



# ROOTS

Sustainable Agricultural Technologies Ltd

Initial Public Offering



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# Investment Risks

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- 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 the Company may not be subject to such a slow rate of penetration but it's 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
  - The Company anticipates that a substantial number of shares will be classified as restricted securities by ASX upon Admission, which will comprise a percentage of the issued share capital on an undiluted basis.
- General Market Risk



# Introducing Roots Sustainable Agricultural Technologies



# Initial Public Offering Summary

Issuer	Roots Sustainable Agricultural Technologies Ltd
Listing / Proposed Ticker	ASX / "ROO"
CDIs Offered	25 million
Price per CDI	\$0.20
Capital Raised at IPO	\$5 million
Use of Funds	R&D, Development and Manufacturing, Marketing and Sales Expenses, Business Development Expenses, Working Capital and IPO Costs
Post-IPO CDIs on Issue	62.5 million
Post-IPO Market Cap	\$12.5 million
Post-IPO EV	\$7.5 million
Lead Manager	EverBlu Capital

Note: All dollars ("\$\$") quoted are in Australian Dollars unless stated otherwise

The Offer that will be contained in the Prospectus is an initial public offering to acquire CHESS Depositary Interests (CDIs) over fully paid ordinary shares in the Company (Shares) as the Company is registered in Israel and adheres to Israeli legal requirements. Each CDI will represent one underlying Share (1:1). The Shares offered under the Prospectus will be issued to investors in the form of CDIs so that those investors may trade the Shares on ASX and settle the transactions through CHESS. Note that in this Prospectus and this presentation, the terms "Shares" and "CDIs" may be used interchangeably, except where the context requires otherwise.





## About Roots

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Founded in Israel  
Incorporated in 2012

\$3.5 million invested to date

\$1.2 million pre-IPO round in June 2017

Graduated from the Israeli Chief Scientist's  
technological incubator program

International operations across Australia, Israel and  
Spain and planned geographic expansion



## An Agricultural Technology Innovator

- Roots is focused on developing, producing and commercialising technologies addressing severe weather conditions and improved crop yields
- The only two-in-one, low energy, root zone heating and cooling system
- 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
- Already completed initial R&D and now in commercialisation phase



# Proposed Board of Directors



**Dr Sharon Devir**  
Co-Founder  
CEO & Exec Director

## Background

- Dr Devir is CEO and Co-Founder of Roots
- Co-Founder of Rimomim, 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



**Tal Misch Vered**  
Non-Exec Director  
(Proposed)

- Ms Misch Vered is a Proposed Non-Executive Director of Roots
- Currently sits on the board of four publicly listed companies: Telsys Ltd, Medipower Public, Opal Balance Investments Ltd and Mordechai Aviv, Keren Hishtalmut le Ovdei Medina

- Previous CEO of Gmul Real Estate Ltd and CFO of Gmul Investment Company Ltd
- Bachelor of Accounting & Economics from Tel Aviv University
- Masters in Philosophy of Science from Tel Aviv University (Magna Cum Laude)



**Graeme Smith**  
Non-Exec Director  
(Proposed)

- Mr Smith is a Proposed 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.graemesmithconsulting.com](http://www.graemesmithconsulting.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  
(Proposed)

- Mr Blumenthal is a Proposed 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, with supply constraints

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## ...Leaves Roots well positioned to grow

### Problems facing 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



## Two major issues Roots is addressing

Roots is addressing two major issues in modern agriculture



2. Water shortages in areas with no access to water grids, wells or rain



1. Sustainable optimising of plant's root temperatures and yield



Roots is developing and commercialising three innovative technologies to meet these challenges



# **Technology 1: Root Zone Temperature Optimisation Control System**

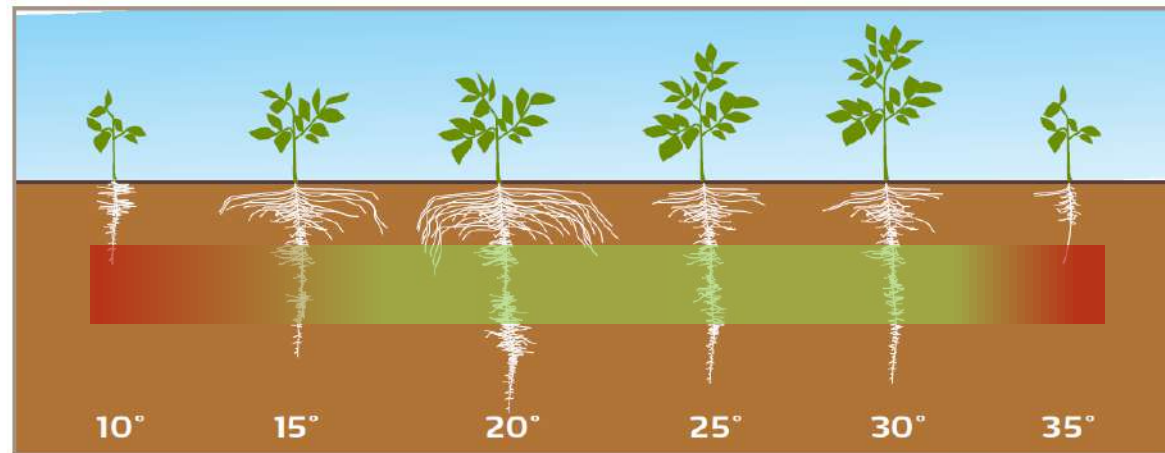




# Root Zone Temperature Optimisation (RZTO) Control System

- **Root temperature is the most influential factor in plant physiology for growth, productivity and quality**
  - An optimum root temperature generally ranges between 16-28°C
  - The optimum range is essential for a plant's robust growth, productivity and output
- **Roots' patented, closed cycle, agricultural system utilises ground source heat exchange principles**
  - Cools and heats root zone temperatures to stabilise the optimum temperature range
- **The Result:**
  - Increase of yield quantity and quality
  - Substantial energy savings by heating the root zone area only during the winter and cooling it during the summer with one system

Effects of Soil Temperature on Root Development



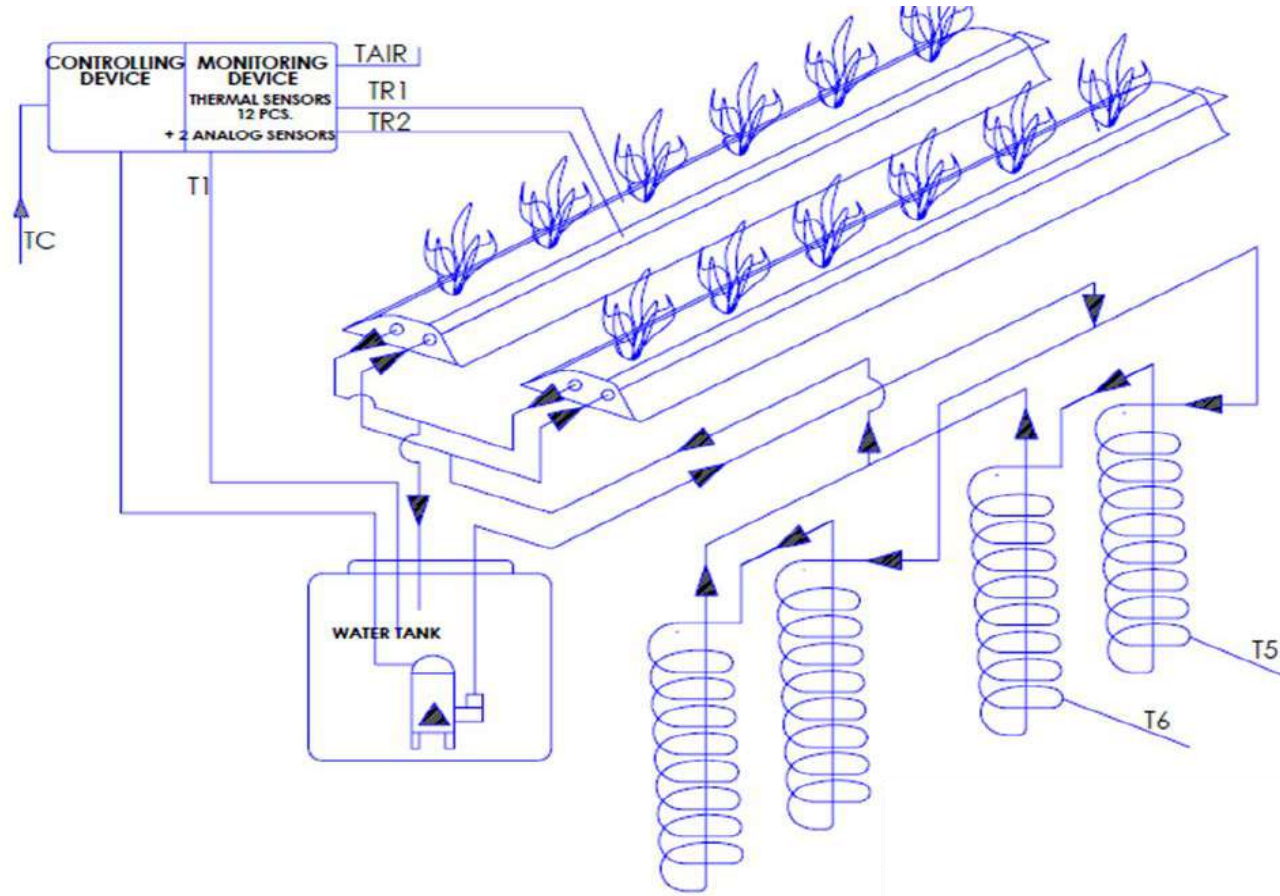
REF: SATTELMACHER ET AL - 1990

**Roots agricultural system maintains an optimal temperature range all year round**



# The RZTO System

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



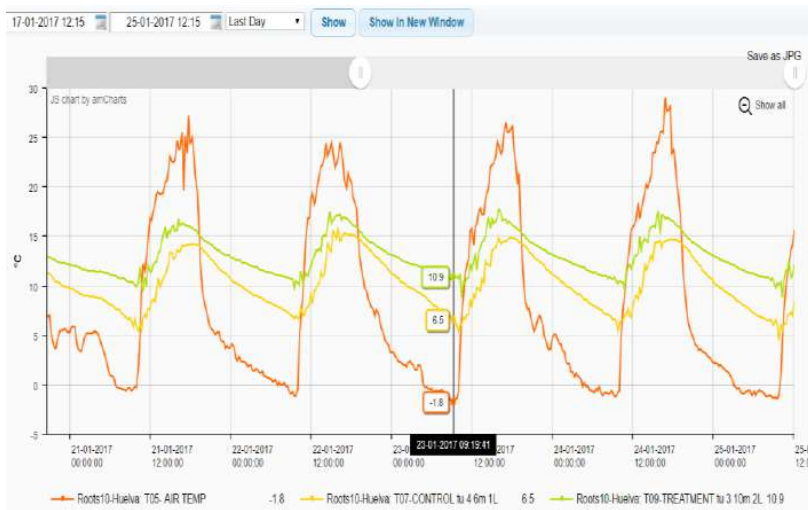
## Case Studies



# Fruits, Flowers and Vegetables

## Cucumbers: Heated in Winter versus Untreated

- Using Ground Source Heat Exchange<sup>1</sup>
  - Upfront Cost: \$8.5 USD/m<sup>2</sup>
  - Typical Payback Period: 2-4 years
  - Typical Yield Increase: >20%
  - Premium Pricing



Real-time software for monitoring results showing decrease in temperature variation



1. Typical Installation, based on Roots' customer 4 rows in each, 76m x 7.4m, 21 spans. ~1.18 Hectare
2. Reflects 55% gross profit to Roots





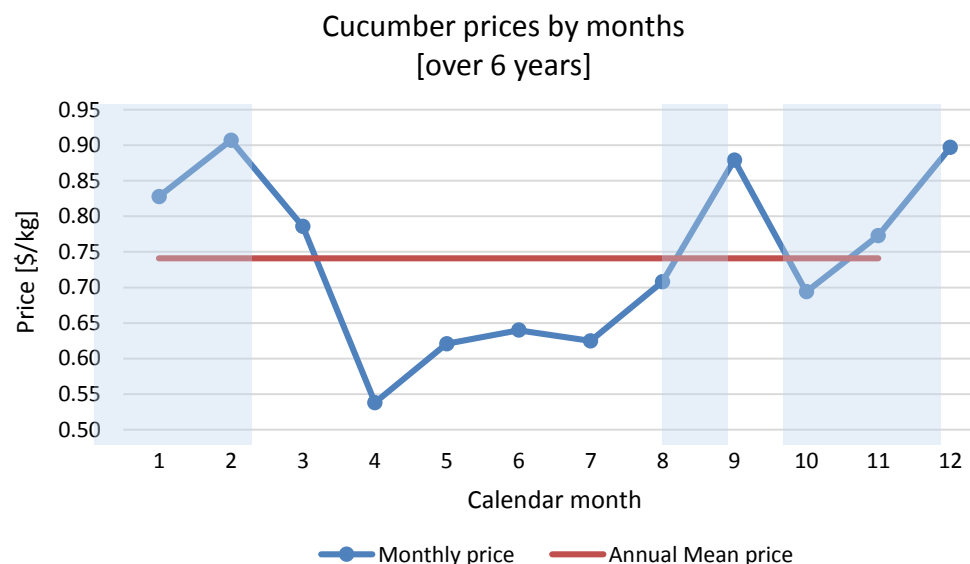
# Return on Investment (Case Study Cont.)

- Farmers using Roots' technology benefiting from premium prices during Winter time<sup>1</sup>
- Yield increase level based on Roots' field tests
- From each \$1USD yield increase, \$0.53USD is deducted to picking, handling and shipping costs<sup>2</sup>
- 3 levels of yield increase due to heating and cooling roots zone<sup>3</sup>
- Four level of premium prices<sup>4</sup>

**Sensitivity:  
Payback  
Period (years)**

Premium prices contribution to  
annual mean price

		0	15%	30%	45%
Yield increase <sup>5</sup>	15%	9	7	6	5
	25%	4	3	3	3
	35%	3	2	2	2



1. Israeli Plant Production and Marketing Board
2. Israeli Agricultural Extension service
3. Yield increase data based on Roots' field data
4. Prices based on Israeli Agricultural Extension service and the Israeli Plant Production and Marketing Board
5. No risk to the farmer, the system cannot cause production to decrease. Either it will not effect it or it will increase production.



# Pilot Testing – Strong Yield Improvements

		Crop Type	Location	Facility	Yield Increase	Comments
Heating Root Zone		Basil	Jordan Valley	Low tunnels, Tuff beds	30%	
		Basil	Jordan Valley	Low tunnels, Soil	10%	60% energy savings compared with traditional heating
		Strawberry	Sharon area	Greenhouse, hanged insulates beds	25%	Shortened growing cycle in 3 weeks, improved quality, elimination of additional air heating
		Cucumbers	Sharon Area	Greenhouse, Soil	100%+	Conducted by Netafim, Magal experimental site
		Flowers	Sharon Area	Greenhouse, Tuff beds		Shortening time to market
		Lettuce	Jordan Valley	Net house, Tuff beds	45%	
Cooling Root Zone		Cucumbers	Sharon area	Greenhouse, Soil	25%	Hot Winter
		Herbs	Jordan Valley	Greenhouse, Tuff beds	Maintain Yield	Without roots cooling system, the farmer could not grow a thing. Ambient Temp. of 40 to 50 C° degrees
		Cherry Tomatoes	Jordan Valley	Greenhouse, Tuff beds	20%	Heat pump
		Tomatoes, type 870	Jordan Valley	Net house Tuff beds	30%	Planting on mid summer end of summer harvest, Heat pump
		Lettuce	Jordan Valley	Net house Tuff beds	50%	Shortening growing period from 10 weeks to 5 weeks
		Lettuce	Israel Valley	NFT	10%	Significant energy saving – 60%



# 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
- **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



# Attractive Go-To-Market Strategy





# Multiple Sources of Revenue from Commercialisation

## Up-front sales to be made with integrators and dealers across a range of products:

- Heat dripping pipes
- Ground source heat exchange coils
- Generic plastic parts
- Excavation and labour
- Heat pumps
- Control systems

## Post sales service to provide additional sources of revenue

- Heat pump service and warranty
- Monthly monitoring and consulting
- Heat dripping pipes

## Revenue generated from financing

- Farmers are offered lines of credit based on their potential earnings and operations



# Targeting Customers Across Crop Varieties and Geographies

- With multiple applications, Roots target customers are farmers who operate with:
  - Greenhouses
  - Shade nets
  - Low tunnels
  - Hydroponics
- RZTO technologies can be applied to a range of key target crops including:
  - Vegetables and fruits
  - Herbs
  - Flowers
- Total world greenhouse vegetable area is 1.2 million acres (489,214 Hectares)  
*(source: International Greenhouse Vegetable Production – Statistics 2017 Edition)*

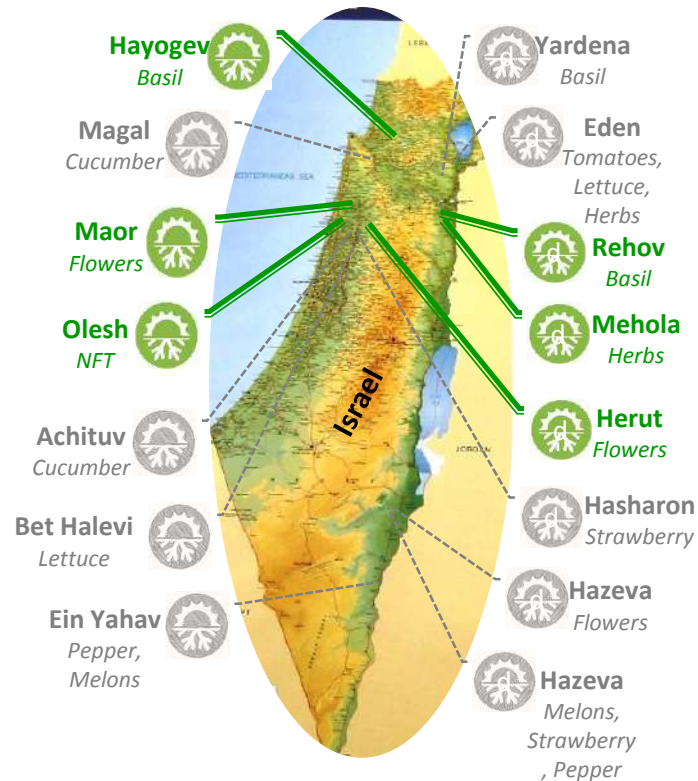
Greenhouses in Almeria, Spain



# RZTO Global Commercialisation Drive

RZTO is already in commercial use across Israel and Spain

## Israel programs



## Pilot programs in Spain



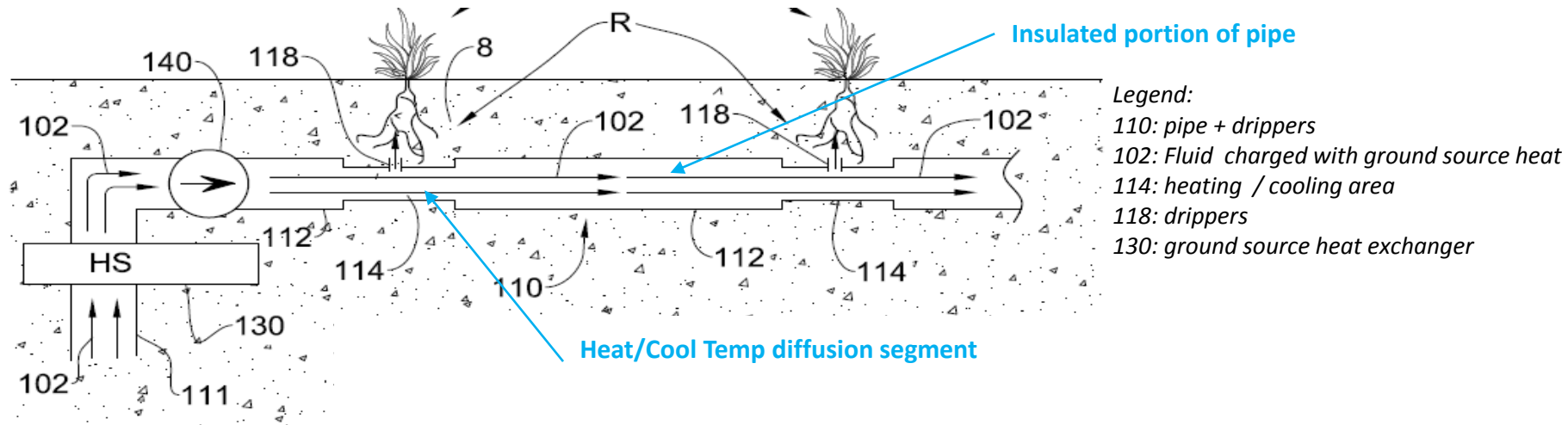
## **Technology 2 & 3: Additional Growth Opportunities from R&D**





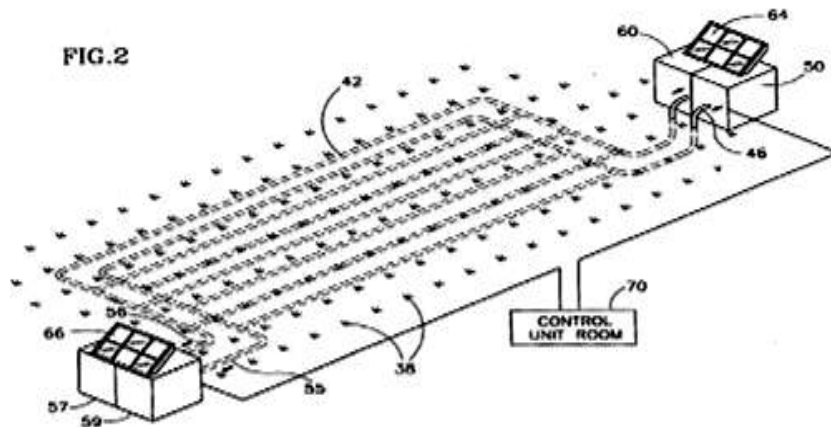
# 1. R&D Patented for Smart Pipe Fertigation and RZTO

- Smart management of combined root zone heating/cooling with underground irrigation and fertigation to facilitate optimal nutrient absorption by the roots, resulting in crop yield increase and healthier plants
- Delivers hot or cold temperature directly to the roots, thus minimizing heat loss between plants
- Irrigates at the root zone level – saving a separate upper or embedded drip irrigation installation
- The emitted nutrient fluid can serve for irrigation, fertilization, and pesticing



## 2. Irrigation by Condensation (IBC) – R&D

- Water shortages have a significant impact on the food production chain
- Irrigation by Condensation is a standalone, closed loop, solar operated system to irrigate crops by condensing air/soil humidity on the external surface of pipes with running cold water for irrigation
- In many cases, no additional irrigation is required to maintain plant survival and harvest quality



- Independent from water and electricity grids
- Allows farming in remote locations which are unsuited to food production due to water shortages
- Cold water irrigation- cools the roots and reduces its water requirements
- Increases crop production and number of seasonal cycles and improves quality



# Intellectual Property



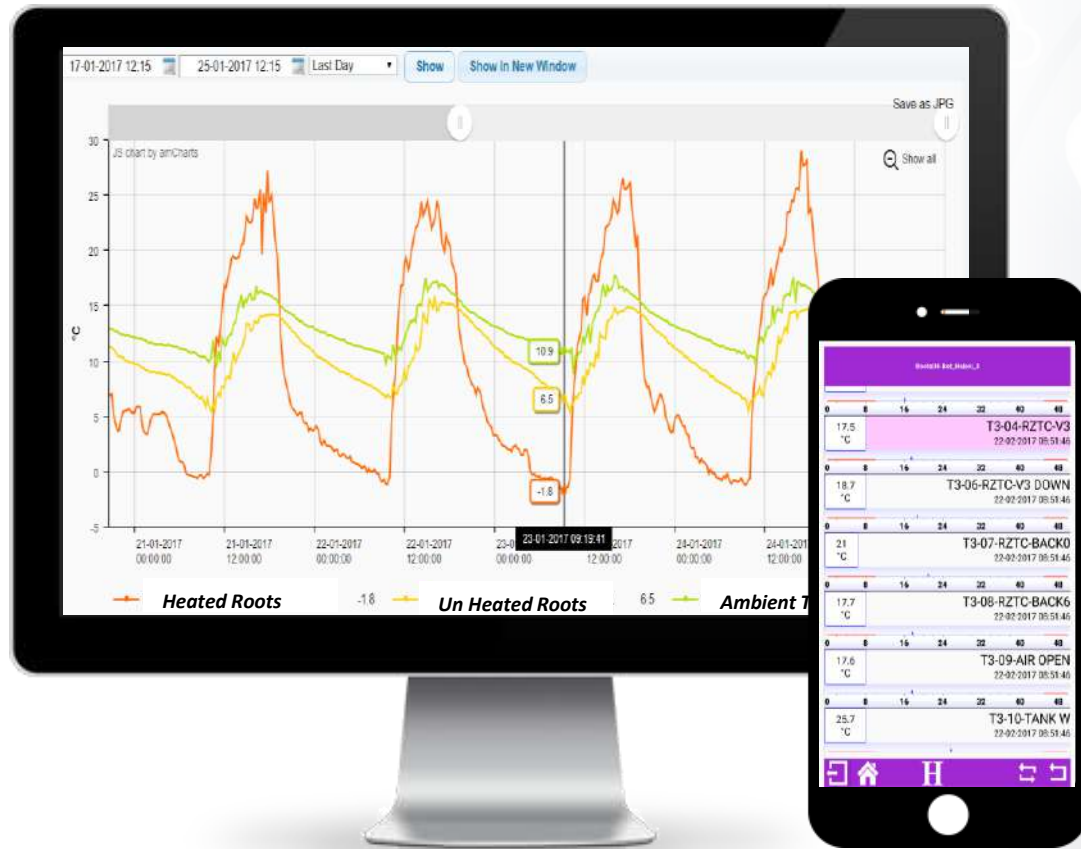
## Registered Intellectual Property

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- Roots have an extensive patent portfolio and continues to invest in its intellectual property across 15 countries
- **Patent family 1 - Irrigation method and system**
  - 14 granted patents across Australia, Europe, Israel, Mexico, USA and UK
- **Patent family 2 - Heat delivery system and method**
  - Additional IP recently filed in the US, Australia, Europe, China and Mexico
  - A revolutionary heat dripping pipe that diffuses the heat/cold only near the roots and not between them and allows combined underground fertilization and water emittance.



# Proprietary Monitoring Software



## Investment Highlights





# Investment Summary

## Uniquely positioned

- Roots has a disruptive technology which is attracting significant attention in the rapidly growing Ag-tech investment community

## Clear path to commercialisation

- RZTO already commercialised in Israel and Spain
- Additional products, backed by IP are in the R&D and pilot production phase

## Experienced management and global leaders of Root-Zone Cooling

- The only known technology with two-in-one heating and cooling ground source heat exchange technology

## Revenue generated from financing

- Farmers are offered lines of credit based on their potential earnings and operations

## Substantial progress to date

- RZTO engineering and commercialisation has further advanced post field testing
- World wide interest in all three innovative technologies is accelerating





**ROOTS**

Sustainable Agriculture Technologies Ltd

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