



The Israeli Agritech Sector

August 18, 2015

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Dalit Ben-Zoor & Maxim Priampolsky

The Finance Division

Economics Department

Highlights

- *Israel is among the leading countries in agricultural technology with 280 related companies and 200 exporters of agritech services and products.*
- *The export turnover of the Israeli agritech sector is estimated at US\$4bn a year.*
- *Approximately US\$90m has been invested annually on average over the past few years in research and development, making Israel a world leader in allocation of funds for R&D in the agritech sector.*
- *The biggest achievement of Israel's dairy farming industry is the annual milk production of the Israeli milking cow, which is considered as the highest in the world.*
- *Israeli farmers grow an average of 300 tons of tomatoes per hectare per season in greenhouses, which is four times more than those grown in open fields.*
- *Exports account for 80% of the Israeli irrigation industry production, which represent 30% of the global drip irrigation market.*
- *An Israeli fruit and vegetable rinsing appliance reduces fresh citrus losses from 15% to less than two percent, and by this, saves more than US\$70m per year for Israeli citrus exporters.*
- *40% of European tomato greenhouses use seeds of a long shelf-life hybrid that was developed and first produced in Israel.*

The Israeli Agritech Sector

The agricultural technology (agritech) industry deals with significant questions about the future of mankind. Companies and academic institutions in the agritech sector deal regularly with issues such as feeding the world's growing population, reducing the negative impacts on the environment caused by agriculture, overcoming a lack of fresh water, and others. As a result, investment in the agritech industry has increased over the past few years. Israel is one of the global leaders in agritech with 280 related companies, and 200 exporters of agritech services and products. The export turnover of the Israeli agritech sector is estimated at US\$4bn a year.

Israel's unique agricultural challenges include, among other things, extremely hot weather, insufficient natural fresh water sources, and unsuitable soil. These challenges, coupled with the high level of entrepreneurship and substantial R&D investment, contributed to the development of the Israeli agritech sector.

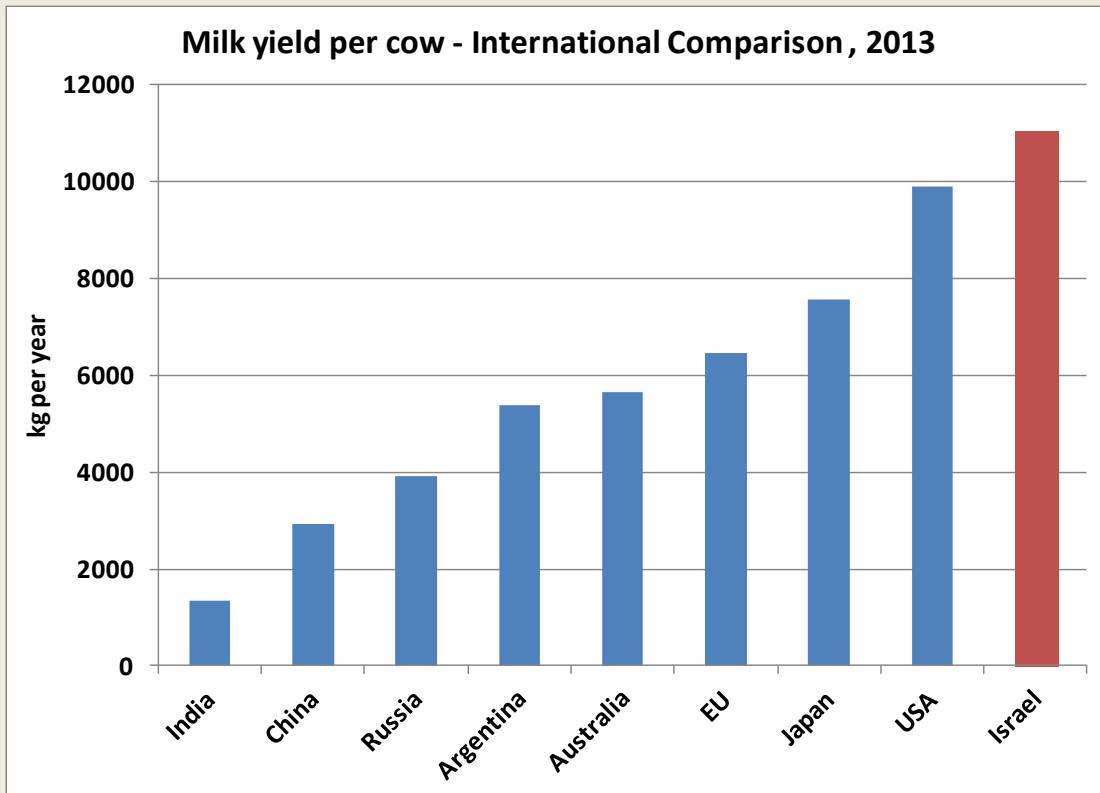
Approximately US\$90m has been invested annually on average over the past few years in R&D, making Israel a world leader in allocation of funds for R&D in the agritech sector. There are many agritech products that have been developed in Israel. The most well-known are the world's first drip irrigation system and cherry tomatoes. Companies like Netafim, which is a producer of drip irrigation systems, and Evogene (traded on the NYSE), which develops plant genetics, have established themselves as global leaders.

This review deals with the main subsectors and the leading companies of the Israel agritech sector.

Dairy Farming

The Israeli dairy industry is highly developed and uses advanced technology. The biggest achievement of Israel's dairy farming industry is the annual milk production of the Israeli milking cow, which is considered as the highest in the world. The success of the Israeli dairy model has led countries from Asia, Africa and East Europe to adopt the Israeli case as the standard to be achieved. Today, the export revenues of the Israeli dairy sector are valued at US\$100m per year.

One of the leading companies in the industry is Afimilk, which provides advanced dairy management solutions. Technologies developed by Afimilk help farmers to control cow feed, monitor the protein levels in milk, and even identify if a cow is ill. The company's systems are used in more than 50 countries worldwide.



Source: Central Bureau of Statistics, Israel

Greenhouses

The Israeli climate is harsh and limits the ability to grow outdoor crops. In order to overcome natural problems such as a shortage of suitable soil, limited water, and high temperatures, Israeli farmers developed sophisticated greenhouses that succeed to increase crop quantities and to improve crop quality. For example, Israeli farmers grow an average of 300 tons of tomatoes per hectare per season in greenhouses, which is four times more than those grown in open fields. The greenhouse technology deals with ventilation, heating, efficient use of water, etc.

Recently, a leading Israeli greenhouse projects company, Netafim, signed a US\$17m agreement with Vietnam's largest publicly – traded real estate operator. According to the contract, Netafim will supply greenhouse structures, drip products, climate control systems, growing platforms, and agronomic services to Vingroup.

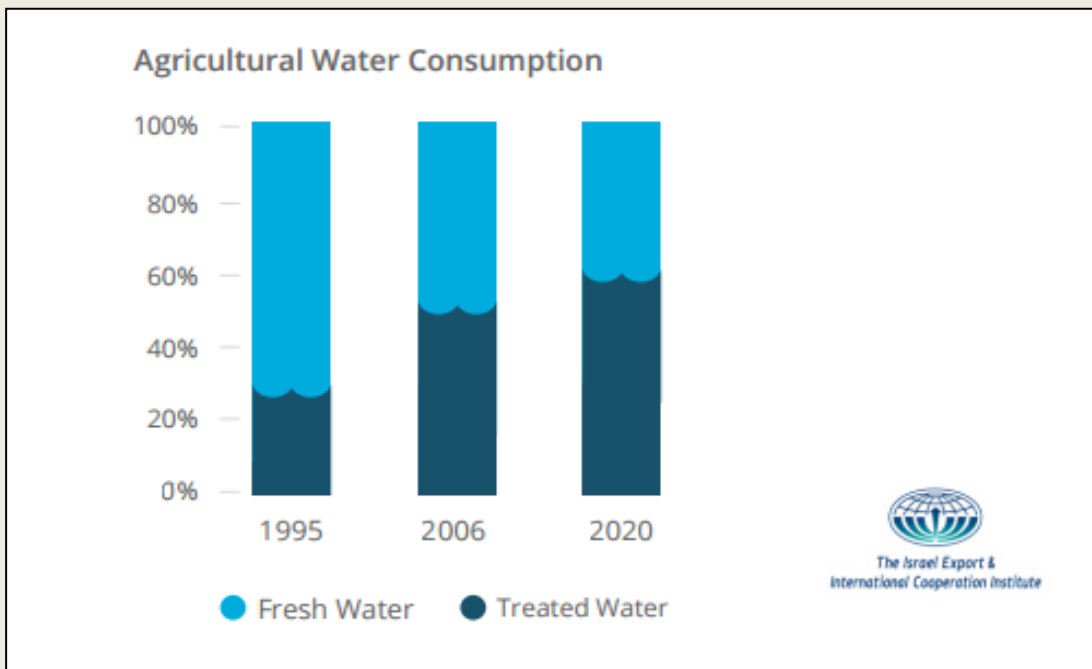
Water and Irrigation

For many years Israel suffered from a shortage of natural sources of fresh water. In order to reduce the use of fresh water in agriculture, Israel has increased the use of treated water, and invested extensively in R&D on systems that improve the

effectiveness of fresh water irrigation. From this intensive research came the drip irrigation method, which saves huge quantities of water and also makes it possible to fertilize the soil during the irrigation process. This invention changed irrigation practices around the world.

Today, Israeli products such as automatic valves, controllers, automatic filtration devices, low discharge sprayers, and other irrigation systems are used worldwide. Exports account for 80% of the Israeli irrigation industry production, which represent 30% of the global drip irrigation market.

An example of the importance of accurate irrigation systems was seen last year when large agricultural areas in the US suffered from a drought that caused a dramatic decrease in some important crops, like soy and corn. According to different research sources, future climate changes during the next 30 years will lead to an 18%-23% reduction in the production of such crops as soy and corn. This pessimistic forecast emphasizes the need for precise, efficient, and cost effective irrigation systems.



Source: The Israel Export & International Cooperation Institute

Recently, the Innovation Endeavors fund, backed by Eric Schmidt (executive chairman of Google), decided to invest US\$9m in Israeli irrigation company CropX. CropX developed software which optimizes irrigation and contributes to higher crop yields while saving energy and water. Another advantage of CropX systems is that every part of the field gets exactly the optimal quantity of water and fertilizers, and thus preserves the soil from needless chemicals.

Another example of Israeli innovation in the field of irrigation is the startup company AutoAgronom, which was bought in September 2014 for US\$20m by China's Yuanda Enterprise Group. AutoAgronom's systems use sensors to sample soil, perform

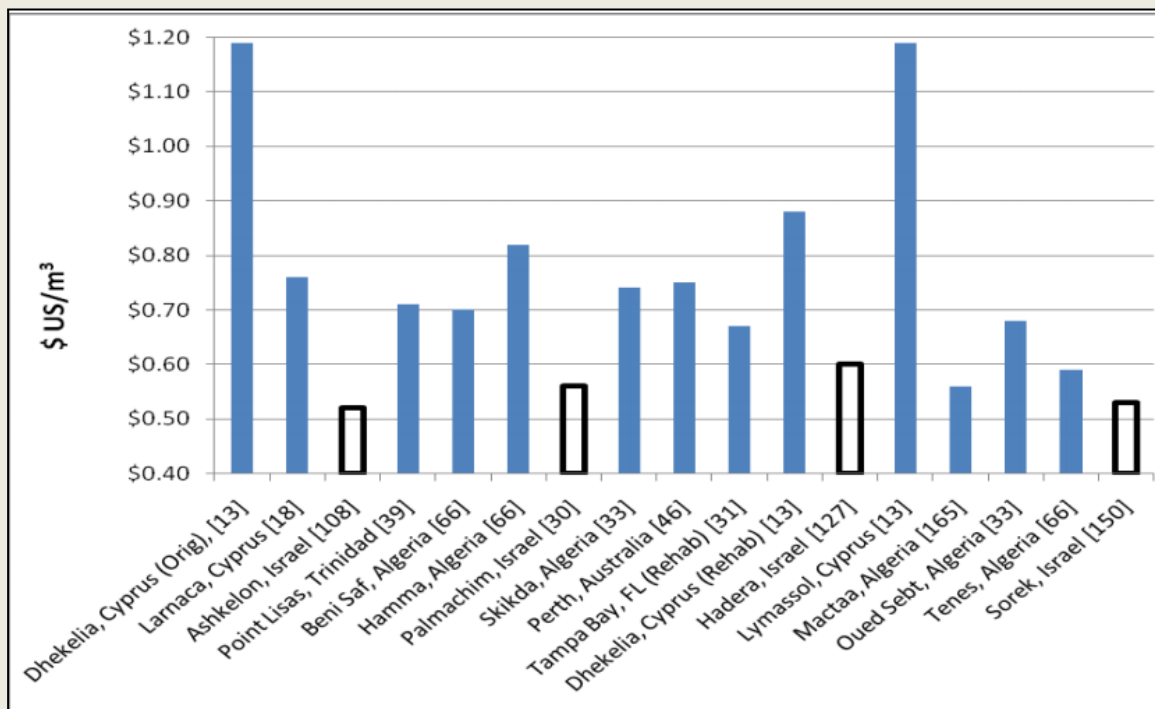
analysis, and automatically activate irrigation and fertilization. Thus, the important tasks of irrigation and fertilization are regulated by the plant itself and not by farmers' "guesswork". The Company's systems are used in 70 different types of crops in 13 countries.

Another advanced field in Israel's water sector is sea water desalination. As mentioned before, Israel has limited natural sources of drinking water, and these sources have steadily decreased over time. In order to overcome the problem, Israel has recently built four advanced desalination plants that are already operational. The plant in Sorek is considered the largest desalination facility in the world. Another plant, located in Ashdod, is in advanced stages of construction.

Israel's desalination plants provide about 50% of the country's drinking water. According to government plans, by 2020 the desalination plants will provide more than 75% of drinking water in the country.

A significant advantage of the Israeli desalination plants is their outstanding cost effectiveness compared to other desalination facilities around the world. The exceptional cost efficiency can be explained by advanced technology and the use of natural gas from Israeli sources for the energy required in the process.

Cost efficiency of desalination facilities



Source: Israeli Water Authority

Post Harvest

Post-harvest technologies deal with developing methods to preserve the quality of produce and to prevent waste of fruits, vegetables and ornamentals after the harvest. Almost one-third of the food in the world, 1.3bn tons of food, is lost from the harvest stage until the consumption stage. The main subjects that are included under the post-harvest technology category are, among others: storage methods, packinghouse operations, sanitation and food safety, and post-harvest pathology.

Adequate application of the recommended post-harvest treatments minimizes post-harvest losses and maximizes producers' profits. For example, an Israeli fruit and vegetable rinsing appliance reduces fresh citrus losses from 15% to less than two percent, and by this, saves more than US\$70m per year for Israeli exporters.

Another interesting development, coming from the field of fruits and vegetables packaging, is "edible packaging". The packaging was presented at the last "Agritech Exhibition" (April 2015), and developed by researchers at the Volcani Center, which is the largest agricultural research institution in Israel.

The goal of "edible packaging" is to protect the product from external contamination and from other injuries, and will also be edible in order to reduce the environmental pollution of plastic packaging that is used today to cover every fruit or vegetable, especially in Europe and North America. The chemical structure of the packaging is from fiber so it is beneficial for consumers' health. According to the scientist who developed the product, the packaging will be an aqueous, cellulose - based solution which each fruit or vegetable will be dipped into, creating a thin layer that protects the product. The product is in advanced stages of development.

Poultry Farming

The egg and poultry sector accounts for almost one-fifth of Israel's entire agriculture production. Farmers in the poultry sector are most interested in achieving low rates of sickness, high quality of chicken meat, and high resistance from environmental factors. One of the Israeli achievements in this field is the improvement in chickens' heat tolerance. This improvement contributed to an increase in the weight of the breast portion of poultry, and to a decrease in the amount of fat in the chicken meat.

Another Israeli development is the featherless chicken. The lack of feathers contributes to the thermo-regulation of chickens' bodies and eases the task of plucking feathers. In general, breeds developed in Israel are highly disease-resistant, and adaptable to extreme climate conditions (high humidity and extreme heat). Furthermore, the chickens are characterized by a rapid growth rate, high egg production, and low-fat meat.

Seeds

The cherry tomato, which was developed in Israel, and was first marketed in the 1990's, is the result of the search for a tomato able to withstand the Israeli heat. These days, some 40% of European tomato greenhouses use seeds of a long shelf-life hybrid that was developed and first produced in Israel.

One of the greatest challenges that mankind will have to face within the next decades is feeding more than 9.6bn mouths. By 2050 crop demand will increase by at least 100%. In order to face this challenge, it is necessary to develop technologies that will enable farmers to increase the amount of food they produce, without an increase in resources like land and water.

One way to do this is by developing resilient and large crops, so more food can be produced per unit of land and other resources. Evogene is a leading Israeli company in the field of seeds. Evogene is using a unique technology infrastructure that is based on scientific understandings of plants and offers a wide-ranging solution for crop productivity improvement. Another leading company is Zeraim Gedera, which was purchased by Syngenta for US\$95m.

Additional examples of Israeli developments in this field are the seedless watermelon, disease-resistant squash and a variety of hybrid cotton with longer and stronger fibers, colored cotton and high-yield crops requiring less water.

Fertilizers and Crop Protection

Fertilizers are used by farmers around the world in order to achieve higher crop yields and improve quality, endure diseases, and provide longer shelf life. Without fertilizers it is most likely that the amount of food in our world would have shrunk by more than half. ADAMA Agricultural Solutions estimates in its financial reports that farmers would have lost 30% to 70% of their crop in the absence of fertilizers. ADAMA is one of the world's leaders in sales of crop protection products (pesticides), among companies that deal with active substances that are not protected by patents. Another large company is ICL (Israel Chemicals Ltd.), which produces fertilizers based on potash and phosphate. ICL has revenues of more than US\$6bn per year, and accounts for about 7.5% of Israeli exports.

Summary

Israel's agritech industry is highly developed, is characterized by high added value, and is well-known around the world. Israel's agritech products, which include, among others, drip irrigation and dairy systems, are used around the globe. Israel's unique conditions such as a challenging climate, shortage of natural fresh water, and unsuitable soil, coupled with an advanced hi-tech sector and entrepreneurship, led to wide scale investments in R&D as well as a variety of innovative products. "Where needs take us" is the slogan of ICL, Israel's largest chemicals company, specializing in the field of fertilizers. This slogan is the best way to describe the Israeli agritech sector.

Source List

ADAMA Agricultural Solutions website

Afimilk website

Agricultural Research Organization (AKO), Volcani Center.

Agritech 2015 .org.il

AutoAgronom website

Israel Central Bureau of Statistics (CBS)

CINADCO Center for International Agricultural Development Cooperation, Ministry of Agriculture and Rural Development.

CropX website

ICL group website

Israel Water Authority

MASHAV Israel's Agency for International Development Cooperation, Ministry of Foreign Affairs

The Israel Export & International Cooperation Institute.

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BANK LEUMI LE-ISRAEL, THE FINANCE DIVISION

The Economics Sector, P.O. Box 2, Tel Aviv 61000

Ph: 972-76-885-8737, Fax: 972-77-895-8737, e-mail: Gilbu@bll.co.il

<http://english.leumi.co.il/Home/>