# **How** do we **grow** enough **food** to feed **8 Billion** people while our **planet** is **running out** of fresh **water**?

**THE UNIVERSITY OF TEXAS AT AUSTIN AND BLUEGRASS FARMACEUTICALS HAVE THE ANSWER . . .**

# THE PROBLEM

- **Climate Change** is an existential crisis, but long before we have exhausted our environmentally responsible coping strategies, our planet will run out of clean water. We will no longer have enough fresh liquid water available to meet agricultural needs in addition to supporting projected consumption by humans. **We need breakthrough solutions to this pressing existential threat**.

- Today 113 countries are considered water insecure, including two of the world's most populated, **India** and **China**. An additional 24 countries are considered critically water insecure, with the largest by population including **Pakistan** and **Ethiopia.** Water security has become a major concern worldwide, and is becoming especially dire in regions like the Middle East and North Africa (MENA), where 13 of the 24 nations in the critically insecure category are located. [find more information here]

- Many predict that in the coming decade, agricultural water use way beyond the limit of renewable freshwater resources will lead to "water wars" resulting in unnecessary deaths as countries fight over available water resources. This problem, most common today in MENA regions, also affects other nations including Spain, South Africa and South Korea. In addition, it is predicted that the United Arab Emirates will run out of ground water by 2030. [find more information here]

- **Where is the water?** Fresh water sources represent about 1% of the world's total water supply. Seawater contains about 97% of the planet's water. Significantly, over 50,000 cubic kilometers of clean renewable water is stored in our atmosphere. Unfortunately, obtaining fresh water from the sea or air currently requires prohibitive amounts of energy.

# THE MARKET

**Atmospheric Water Harvesting** enables the next generation of advanced drip irrigation. According to Emergen Research, the global advanced drip irrigation market was valued at USD 5.22 billion in 2019 and is projected to reach USD 11.25 billion by 2027, growing at a CAGR of 10.7%. A more recent forecast from the same firm estimates the market will be worth USD 18.70 billion by 2032, driven by:

- 💧 Escalating Water Scarcity: With agriculture consuming over 70% of global freshwater, atmospheric harvesting with drip irrigation's ability to reduce water usage by up to 60% is driving adoption—especially in arid and semi-arid regions where water stress is acute.

- 🌾 Shift Toward High-Value Crops: Growers are increasingly cultivating fruits, vegetables, and specialty crops that demand precise moisture control. Drip systems deliver water directly to the root zone, improving yield quality and minimizing disease risk.

- 📡 Integration of Smart Technologies: The rise of IoT-enabled controllers, soil sensors, and cloud-based analytics is transforming drip irrigation into a precision farming tool. These systems optimize water and nutrient delivery, boosting efficiency and profitability.

- 🏛️ Government Incentives & Sustainability Mandates: Global and regional policies—such as subsidies, water-use regulations, and climate adaptation programs—are accelerating the transition to atmospheric harvesting and drip systems as part of broader sustainable agriculture initiatives.

# EXISTING TECH


- Desalination plants are large, complex and expensive to build and cannot always be located where needed most.
- Salt dissolves easily in water forming strong bonds that require a lot of energy to break so the process is difficult and expensive.
- Very complex technology is needed with lots of moving parts: pumps, valves, filters, etc.
- High maintenance and low water quality.
- Large carbon footprint that exacerbates the existential climate crisis.

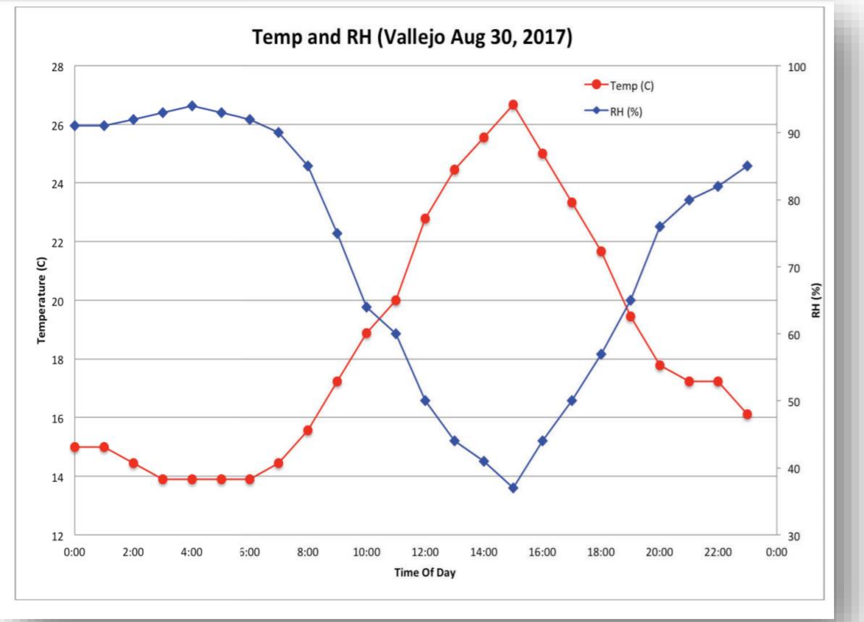

- Most technologies use a condensation method which is based on circulating an environmentally hazardous refrigerant.
- The process is energy intensive requiring a lot of electrical energy per unit of liquid water produced.
- Does not work as well in low-humidity (<50%) environments.
- Lots of mechanical and moving parts: compressors, valves, cooling fans, plumbing.
- Large carbon footprint that exacerbates the existential climate crisis.

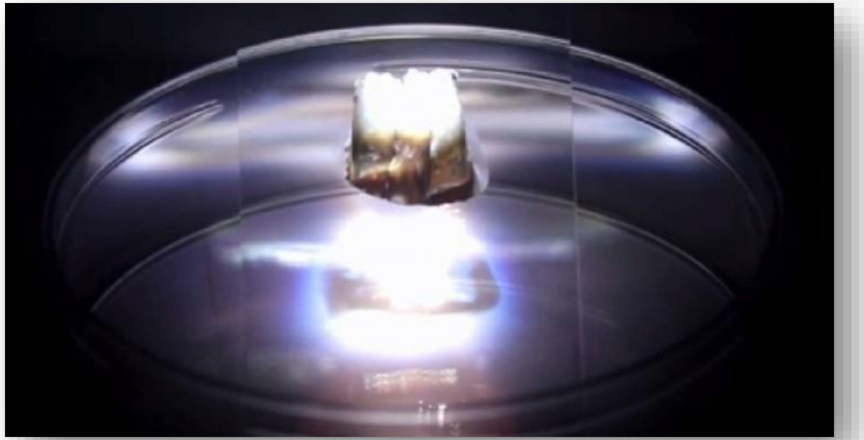
# OUR SOLUTION

**What if there was a way to harvest an unlimited supply of fresh water from air using a simple apparatus with no moving parts – and – powered only by the sun?**

**The University of Texas at Austin** has developed a revolutionary new hydrogel technology that absorbs moisture from the air and returns it as clean usable water – in astounding quantities – even in low humidity environments. [find more information here, here, here and here]

This new, patented hydrogel is designed to both harvest moisture from the air and produce liquid water with no moving parts, and no fossil fuel energy input - powered only by diurnal temperature variations - and having a negligible carbon footprint.

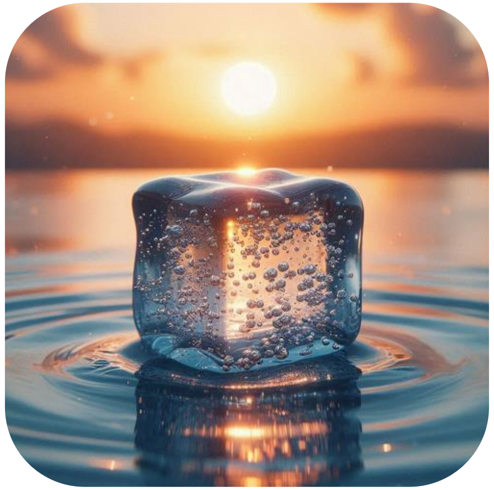


**Bluegrass Farmaceuticals** is licensing the UT hydrogel technology to develop an atmospheric water harvesting and irrigation system (patent pending), for efficiently extracting, collecting and distributing liquid water from atmospheric moisture for use in irrigating high-value crops.

# HOW IT WORKS

- **The University of Texas at Austin** has invented an extraordinary material called Super Moisture Absorbent Gel (SMAG). Unlike similarly constructed hydrogels that can only absorb water vapor, the SMAG material can both absorb atmospheric moisture and release it as potable liquid water.
- As the sun sets and the air begins to cool, arrays of inexpensive biodegradable SMAG polyhedrons begin absorbing hundreds of times their weight in water vapor sequestering the molecules within their matrices.
- As the sun rises and the SMAG arrays begin to warm, the sequestered vapor is released in the form of liquid water. The temperature difference between absorption and desorption is only a few degrees C. The SMAG gel can be cycled in this manner hundreds of times without needing replacement.



- The SMAG material can produce up to 50 liters of water per kilogram per day. The material will function effectively even with humidity levels as low as 15%.
- **Bluegrass Farmaceuticals** has designed and patented a fenestrated modular conduit network that incorporates the SMAG material to harvest atmospheric moisture utilizing diurnal temperature variations creating a controlled, self-watering irrigation system that has the potential to revolutionize agriculture.

# IMPACT

- Increased crop yield and food production while simultaneously increasing the availability of drinking water in regions with water fragility.
- Reduced regional food insecurity, hunger, illness and poverty in developing nations.

- Significantly reduced carbon emissions by moving away from water production methods that currently rely on fossil fuel for energy.
- Reduced pressure on freshwater sources that are being systematically depleted as populations grow. [learn more about the Lake Mead crisis]

- Help make drylands and semi-arid landforms fertile supporting the sustainable growth of **$CO_2$** absorbing vegetation and significantly reducing the total carbon loading of our atmosphere.
- Reduced impact of droughts, water scarcity and variations in seasonal rainfall.

# ABOUT

Bluegrass
FARMACEUTICALS
Harvest. Life.

**Bluegrass Farmaceuticals** is a health, wellbeing and life sciences company with operations in Coral Springs, Florida and Miamisburg, Ohio. Our women-owned, minority-owned business aims to help save our environment by exploring transformative technologies for solving agricultural challenges primarily associated with the cultivation of high-value crops. For more information about Bluegrass, visit www.bluegrassfarma.com or follow us on Instagram: https://www.instagram.com/bluegrassfarma/