TECH OFFER
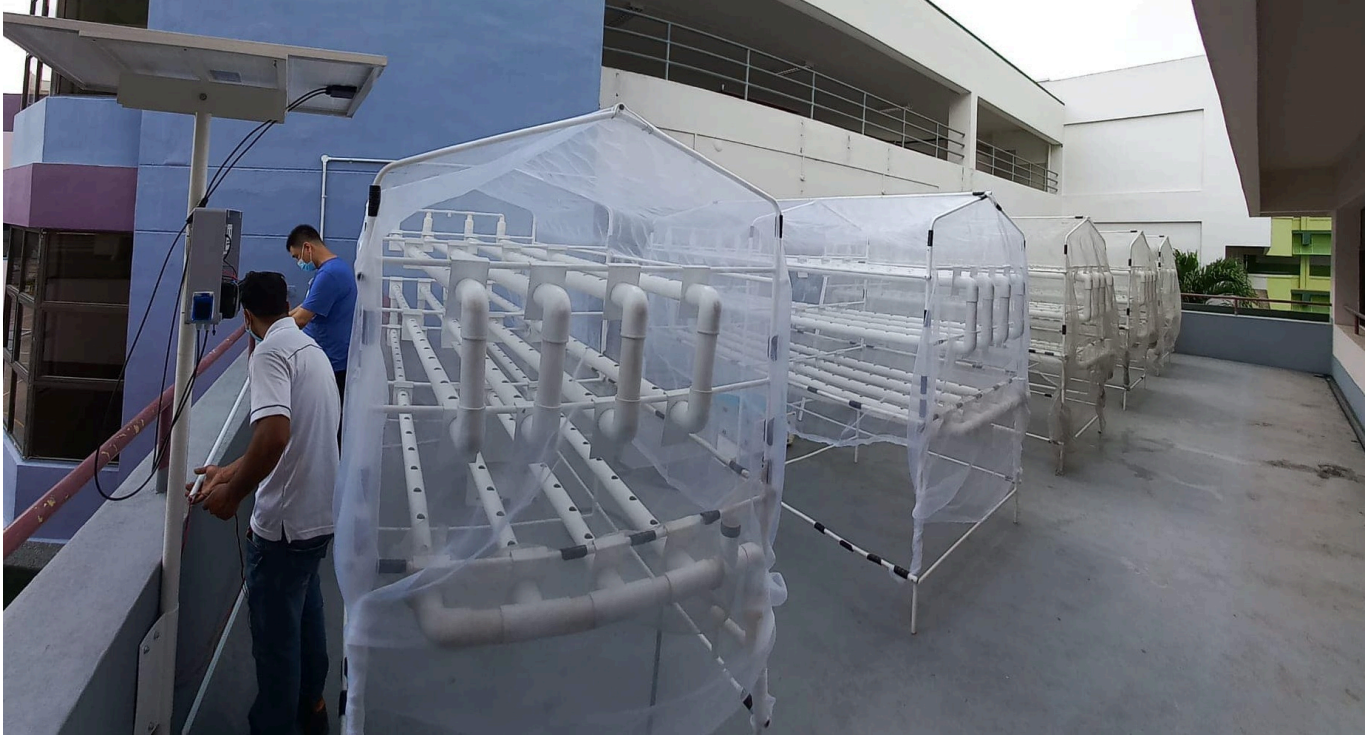
Intelligent Internet of Things (IoT) Vertical Farming for Sustainable Singapore

KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Food Security
Infocomm - Internet of Things
Infocomm - Smart Cities

TECHNOLOGY READINESS LEVEL (TRL): **TRL7**
COUNTRY: **SINGAPORE**
ID NUMBER: **TO174773**

OVERVIEW

This technology offer is an Intelligent IoT Vertical Farming system, which is designed to be 4-tiered and mobile, for either indoor or outdoor farming. It uses a hydroponic system that grows plants by enhancing the photosynthetic process. Since the system does not use soil, it is cleaner and more hygienic. FDA-approved and organic mineral nutrients are used for the hydroponic growing.

Compared to traditional agriculture, the vertical farming implementation saves more than 90 percent land area needed, while harvesting 80 percent more per unit area. Furthermore, with the water recycling design, the system achieves a reduction of 70 to 85 percent water usage. The set-up therefore, promotes the "Go Green" initiative and contributes towards Singapore's effort to reduce our carbon footprint. In summary, the following is achieved:

- More than 90% land savings with more than 80% physical spaces unlocked.

- 70-85% water savings.
- Reduced wastages of fertilizers and nutrients.

TECHNOLOGY FEATURES & SPECIFICATIONS

The main features are:

- The system automatically monitors temperature, humidity, CO_2 level in the environment and maintains optimal conditions for the growth of vegetables.
- The system reduces maintenance costs by automatically controlling lighting and watering, and reducing water usage by recycling.
- The system incorporates a mobile-enabled dashboard that enables owners to monitor the growth of their crops and receive alerts when anomalies occur.

The technology owner is keen to customise, out-license or test-bed this technology with the following potential collaborators:

- Food and Agricultural Industries
- Institutions (such as secondary schools, IHLs)
- Offices and shopping mall owners with spare land/space
- HDB roof-top carparks and gardens
- Warehouses with spare spaces
- Private Estate Owners

POTENTIAL APPLICATIONS

The technology owner has been working closely with various partners to bring this affordable and IoT-enabled vertical farming solution to consumers, such as public housing owners and private estate owners, as well as urban farming industries. The system has also been deployed at a few Ministry of Education secondary schools.

MARKET TRENDS & OPPORTUNITIES

System is suitable for:

- Urban Farming Industry companies
- HDB Owners
- Private Estate Owners

Resizable to satisfy the requirements of consumers

- Portable and compact size system
- Bespoke large sized system

Cost will vary based on system size

UNIQUE VALUE PROPOSITION

- IoT-Enabled automated system
- Environment control
- Monitor & Alert system
- Cleaner environment (No pests)
- Increase yield of crops
- Less land/space required
- Less water, fertilizers & nutrients required
- Crops grown are organic

The system is suitable for:

- Urban Farming Industry companies
- HDB Owners
- Private Estate Owners

The system is resizable to satisfy the requirements of consumers, and the cost will vary based on system size, which can be:

- Portable and compact size system
- Bespoke large sized system