROI and a lower price variation.

2) Stay with the high-tech solution and choose a different geographic area within Egypt:

Other interesting areas could be Sharm el-Sheikh or Cairo metropolitan area.

2a) Sharm el-Sheikh targets high-end Western tourists and offers a significant amount of premium hotels. Furthermore, the distance to the national wholesale markets in El Obour and 6th of October is much longer, which adds additional costs to products sourced from there and makes on-site production in Sharm el-Sheikh more attractive in a cost perspective.

2b) Cairo on the other hand targets business tourists and has a good share of high-end hotels with attached premium restaurants that serve a highly demanding customer group. Besides business travellers Cairo also has a large enough share of wealthy Egyptians as well as international residents that are likely to be demanding such a product and willing to pay the corresponding price.

3) Stay with the high-tech solution and choose a different geographic area in the region:

The Gulf countries could be a very interesting location to start a high-tech pilot as the circumstances for traditional production are even more difficult than in Egypt and the market prices for fresh produce are supposedly much higher. Also, the Gulf countries should probably offer a large share of population that demand a high quality product and are able and willing to pay a high price for a high-end product.

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Appendix 1: Overview of interviews

Tuesday, 11 November 2014

Joep Hendricks, Managing Director, HortiAlliance

Monday, 24 November 2014

Tom Andersen, Head of EIB Regional Office for the Near East, European Investment Bank

Mohamed Madkour, Business Analyst, European Investment Bank

Malak El-Shishiny, Business Analyst, European Investment Bank

Ayat Abdel Mooty, Executive Director, Sawiris Foundation for Environmental Development

Mounir Makar, Owner, Makar Farms

Wednesday, 26 November 2014

Joost Geijer, Agricultural Counsellor, Netherlands Embassy in Cairo

Thursday, 18 December 2014

Manal Hussein Abdel Razek, Chairman & CEO, Orascom Hotels & Development

Ayat Abdel Mooty, Executive Director, Sawiris Foundation for Environmental Development

Sami Adam, President, Gafman LLC

Amir Adam, CEO & Commercial Director, Gafman Food

Tom Andersen, Head of EIB Regional Office for the Near East, European Investment Bank

Joost Geijer, Agricultural Counsellor, Netherlands Embassy in Cairo