Basic Facts about Israel

Population: 8,309,400

Area: 22,000 km²

GDP Agriculture
12.6 Billion NIS - 1.4%

Employment in Agriculture
about 40,000 - 1.2%

Agro-food Exports
2.4 Billion NIS - 3.7%

Agro-food Import
5.3 Billion NIS - 7.3%
Main constraints on Israeli Ag. sector

Israel’s small land area is divided into 4 distinct climate zones

- Shortage of natural water resources
- Scarcity of precipitation
- Two thirds of Israel area is defined as semi-arid or arid
- Shortage of “On farm labor”
- Complex geopolitical environment
- Distance from the export & import markets
Additional constraints
Support of Agriculture in Israel

Low level of support for farmers,
Compared to other developed countries

Decline of support levels over time

Mainly, distortive market price support measures
Producer Support Estimates by Country
(% of gross farm receipts)

Source: OECD, PSE/CSE Database, 2015
But ...
The Agriculture sector has benefited from high levels of investment in research and development, well developed education systems and high performing extension serviced

Israel is a world leader in many aspects of agricultural technology, particularly those associated with farming in arid conditions

Agriculture relies not so much on a “natural” comparative advantage in farming, but on an “induced” comparative advantage built on technological progress and innovation

Israel has implemented an advanced water pricing policy and has encouraged innovation in water-related technologies
Solutions: Israel as a Global Agro-Tech Center

- Global leader in Agro-Technologies (especially arid areas) and water systems
- Multidisciplinary R&D with proven abilities in developing Agriculture know-how
- Among highest ranking in Agriculture yields
- A global leader in high-tech and information & communication technologies (ICT) for tomorrow’s agriculture
- Israel agriculture is a worldwide “beta site”
- Knowledge and experience in introducing, together with mega-companies, new products and technologies into agricultural practice all over the world

Combining these will place Israel as a Global Agri-Tech center.
Evolution of Productivity
In Agriculture & other sectors

Source: Bank of Israel 2015 (1995 = 100)
Increasing Productivity and Efficiency

Partial Productivity Indices
(Labor, Capita, Water, 1980 = 100)

Source: Agricultural Atlas, Kislev 2013 (based on CBS data)
Key for Success

- Close cooperation and interaction
- Promotions of advanced technologies in all agricultural sectors.
Irrigation and Water Resources Management Technologies in Israel
The global Water Challenge

Is the world going into a Water crisis?

The US government predicts that by 2025

60%

Of the world’s landmass and 40 of 50 US states will experience Water Shortages

Seth M. Siegel, Prager University Foundation (2016)
Water Consumption in Israel

According to sectors, Data for 2014

Total: 2.114,1 MCM
(including 29,6 MCM for Nature)

Supply to PA – 66.1 MCM
Supply to Jordan – 54.9 MCM
Water Resources & Water Demand

- Average total natural enrichment – 1,170 Billion m³/year!!
- Overall water demand – 2,2 Billion m³/year, of which:
  - Current potable water demand ~ 1.2 Billion m³/year
  - Actual Deficit - 1.0 Billion m³/year
- Forecast for potable water demand:
  - 2020 ~ 1.7 Billion m³/year
  - 2030 ~ 1.95 Billion m³/year
  - 2040 ~ 2.2 Billion m³/year
  - 2050 ~ 2.45 Billion m³/year
R&D – Potential Expansion of Water Resources

Irrigation technologies, Purification and Recycling, Desalination

- Marginal water– saline and brackish water
- Waste water treatment technologies and recycling
- Desalination Technologies
- Water saving: improving irrigation practices, precision agriculture, preventing leaks, drip irrigation, public education
Water for Agriculture
(1970-2015)

Source: Water Authority 2015, MOAG 2015
Agriculture Irrigation Water

- Israel produces 530MCM of treated water every year
- More than 80% of the water is used for irrigation
- Placing Israel 1st in the world in water recycling

<table>
<thead>
<tr>
<th>Israel</th>
<th>Spain</th>
<th>Australia</th>
<th>Italy</th>
<th>Greece</th>
<th>Europe/USA</th>
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<tr>
<td>87%</td>
<td>17%</td>
<td>15%</td>
<td>8%</td>
<td>5%</td>
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R&D - The effect of micro-pollutants in recycled water on human health and the environment
The environmental impact of surfactants, pharmaceuticals, hormones and cosmetics
Water Technologies

**Sector Highlights**

- Israeli systems account for 50% of the world's low-pressure irrigation systems, reducing agricultural water consumption by 30%
- Israeli companies have installed more than 350 desalination plants in nearly 40 countries
- Among world’s lowest-cost producers of desalinated water: ~ $0.55/m³ vs $1.00/m³ world average
- Global opportunity – only 12% of the world irrigation is through drip irrigation

Source: Israel Export Institute, The Israel Water Authority
Other selected aspects of High-tech in Israeli Ag. sector
Precision Agriculture

Thermal imaging for water status mapping

Thermal imaging exposes differences in water status of plants which cannot be detected by our eyes.
Nectarines excessively irrigated

Vineyards regular irrigation

Vineyards regular irrigation

Vineyards over irrigation

Vineyards – Yiftah, Israel
Innovation / Sophistication in Postharvest Practices in Israel

New technology

New storage technology

Sophisticated produce
FAO estimates that each year approximately one-third of all food produced for human consumption in the world is either lost or wasted.
Postharvest Technologies

- Prolonged storage and extended shelf life
- Modified atmosphere packaging (biodegradable materials)
- Environment-friendly technologies (non-chemical): hot water rinsing and brushing
- Biocontrol agents against pathogens
- Long vase life of ornamentals
Grain Storage Aim

To prevent quantity and quality loss of stored grain

As a result of efficient monitoring, intensive R&D of innovative methodologies and technologies, grain losses in Israel do not reach levels higher than 0.5%.

Such levels are regarded as a notable international achievement
Israeli Dairy Farming
Facts about the Israeli Dairy Herd

- 124,000 dairy cows
- 90% are herd book registered (monthly recorded)
- Breed: Israeli Holstein; 100% AI
- 100% mechanically milked; Milk equipment is mostly locally made (SAE Afikim; SCR)
- 2 types of farms:
  - Big farms, 300-900 cows, (Kibbutz farms); 3X
  - Smaller family farms, 40-200 cows (Moshav farms); 2-3X
- Annual production: 12,000 liter/cow.
- 3.75% Fat
- 3.37% Protein
Key factors for the success of the Israeli Dairy sector

- Genetics
- Management
- Nutrition
Number of dairy farms and production per farm

Source: Israeli Dairy Marketing Board
The Israeli “High-tech” cow

- Milk yields
- Fat, protein and lactose percentages
- Body weight
- Feed intake
- Activity
- Lying time
- Rumination time

5 Tags
Feeding centers
Advantages of the Feeding centers

- Few and efficient machinery.
- Cooperation between centers.
- Extensive use of byproducts and others additives.
- Computation and exact control.
- Size advantages while buying foodstuff.
- High variety of energy and protein sources.
- Different treatments of whole grains.
- Long range storage (cottonseeds, silage, hay).
- TMR
- Low depreciation and waste (proper storage equipment).
- Distance between stores to avoid fire.
Current Challenges and Future Perspectives in Mariculture Research

Dr. Hanna Rosenfeld
National Center for Mariculture
Israel Oceanographic and Limnological Research
The National Center for Mari culture (NCM), Eilat

Mandate:

To develop a branch of agriculture that utilizes seawater & brackish water for culture of high quality marine organisms & establish an associated biotechnology
The National Center for Marine Culture (NCM), Eilat

Mode of activity

**Research Groups**
- Pathobiology
- Genetics
- Aquaculture Engineering
- Water quality
- Environmental quality
- Gastropods and integrated systems

**Area of activity**
- Domestication of marine organisms (fish, shellfish and algae)
- Development of environment friendly rearing systems

**Research Groups**
- Reproduction
- Larval rearing
- Nursery and physiology
- Nutrition
Mari culture R&D

Mari culture production
Off-shore cage farming
12 km offshore, 12m wave height

Domestication of high value species

White grouper
Blue fin Tuna

Mullet (Mugil Cepalus)
Extensive & Intensive Aquaculture

Recirculating Aquaculture Systems (80-100 kg/m³) also for marine species

Tilapia
Card
Koi
Agri is our Culture
From Biblical Times to Nowadays
Thank You

Mahalo

Kiitos

Toda

Gracias

Merci

Takk

Grazie

Obrigado