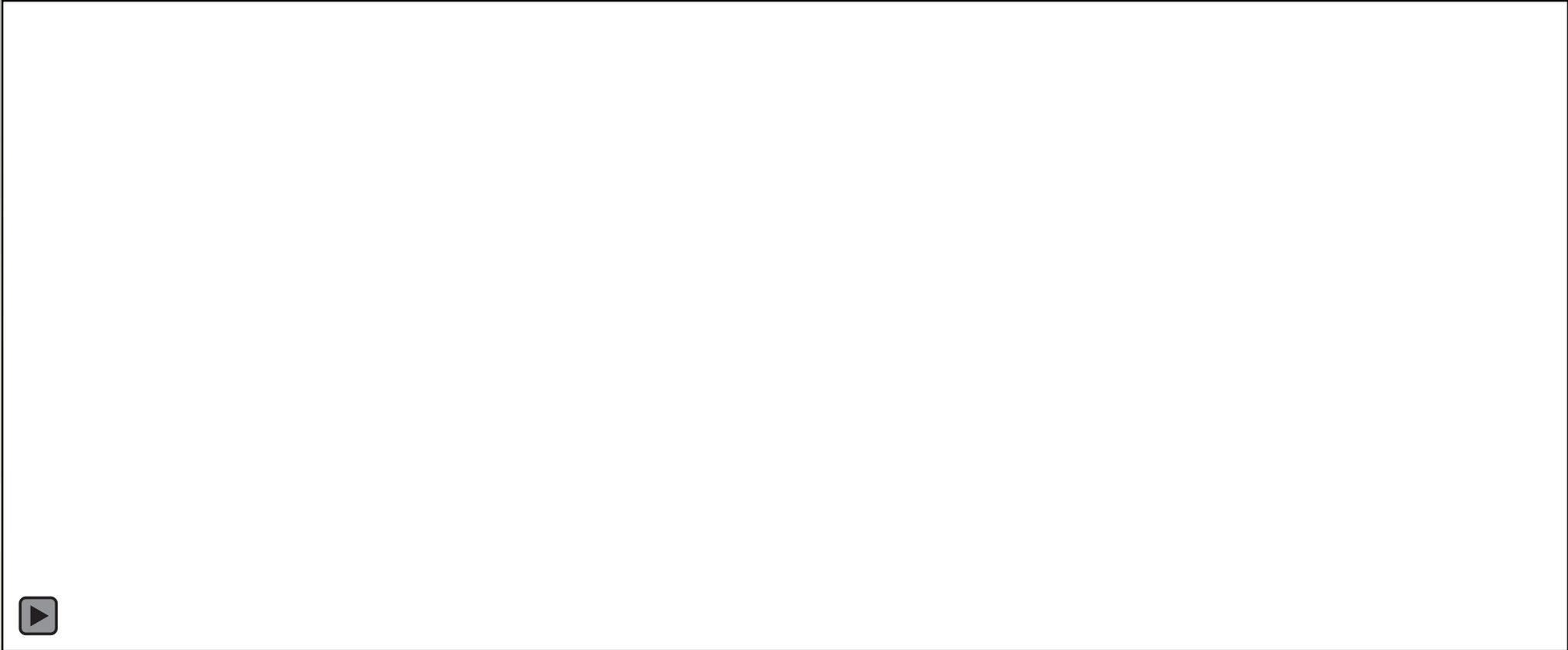


KEEPING OUR “BLUE PLANET” GREEN – IS IT POSSIBLE?



COULD THIS BE A GLIMPSE OF THE FUTURE?

# GLOBAL WATER CRISIS

**BY 2025 TWO-THIRDS OF THE WORLD'S POPULATION  
COULD BE LIVING UNDER WATER STRESSED CONDITIONS**



- **37 countries** currently face "extremely high" levels of water stress, meaning that more than 80 percent of the water available to agricultural, domestic, and industrial users is withdrawn annually
- **21 OF THE WORLD'S 37 LARGEST AQUIFERS** — in locations from India and China to the United States and France — have passed their sustainability tipping points
- **By 2050, at least 1 in 4** people will likely live in a country affected by chronic or recurring fresh-water shortages
- According to the U.S. Intelligence Community Assessment of Global Water Security, **BY 2030 HUMANITY'S "ANNUAL GLOBAL WATER REQUIREMENTS" WILL EXCEED "CURRENT SUSTAINABLE WATER SUPPLIES" BY 40%**

# CLIMATE CHANGE & CARBON EMISSIONS

## BURNING FOSSIL FUELS IS NOT THE ONLY SOURCE OF CARBON EMISSIONS:



- Altering ecosystems by removing or burning vegetation
- The principal reasons for deforestation are agriculture and urban growth
- ¼ of the carbon dioxide emissions can be attributed to land-use change
- Agriculture is directly responsible for 14% of total greenhouse gas emissions
- Deforestation accounts for an additional 18 % of emissions
- Dr. Rattan Lal, Professor of Soil Science at Ohio State University, calculated that over the last 150 years, 476 billions of tonnes of carbon were emitted from farmland soils.

## **CARBON EMISSIONS HAVE RESULTED FROM:**

- Deforestation - biodiversity loss - accelerated soil erosion - loss of soil organic matter
- Salinization of soils - costal water pollution - acidification of the oceans



# URBAN HEAT ISLAND EFFECT

## HEAVILY URBANIZED AREAS WITHIN CITIES ARE BETWEEN 1°C AND 3°C HOTTER THAN OTHER AREAS:

- Rows of tall buildings are organized into blocks which resist any natural breeze.
- Streets and roofs are clad in dark materials like asphalt and bitumen.
- Natural ground absorbs rain - In a city, the rain just runs into the sewer system - turning rivers and lakes warmer, which affects marine life.
- Urban areas tend to lack trees that help reduce air temperature by blocking the sun's rays, while cutting pollution levels by absorbing harmful particles.
- Higher city temperatures lead to increased use of air conditioning, which feeds climate change by producing more carbon emissions through increased electricity demand.



## SOLUTIONS TO THE PROBLEM:

- Reduction of hardscapes and pavement
- Restoring Greenscapes to Reduce the Heat Island Effect:
  - Planting of trees, green vertical walls, rooftop gardens, urban patio gardens, and other natural, open green spaces

# A PLANET IN CRISIS

AN OVERVIEW OF GLOBAL ISSUES PAINTS A GRIM PICTURE:  
PLANT-RESPONSIVE TECHNOLOGY SOLUTIONS PRESENT AN OPPORTUNITY FOR CHANGE

## GLOBAL PROBLEMS

Increasing Water Scarcity (70% of water used in agriculture)

Global food production demands to meet population increases

21 of the largest aquifers passed their sustainability tipping point  
+ Center pivot irrigation draws 3,000 gal/hr from an aquifer

Agriculture is responsible for 30% of carbon emissions

Agriculture practices & use of agrochemicals resulted in degradation of soil & increased salinity in soil and water

Pandemic lead to disruptions in supply chains – countries are focused on food security and local supply chain

Urban heat island effect:  
cities are between 1°C and 3°C hotter than other areas

## PLANT - RESPONSIVE TECHNOLOGY SOLUTIONS:

Reduces water usage by 30-90% over other forms of irrigation;  
Plant-Responsive can use poor quality & reclaimed water

Dramatically increases crop yield

Plant-Responsive uses 70-90% less water than center pivot

No electricity or fuel is needed with Plant-Responsive tubing, no carbon footprint

Improves soil health and its ability to sequester CO<sub>2</sub>, improves microbial activity in rhizosphere, eliminates fertilizer run-off

Works in harsh climates & non-arable land, enables local farms to implement crop diversity and produce higher yields

Restoring Greenscapes:  
Using efficient Plant-Responsive irrigation



**ROOFTOP GARDENS**



**PARKS**



**ROADWAYS**



**GOLF COURSES**



**RDI**  
RESPONSIVE  
DRIP  
IRRIGATION

**A SOLUTION FOR CITIES**



**SPORTS FIELDS**



**LIVING WALLS**



**RESIDENTIAL**



**COMMERCIAL**

# FORCED IRRIGATION vs. PLANT-RESPONSIVE

All previous irrigation technologies “force” water into the soil, attempting to uniformly distribute moisture and ideally match evapotranspiration rates (ET).

New “smart” controllers and sensor technology allow for greater insight into crop environments - but can still only estimate the need of a broad area of plants.

**Plant-Responsive Technology** ushers a new generation for water delivery - the world’s first system able to interact with plant roots to deliver exactly what EACH plant calls for, minute-by-minute, plant-by-plant.



DRIP / MICRO  
RESPONSIVE



SPRAY



SPRINKLER



SOAKER



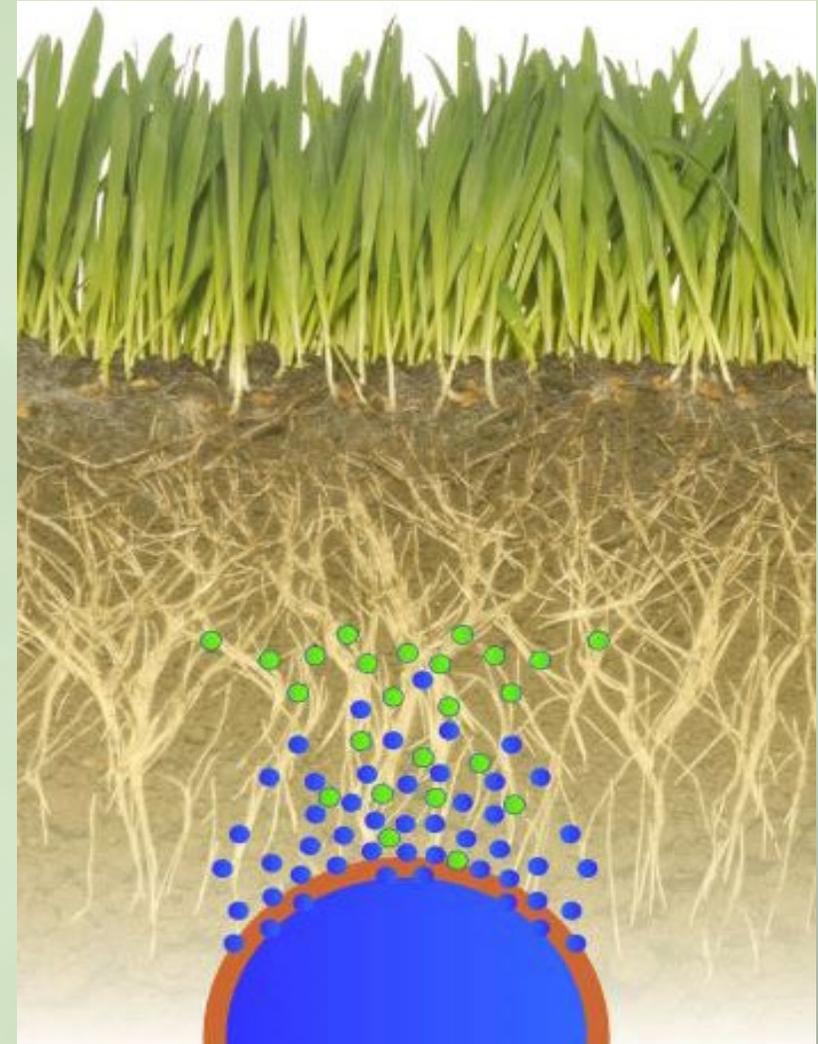
HIDROPONICS



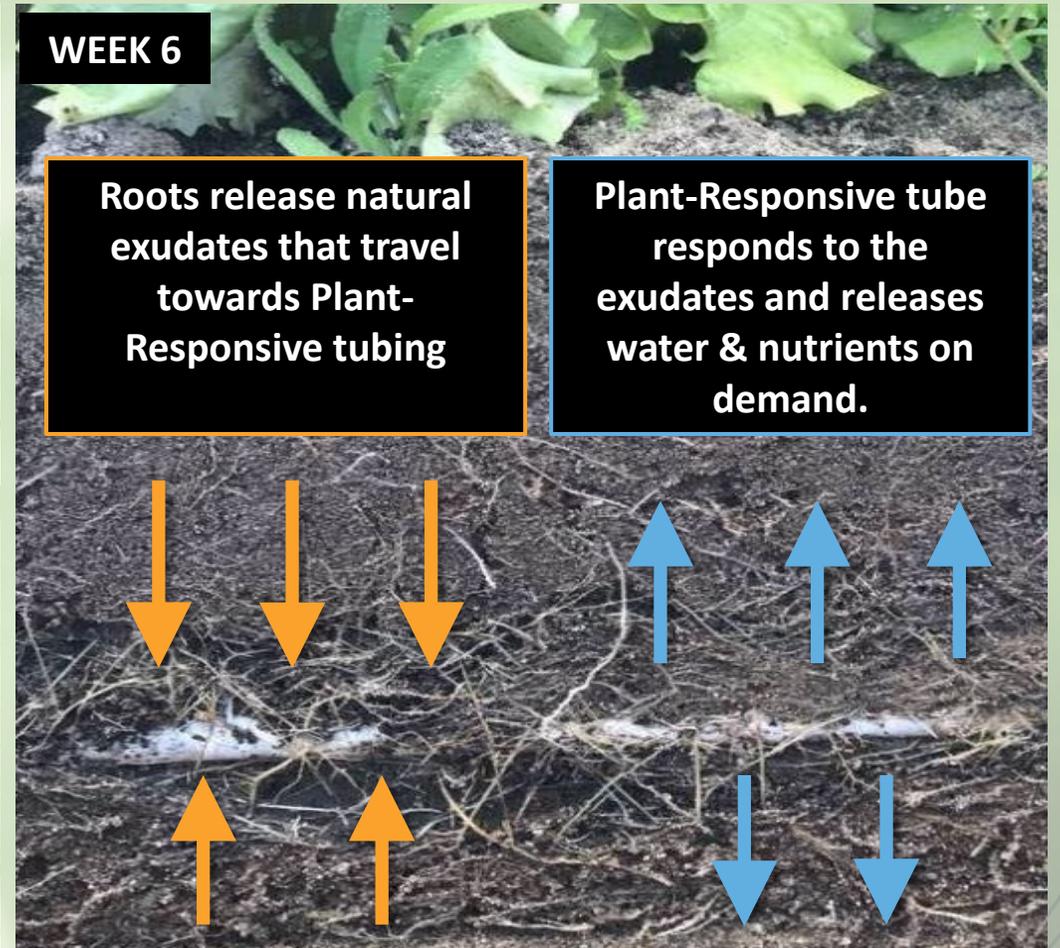
PLANT-

# HOW IT WORKS

- ✓ Tough microporous tubing is buried near the roots and holds water at very low pressure; acting as an underground reservoir
- ✓ Plant roots release signals into the soil when they need water
- ✓ “Smart” micro-pores of the Plant-Responsive technology *respond* to these signals and release water from the tube
- ✓ Release rate is matched to plant’s absorption rate
- ✓ After plants have absorbed the water, the micropores stop releasing water
- ✓ The world’s first and only “nature-driven” irrigation technology



# Plant – Responsive Irrigation Working With Plant Roots



# A UNIQUE INTERACTION WITH ROOT SIGNALS TO DELIVER WATER AND NUTRIENTS

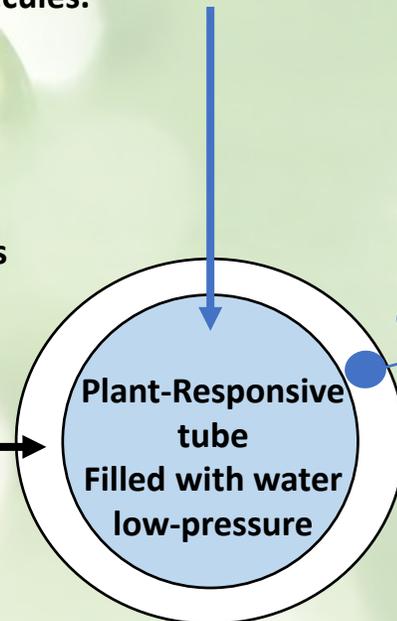
**STANDARD "FORCED"** irrigation is based upon timed intervals for delivery of set amounts of water

**PLANT-RESPONSIVE** irrigation is based on organic chemistry, **Interacting directly with the plants' roots** to deliver water and amendments **on demand**. Plant-Responsivetube operates at constant low pressure, providing a **reservoir** that plants can access when needed. Water and nutrient delivery fluctuates in **response to the plant**.

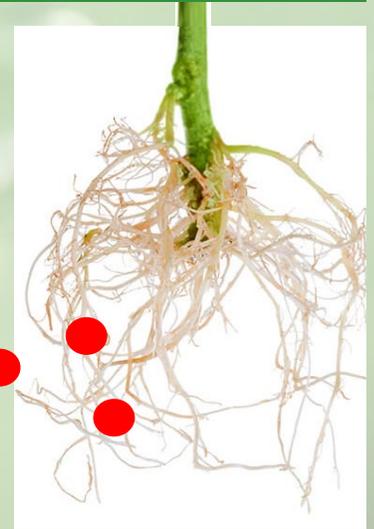
**1** Growstream has a smooth interior surface that has been **infused with a hydrophilic polymer**.  
=> Creates a **chemical bond** that attracts water molecules.

**2** The **hydrophilic polymer** enables the movement of the water molecules and water soluble amendments through the micropores along the tube's surface.

**Patents of RDI** support the science behind the Plant-Responsive technology and its delivery process in response to plant exudates



**3** Plants release **chemical exudates**. Their affinity for water breaks the molecular bond of the water from the hydrophilic polymer and triggers the flow of water through the micropores of the tube



# DELIVERING WATER ONLY WHEN THE PLANTS NEED IT.

Traditional irrigation systems cannot irrigate when plants need most water because of huge losses in evaporation if irrigation is done mid-day. **PLANT-RESPONSIVE TUBE CAN !**

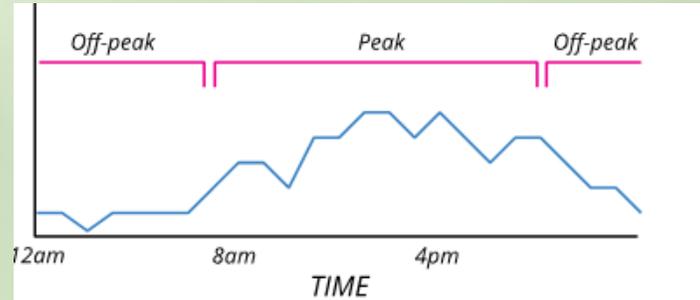


**PLANTS DON'T NEED WATER DURING THE NIGHT !**

**DAILY USAGE, PEAK VS. OFF-PEAK**

Water usage fluctuates minute-by-minute, Design must consider peak usage needs to ensure adequate flow is available to the field. Although no two days will be identical, typical daily water usage will show minimal overnight use, then increased usage throughout daytime hours.

**PLANTS NEED MOST WATER AT MIDDAY**



# NEXT-GENERATION EFFICIENCY ZERO ELECTRONICS

PLANT-RESPONSIVE TUBING HAS BILLIONS OF MICROPORES THAT RELEASE WATER AT COMPLETELY VARIABLE RATES, **ALLOWING EACH & EVERY PLANT TO CONTROL ITS OWN WATER DELIVER!**



# THE PLANT-RESPONSIVE TECHNOLOGY DIFFERENCE



- 50% Water Savings
- Regenerates Soil
- Restores Microbial Activity & Soil Health
- Lowers Fertilizer Consumption
- Produces Faster Growth and Development
- Earlier Harvest and Extended Harvest
- Minimizes Biotic and Abiotic Stressors
- Reduces Disease and Pest Infestations
- Increases Yield
- Reduces Energy Requirements
- Requires No Electricity or Fuel to Operate
- Facilitates Regenerative Farming
- Crop Diversity Simplified
- Reduces Carbon Emissions & Greenhouse Gases in Agriculture
- Extended Life of System:
  - ✓ Reduces Petroleum Consumption for Replacement of Drip Tape annually
  - ✓ Decreases Plastic Waste from Drip Tape Extraction & Disposal

**PROVIDES SUSTAINABILITY, REGENERATION & IMPACTS CLIMATE CHANGE**



# CREATING LIVEABLE AND SUSTAINABLE CITIES FOR FUTURE GENERATIONS

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# Forum Closing Session

