



ROOTS

Sustainable Agricultural Technologies Ltd

Corporate Presentation

October 2018



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Investment risks

- **Risk of Israeli company – political, economic and military:** The company is incorporated and based in Israel. Accordingly, political, economic and military conditions in Israel and the surrounding region may directly affect the company's business. Additionally, the Company is prone to the applicability of Israeli law and Israeli Government grants.
- **Intellectual property:** Although most of the existing IP owned or licensed to the company are granted, there is a risk that other manufacturers may decide to attack the validity of the existing or newly filed IP. In such case the Company will have to defend its IP in lengthy and costly legal procedures.
- **Slow penetration rate in the agricultural industry:** Agriculture is a conservative sector and adoption speed of new technologies is slow. Disruptive technologies, such as those developed by the Company may not be subject to such a slow rate of penetration however, this is an existing risk that must be taken into account.
- **Competition:** There is a risk that competitors will introduce into the market place new and better technologies and will undermine the success and penetration rate of the Company's technologies and products. Additionally, there is significant competition in the agricultural technology industry generally, more so in greenhouse heating technologies and less in cooling technologies.
- **New technology with limited feedback and lengthy testing cycles:** The Company's technologies are new in the agricultural sector and as such require lengthy testing cycles (usually a year) on its own and in new territories. This may delay achieving sales and revenue forecasts contemplated by the Company.
- **Limited commercial sales to date:** There are limited commercial sales to date. This is due to the experimental nature of the technology, slow adoption rate of new technologies by the agricultural sector and the limited funds available to allocate to sales efforts to date.
- **Reliance on key personnel:** Success of the business will depend on the Directors and the officers of the Company to develop the business and manage operations, and on the ability to attract and retain key quality staff and consultants.
- **Liquidity Risk:** A substantial number of shares are classified as restricted securities by ASX which comprises a percentage of the issued share capital on an undiluted basis.
- **General Market Risk.**



Corporate overview

Market Cap @ \$0.30 ¹	\$m	19.2m
Cash at 30 June 2018	\$m	1.8m
Enterprise Value	\$m	17.4m
Shares on Issue	\$m	64.0m
Top 20 Shareholders	%	54.0
Escrowed Shares	%	51.0

Roots, founded in 2012, is a graduate from the Israeli Office of the Chief Scientist's Incubator program.

Operations across Australia, Israel, China, US, Spain and South Korea and planned geographic expansion.



¹ as at 27 September 2018



Corporate overview

An Agricultural Technology Innovator



Roots is focused on developing, producing and commercialising technologies addressing food production security, quality enhancement and access to irrigation water



The only two-in-one, low energy, root zone heating and cooling system world wide



One technology provides water for irrigation by condensation in an environmentally sustainable manner



Combined experience and unique know how in agronomy, engineering and remote data management and control



Board of Directors



Dr Sharon Devir
Co-Founder
CEO & Exec Director

- Dr Devir is CEO and Co-Founder of Roots
- Co-Founder of Rimonim, an Ag-Tech fund and Sailcrop, an abiotic stress seed treatment
- Former CEO of NGT, a technology incubator which sold to Colgate for USD\$100m
- Former CSO of AFIMILK dairy management systems
- Agriculture faculty lecturer at the Hebrew University
- Awarded Channel 2's "Man of the Year", Israel
- Ph.D. in Agriculture and Environmental Sciences from Wageningen University, the Netherlands
- Bachelor of Science and a Masters of Science from the Technion Institute of Technology, Israel



Boaz Wachtel
Co-Founder
Non-Exec Director

- Mr Wachtel is Co-Founder and Non-Executive Director of Roots and inventor of Roots' core technologies
- Co-Founder of two ASX listed medicinal cannabis companies; Creso Pharma Limited and MMJ Phytotech Limited
- Masters in Management and Marketing from the University of Maryland
- Former assistant army attaché to the Israeli Embassy in Washington DC
- Guest Lecturer at the UN Conflict Resolution conference
- Published 25 publications on water and he is a frequent lecturer on Ag-Tech, Middle East water issues and sustainability



Dafna Shalev- Flamm
Non-Exec Director

- Ms Dafna Shalev-Flamm is a Non-Executive Director of Roots
- Currently the CFO of Destiny Group, which owns Giron Development and Building Ltd, a publicly traded real estate company
- Former Director of MTI Computers and Software Services Ltd, Plasson Industries Ltd and Polyram Plastic Industries Ltd
- A Certified Public Accountant in Israel since 1994
- Bachelor of Accounting & Finance and a Masters of Business Administration from Ben-Gurion University, Israel



Graeme Smith
Non-Exec Director

- Mr Smith is a Non-Executive Director of Roots
- Highly awarded industry expert
- Published over 50 works over the last 20 years
- Former President, Chairman, Board Director and Member of both local and international Greenhouse, Hydroponic, Cropping and Horticultural groups
- Current MD of Graeme Smith Consulting (www.graeme-smithconsulting.com)
- Current equity partner and greenhouse horticultural technical advisor for Nectar Farms with plans for a 40ha climate resistant glasshouse in VIC and NSW, Australia
- Certified Practicing Agriculturist (CPAg) from the Australian Institute of Agricultural Science and Technology



Adam Blumenthal
Non-Exec Director

- Mr Blumenthal is a Non-Executive Director of Roots
- Brings over a decade of corporate finance and investment banking experience
- Director of multiple ASX listed companies
- Bachelor of Commerce and Masters of Commerce from UTS and RMIT university
- Masters of Business Administration from Australian Catholic University



A Compelling Business Opportunity - Increasing demand for food & water, combined with supply constraints, leaves Roots well positioned for growth

Problems facing humanity and agriculture:



Demand for food outstrips supply



Water shortages



Severe weather conditions and global warming



Ecosystem degradation



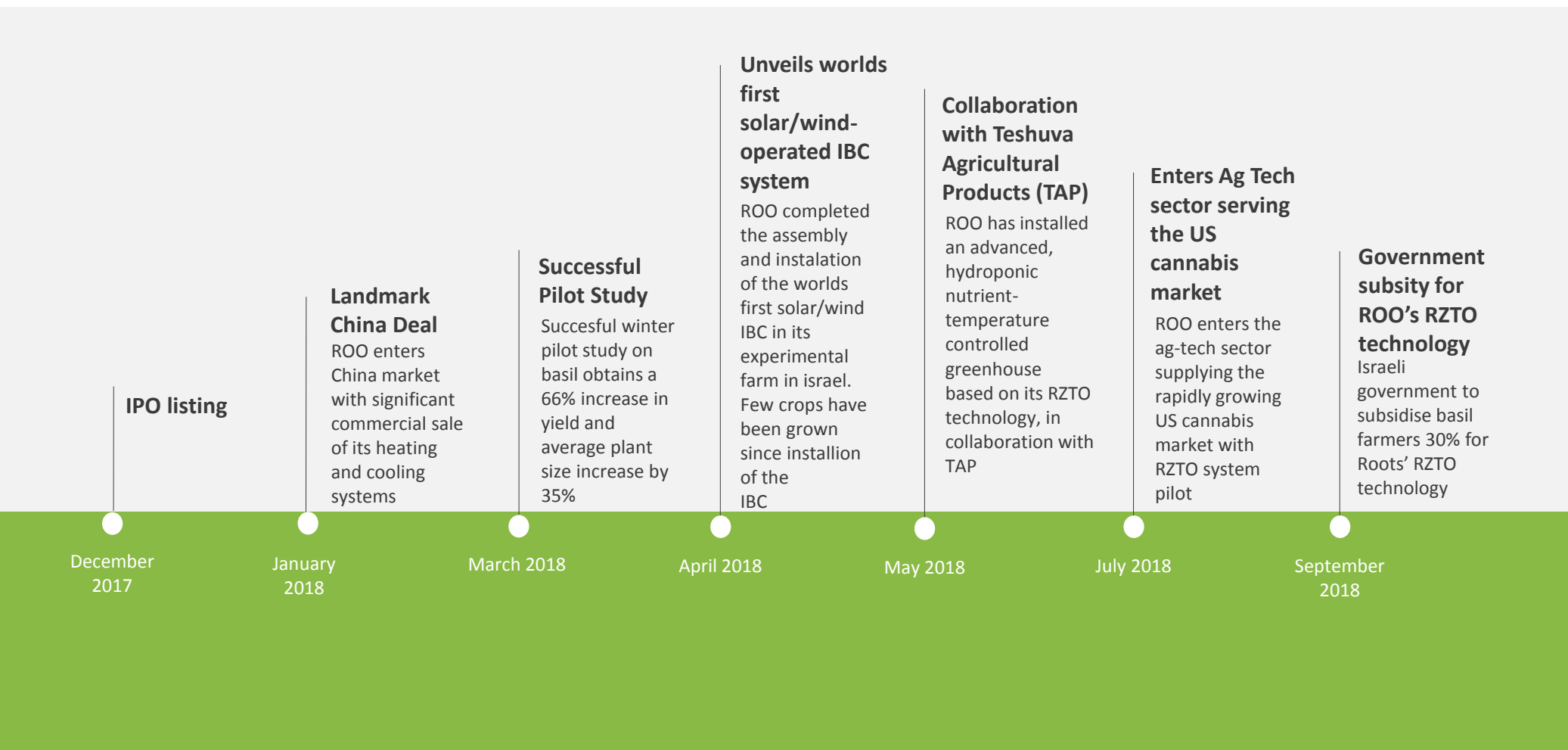
High usage of chemicals in fertiliser



High energy prices



Achievements to date



Roots' two innovations helping modern farmers

1

RZTO controls root zone temperatures to optimise crop yields



2

IBC addresses the lack of access to water for irrigation



Technology

What is RZTO technology?

Root temperatures influence all parameters of plant's physiology. An optimum RZT range is essential for a plant's robust growth, productivity and quality.

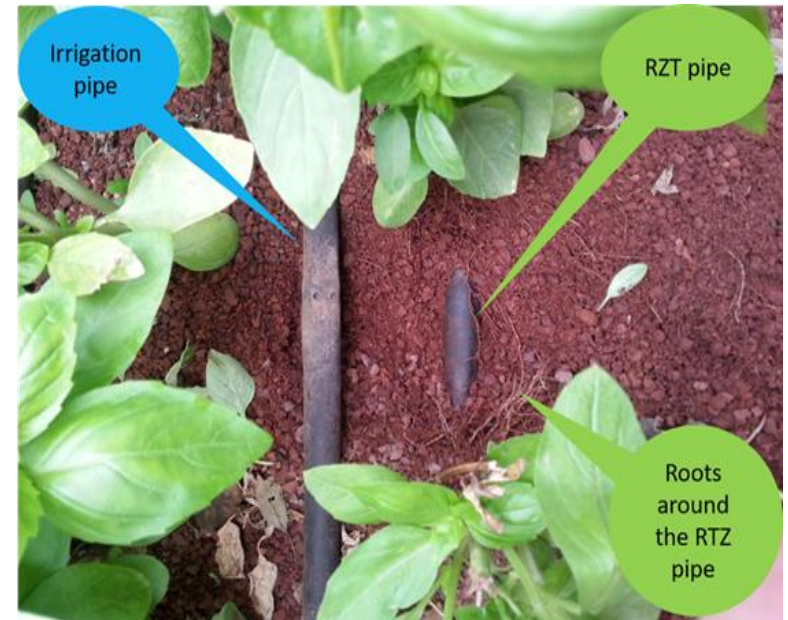
The RZTO technology is a closed loop system exchanging heat in water flowing between underground inserted coils and root zone area.

Leveraging the principle of Ground Source Heat Exchange (GSHE), up to 10 degrees Celsius heating and cooling of root zone is achieved by the closed cycle system in a very cost-effective and environmental friendly ways.



The RZTO Solution

Heat charges water at depth temperature and discharges at root zone level

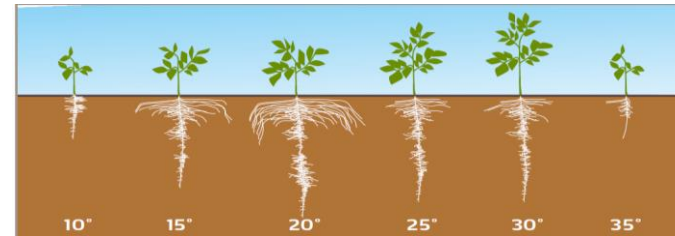


Root Zone Temperature Optimisation (RZTO) control system

Root temperature is the most influential factor in plant physiology for growth, productivity and quality:


- An optimum root temperature generally ranges between 12-28°C
- The optimum range is essential for a plant's robust growth, productivity and output

Roots' technology cools and heats root zone temperatures to stabilise the optimum temperature range all year round







Effects of Soil Temperature on Root Development

Results:

-  **Increase of yield** quantity and quality
-  **Faster** growth cycles
-  **Substantial** energy savings
-  **Additional profitability** premium prices
-  **Improves** uniformity and supply security

Additional benefits:

-  Cooling and heating of roots
-  Enhanced supply security
-  Off season planting and early maturity
-  Ability to withstand severe heat and cold spells

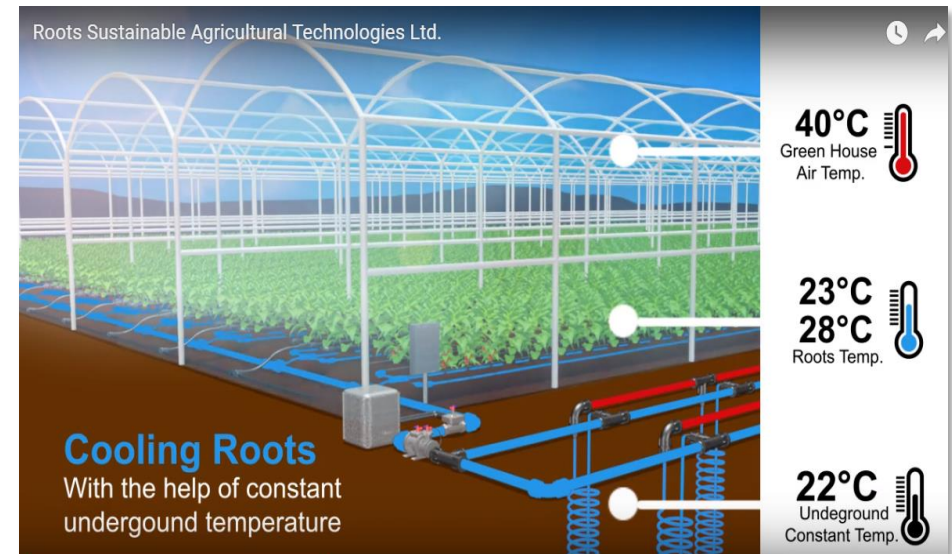
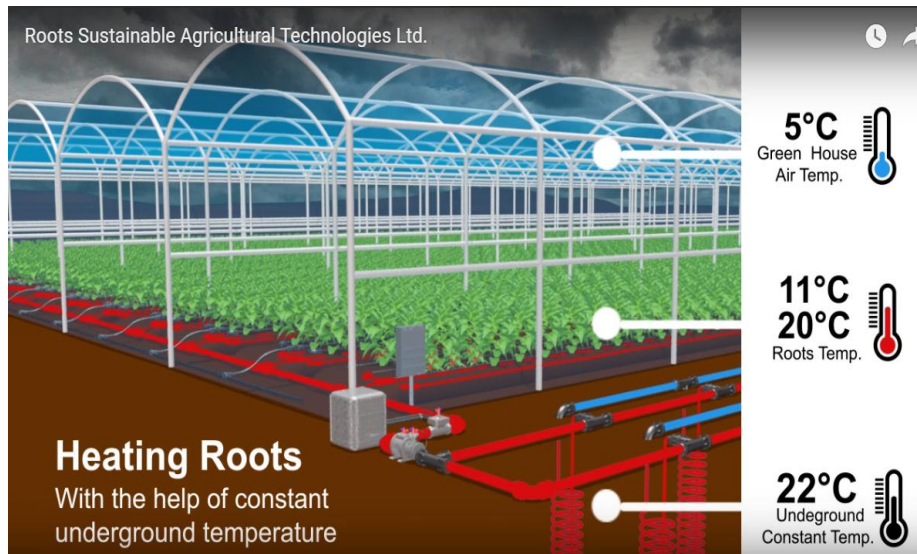


RZTO for heating & cooling

Ground Source Heat Exchange principles for the smart control and management of root-zone temperatures all year

Targeting the roots and not the canopy:

Saving approx. 90% of heating energy costs compared with traditional air heating (Israeli Agricultural ministry analysis)



Roots have developed the first and only commercially viable roots zone cooling technology in the world



Irrigation by Condensation (IBC) technology

1

Electric or Standalone, closed loop, solar-operated system

2

Irrigates crops by condensing air/soil humidity on external surface of pipes with running cold water for irrigation

3

In many cases, no additional irrigation is required to maintain plant survival and harvest quality

4

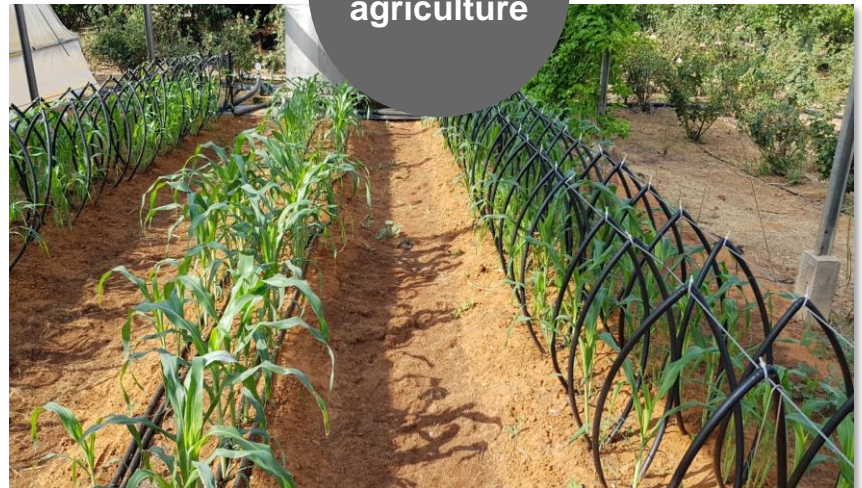
Independent from water and electricity grids

5

Allows farming in remote locations normally unsuited to food production due to water shortages



Off-grid
agriculture



Irrigation by Condensation (IBC) | R&D



1 Solar, vertical

2 Electric grid, horizontal

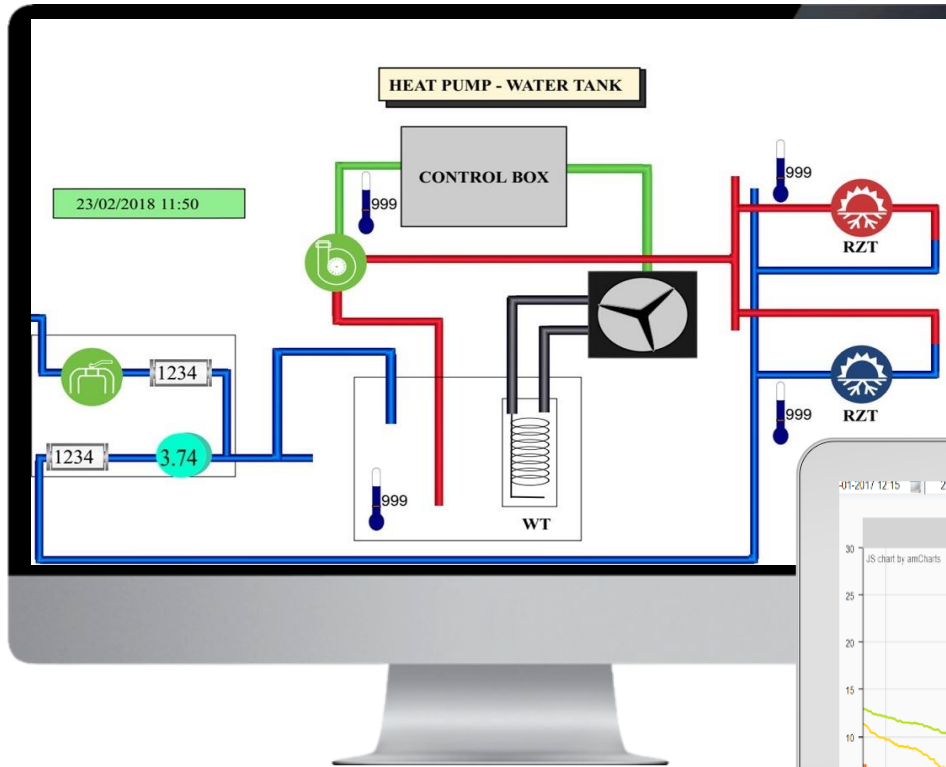
3 Electric grid, vertical

4 Electric grid source

5 Solar/wind source



Proprietary control & monitoring software

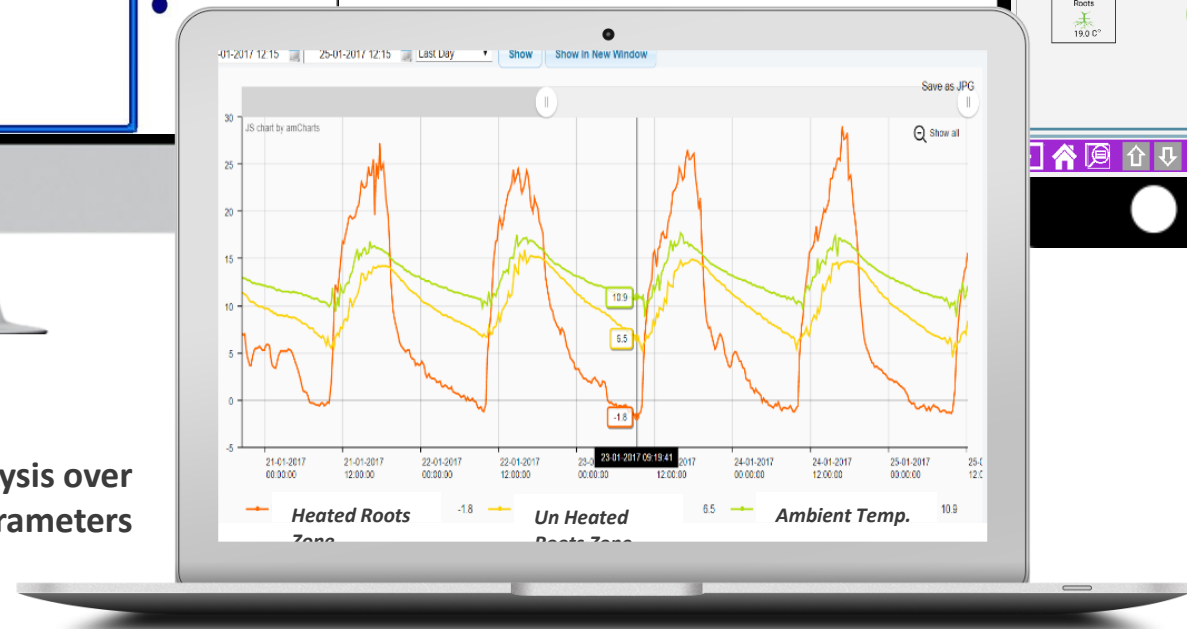


Online data
monitoring and
control

Mobile phone
user interface



Data analysis over
various parameters

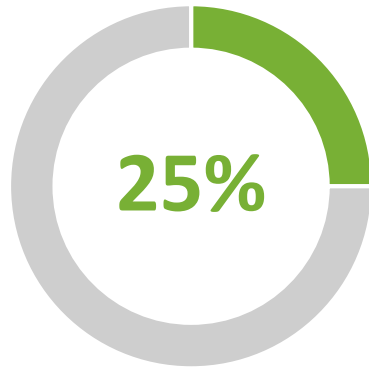


IBC Key Milestones Achieved

1. Agronomical Proof of concept for IBC completed with the full growth cycle of 6 crops with electric and solar cooling for night irrigation
2. Both horizontal and vertical irrigation was sufficient to sustain growth cycles – horizontal irrigation at a slower rate of growth
3. Stand alone solar/wind operated IBC is in place and working to produce off grid IBC



Case Study: Vegetables | heating & cooling cucumber roots



Yield increase
in cooling



Yield increase
in heating



Rapid ROI

(depending on price of product per kg sold)



Case Study: Herbs | heating basil roots



66% additional yield



35% size increase



Increased profitability due to premium prices



Very low energy consumption



Quick return on investment*



Improves supply security*



Un-Heated



Heated



* In US prices - **18 months** | Spanish prices - **2 years** | Israeli prices - **2-3 years**

* Heating was done with GSHE coils and a circulation pump only



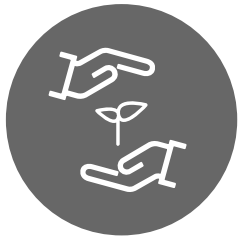
Case Study: Vegetables | stabilising nutrient temperatures of lettuce



Yield increase due to cooling by ground source heat exchange



Shortened growing cycle in NFT¹



Protects against excessive heat



Rapid ROI
(depending on price of product per kg sold)



*The smart agriculture market is estimated to be worth USD 7.53 billion in 2018 and is projected to reach USD 13.50 billion by 2023, at a CAGR of 12.39% between 2018 and 2023**

*Europe is the largest hydroponic segment and is expected to account for around 41% of the global market by 2025. Asia-Pacific forms the second largest market for hydroponics, which is also expected to grow at a steady pace during the forecast period**

Source: [*PR Newswire Article](#)

[*PR Newswire Article](#)

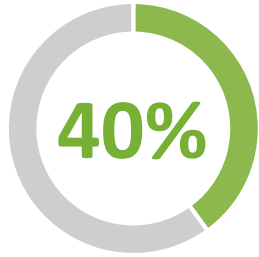
¹ Nutrient Film Technique



Case Study: Cannabis | indoor medical cannabis (interim results)



World-first cooling of cannabis roots



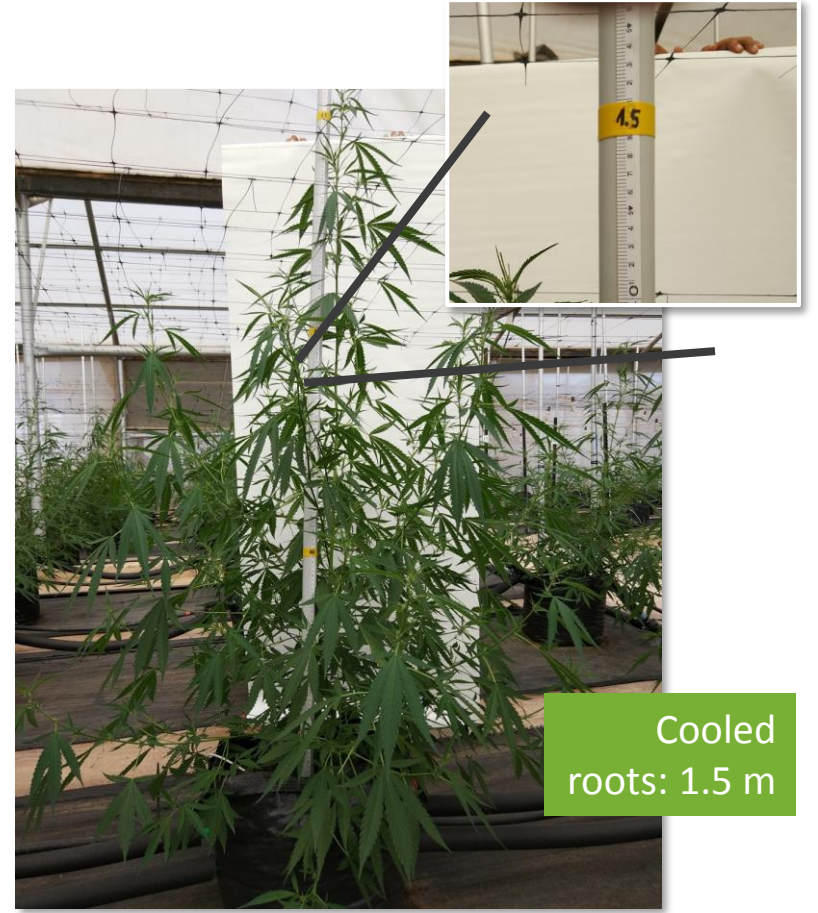
Increase
in plant
height



Increase in
stem diameter



Control:
1.0 +m



Cooled
roots: 1.5 m

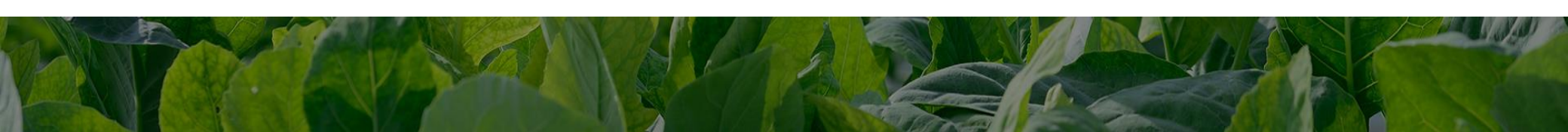


Root Zone Technology Optimisation (RZTO)

The technology is comparable to the revolution of drip irrigation, which means targeting the root zone area and not the canopy

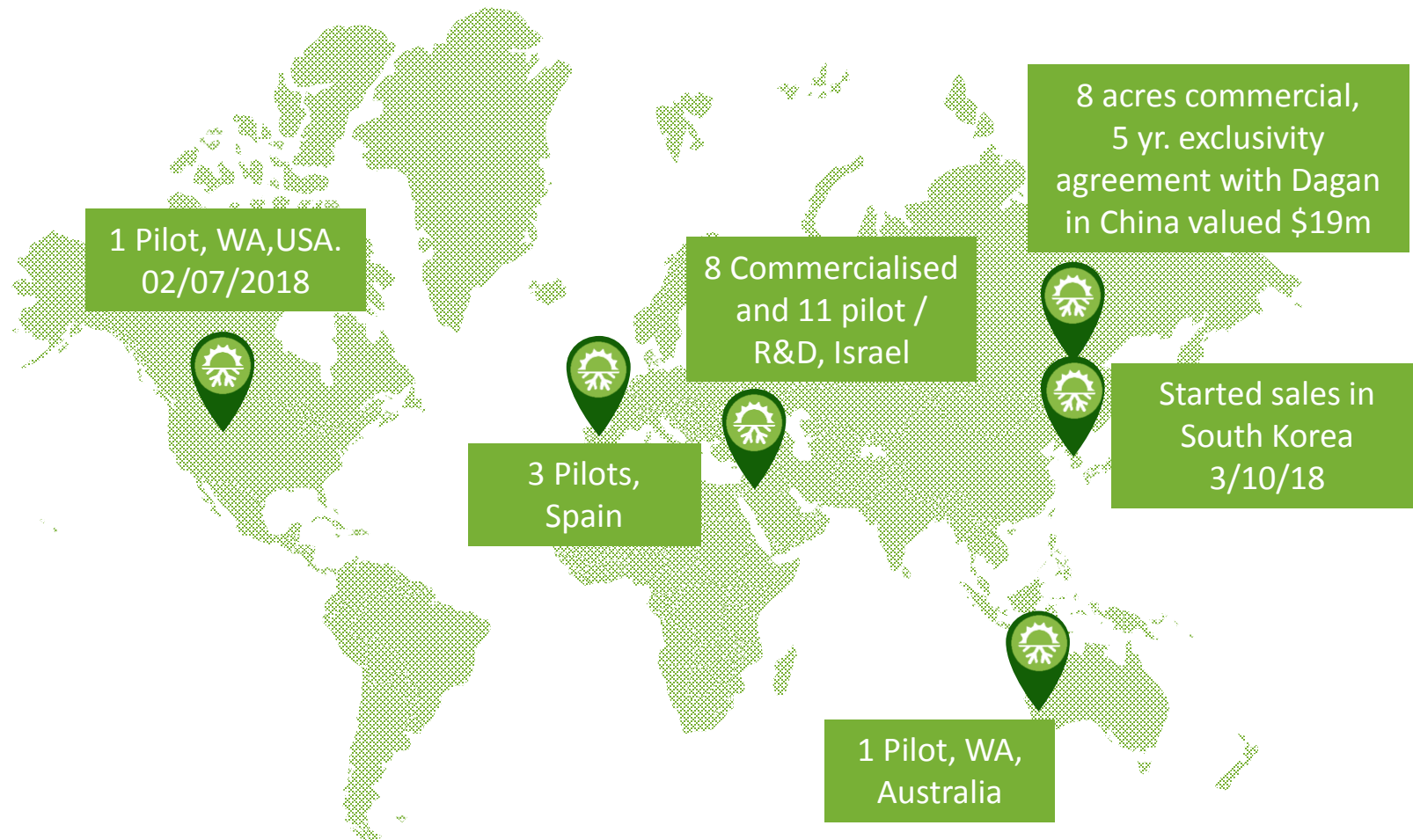
Advantages over existing options including:

- Pioneering of a **two-in-one system** - able to both heat and cool plants at the root zone area
 - There is no known company with RZTO optimization technology that uses sustainable low energy ground coils heat exchange system both for heating and cooling
- **Increased yield and quality**, with reductions in growing cycles
- **Energy efficient**, saving up to 80% of energy compared with air heating
- **Faster ROI** than competing solutions, which are expensive to run
- **Addresses climate management problems**
- **Real-time results tracking** via smartphone and PC software
- **Eco friendly** - competes favourably with fossil-based air heating companies and air cooling mats for plants



Commercialisation Strategy: RZTO global commercialisation*

RZTO is already in commercial use across Australia, China, Israel, Spain, South Korea and US



*As per ASX announcement/media release on June 7, 2018.



Israel

Leafy vegetables



NFT

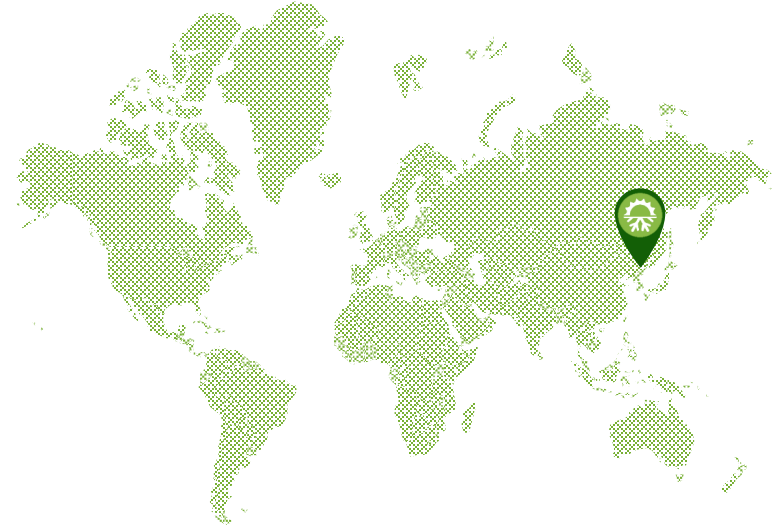


Bet Halevi research site



China: ongoing sales*

- Exclusive distribution agreement with Dagan Agricultural Automation signed in 2018
- Exclusivity conditional on \$19 million over a five-year period
- First order shipped and payment received



*As per ASX announcement/media release on February 5, 16 & July 31, 2018.



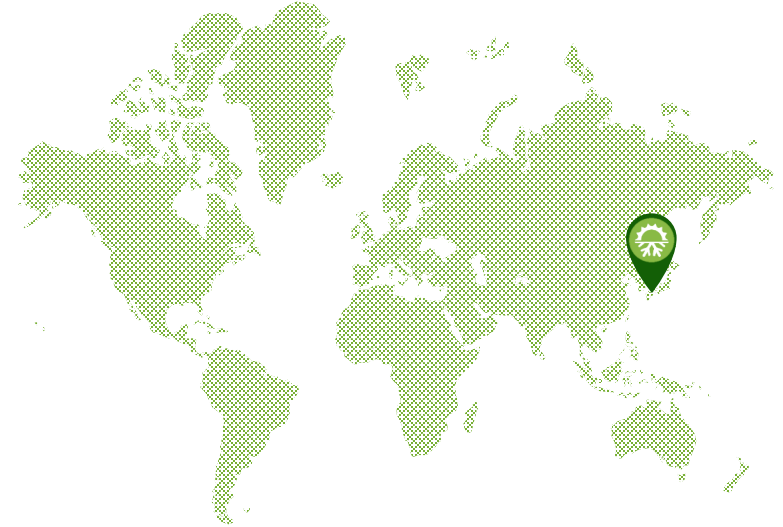
Spain: ongoing commercialisation

- Two pilots in Almeria
 - Tomatoes – Hybrid system
 - Zucchini – GSHE only
- One pilot in Huelva:
 - Strawberry Hybrid



South Korea first sales*

- Non-exclusive reseller agreement signed with Ezfarm in August
- Initial one-year agreement with option for annual extensions
- First commercial order placed in September



*As per ASX announcement/media release on August 8 & October 3, 2018.

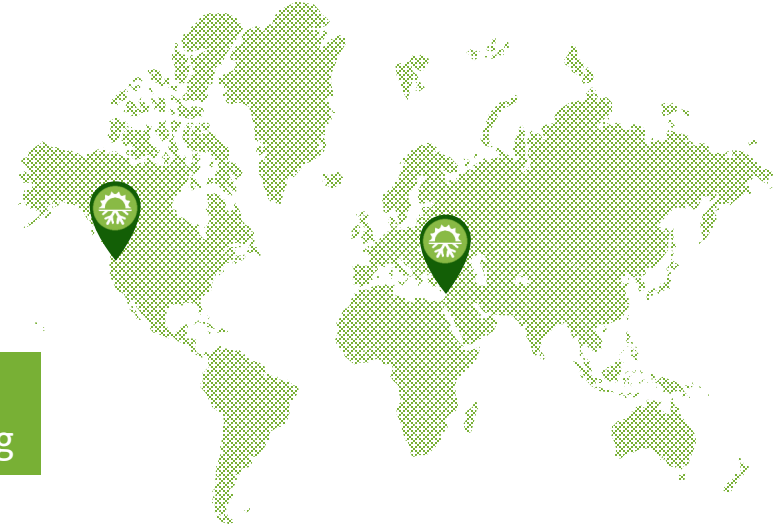


New sector | cannabis US & IL

- Washington State, USA: Open field, outdoors, sun-grown pilot in root zone heating for the winter 2018
- Israel: Indoor, greenhouse root zone cooling



USA: outdoor
root zone heating



Israel: indoor
root zone cooling





ROOTS

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