



AQUASUSTAIN VERTICAL FARMING

The innovative aeroponic vertical farming system which saves water. Simple, clean and 98% more efficient.



Saves water

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Meet the team



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Support

Thank you for supporting us! Join the faming revolution to save water worldwide.

By combining futuristic smart technology with aeroponics, Aquasustain is the solution to minimize the water used in agriculture.

Funding Period

May 1 2020 – Jun 13 2020

(43 days)

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This **Grand Challenge** we were tasked to investigate engineering solutions for **clean water and sanitation** in the year **2040**.

It is currently estimated that 2.6 billion people in the world lack **adequate sanitation** and 1.1 billion people lack access to clean water supplies. The global health burden is staggering, where thousands of people die each day from diseases associated with these conditions.



NTUENG GRAND CHALLENGE 2020
SUSTAINABLE DEVELOPMENT



Research

Water is a **renewable resource**, but its availability is variable and **limited**. Factors such as rainfall, temperature, evaporation and run-off determine its availability.

Only **0.5%** of the Earth's water is freshwater and available for agricultural, industrial, and personal use. And despite an increasing population, set to hit **over 9 billion by 2040**, this water volume will not change.

Despite progress, every country in the world experiences water shortages at some point in the year.

The solution to the water **crisis** will be found by increasing the **productivity** of existing water resources in order to ease **water scarcity**.

Problem we addressed

Agriculture alone consumes **70%** of the freshwater withdrawn in the world.



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Our Product

H2Eco has developed the product **AquaSustain** which uses the concept of vertical farming in order to maximize the amount of water that can be **saved** during farming.

This **innovative** product involves growing crops in vertical layers using water saving techniques, known as **aeroponics**.

This technology uses a nutrient enriched spray **mist** as a method to sustain the growth, that can massively reduce the amount of **clean water** currently being used for agriculture.

AquaSustain aims to use **futuristic techniques** to collect and store rainwater which can then be **recycled** as crop hydrating mist.

AquaSustain's vertical farming method uses **95% less water** than conventional farming methods. In turn this saves water, allowing greater quantities of freshwater to be exploited for personal use.



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Aquasustain does not use any soil in order to **minimize water retention** and increase efficiency. The freshwater is in direct contact with the roots via the aeroponic system, allowing for utmost osmosis. Furthermore, this **clean farming** method decreases the chance of bugs, improving farming **sanitation**.



With a growing demand for clean products, AquaSustain offers a pesticide and herbicide free farming process. Pesticides are often **water rich** in order to distribute the chemicals evenly across the crop. Not only does AquaSustain **save** considerable amounts of water by eliminating this process, it also produces **safe and clean crops**.



Aquasustain uses aeroponics, a water saving plant-cultivation technique where the roots hang in the air and receive nutrient rich water via fine mist. This is the most water conservative method as compared to hydroponic irrigation, aeroponics uses 80% less water.



AquaSustain takes advantage of wasted rainwater and uses this free source of supply effectively. Unlike conventional irrigation systems, our product also utilizes gravity to recycle the unabsorbed mist back into the aeroponic system. Therefore, reducing the demand for manual refills.



Wireless communication and controlling is implemented into this futuristic design where data can be accessed and analysed remotely. In addition, each plant cup is personal and mist volume customizable via smart interface. Therefore, each plant species will receive exactly the amount of water it requires, minimizing water wastage.

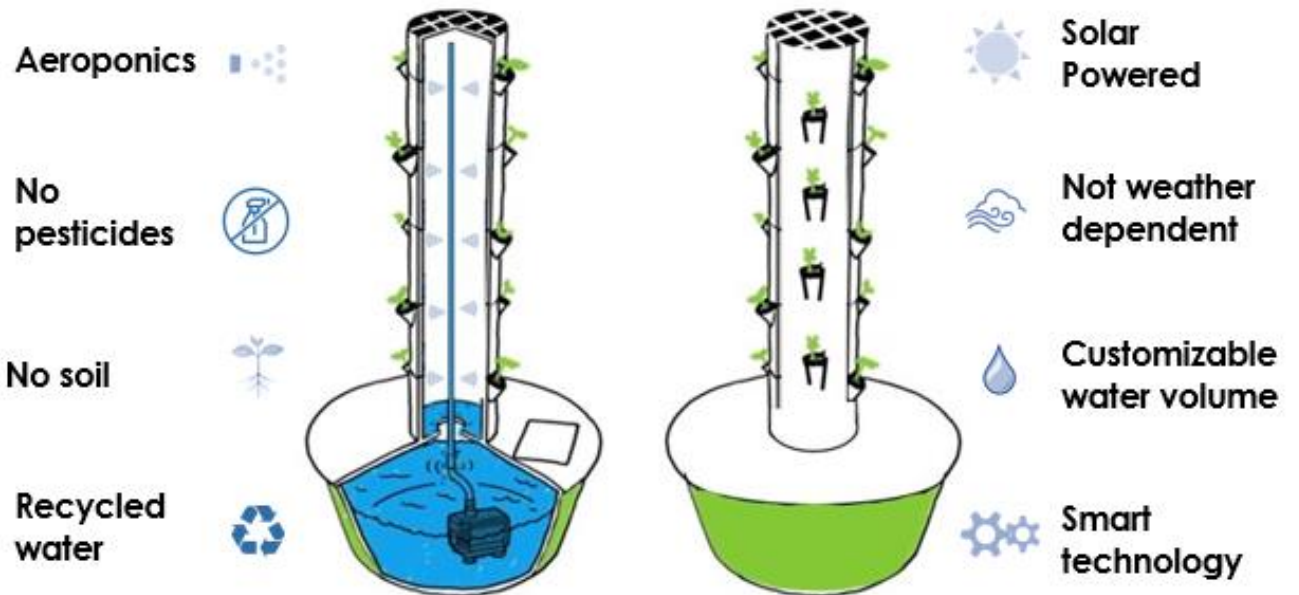
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Despite rainwater being AquaSustain's main water source, the product can easily be supplied with freshwater from a hose. Therefore this solution can be implemented in both **developed** and **developing countries**, so that they are able to utilize clean water all around the world.



- 270 Litre Water tank base
- 37.5 Watt Water pump
- Customizable Water volume mist
- Growing capacity up to 28 Plants
- Saves Water

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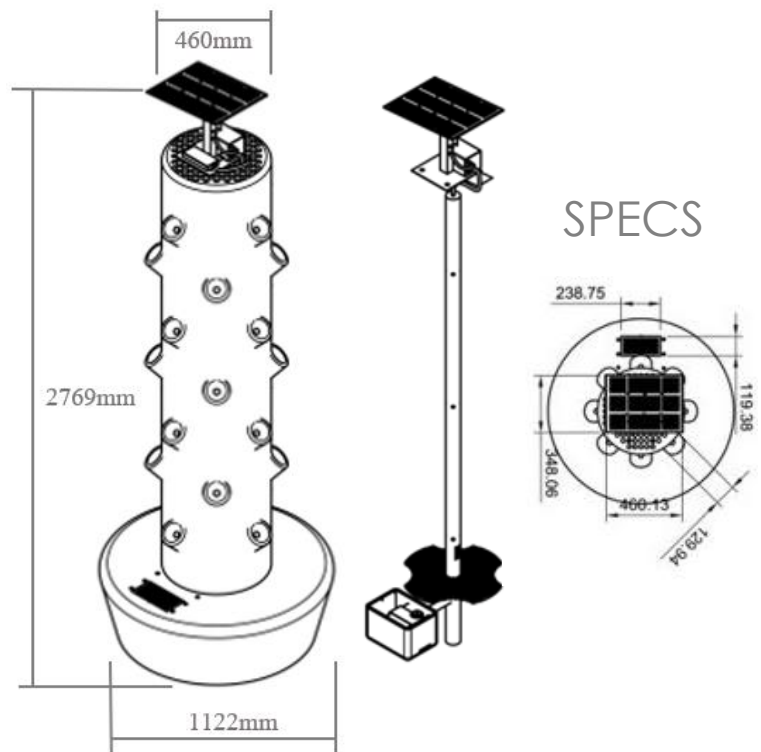
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Sustainable Development

In the year 2040, sustainable innovation will be leading businesses' therefore H2Eco has developed an **eco-friendly** product to fit the predicted sustainability trends.

As a company we have ensured that the shell of Aquasustain is manufactured from **recycled plastics**. At product death, this material can then be recycled again safely. Not only have we chosen materials that are **strong, durable** and **cost effective**, but also are sourced sustainably and plant friendly.



SPECS

Materials

Polypropylene for the tower and the base

- ✓ Biodegradable
- ✓ Generate fewer waste products in production and disposal

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Why should you invest?

AquaSustain combines futuristic, **smart technology** with aeroponics to minimize the water used in farming.

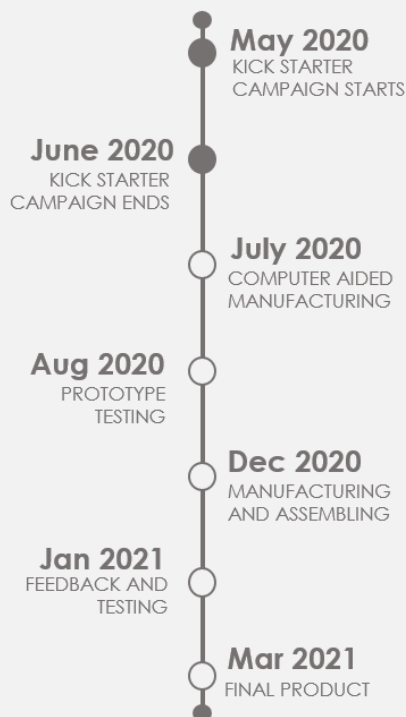
We have exploited the increasing opportunities in smart **connectivity** and smart materials to create an innovative engineering solution.

With our main focus on **sustainable development**, renewable energy techniques, water recycling processes and water saving systems have been at the forefront of our design.

This product is a fantastic **business opportunity** and your intelligent **investment** into this increasingly progressive field will not only have a significant impact on global clean water and sanitation but will also provide high profit returns.



PRODUCT TIMELINE



Why we need you

We are here to expand our passionate community of urban farmers and reduce water consumption in agriculture worldwide. We believe that you play an **integral role** in the development of AquaSustain and by supporting this innovative product you help to **build the future** of water efficient farming.

£0

pledged of £ 50,000 goal

43

days to go

0

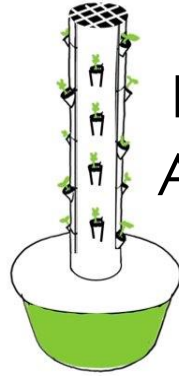
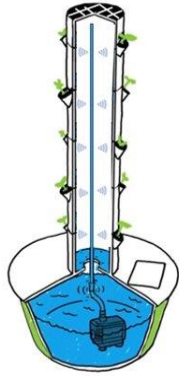
backers

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Price of one
AquaSustain:
£300

The investment of £50,000 will be broken down as follows:

- £13,500 Materials
- £6,000 Smart System
- £11,000 Manufacture
- £2,500 Marketing
- £17,000 Employees

Invest in the future

The niche market of vertical farming is **rapidly evolving**, with an estimated market size to increase from \$2.30billion to \$12.77billion in the next 6 years. Therefore, H2ECO provides a great business and invest opportunity in this progressive field with large expected **returns**.

This product is hugely attractive as a significant focus of H2Eco is sustainable development and futuristic technology. H2ECO is aware of the circular economy and actively seeks ways to reduce waste and support the environment.



Why are we better than leading competitors?



- We save more water
- Cheaper – cost efficient
- Made from recycled materials
- Utilizes rainwater
- Renewable energy
- Grow more plants
- Smart technology
- Personalized



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Business risks

RISKS AND CHALLENGES

It is important to identify and acknowledge the business risks, in order to minimise the potential negative effect they could have economically, ecologically and socially.

ENVIRONMENTAL COMMITMENTS

To ensure that H2Eco is a **profitable business**, product sales must be greater than operational expenses and manufacturing costs. This will be achieved through our attractive price of an AquaSustain compared to existing competitor products, so that it is an desirable investment for small, medium and large scale farmers

Furthermore, in order to be more economically efficient and to avoid large taxes, sustainable recycled resource will be used.

- 💰 Materials
- 💰 Components
- 💰 Manufacture
- 💰 Testing
- 💰 Marketing
- 💰 Distributing
- 💰 Transport
- 💰 Installing
- 💰 Labor



It is vital that labor costs are taken into consideration, an underestimate would lead to inefficiency and economic damage. Therefore, H2Eco breaks down labor costs as follows for an order of 100 AquaSustain towers:

- Moving in the components for (5 labours for 3 days)
- Assembling them including plumbing with a central tank (5 labourers for 10 days)
- Network setting for 100. Raspberry pis (3 labours for 5 days)

Expense = approx. £6880

We envision AquaSustain in small, medium and large-scale agriculture. We will therefore attract different sizes of farming companies which would lead to more orders and hence mass production at lower cost.

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Challenges

The H2Eco team has worked incredibly hard to solve and overcome as many challenges as possible, and these are some of the key challenges we have considered:

Pollination

In vertical farming, there is the absence of bugs, flies, and insects therefore the pollination process stops. Consequently, manual labour is required to perform this process.



Lifespan

Some parts of the product have a short lifespan, for example the solar panels will only last up to 30 years before needing to be replaced. Furthermore, unpredicted maintenance technical issues may arise.

Crop variety

Different crops require different water volumes to grow. Some plants that Aquasustain can grow are high water intensive, and therefore water saving is not as effective.



Technical Risks

⚙️ Materials

⚙️ Components

⚙️ Manufacture



Plan B

If Polypropylene is not available, our second option is TerraSkin.

An inherently waterproof, tear resistant and grease resistant material which is plant and environmentally friendly.

If the Raspberry pi is not available, we would replace it with the microcontroller Arduino Uno.

