



# ***ICT Solutions from Farm to Meal: Sustainable Model Of Micro-Ecological Farming For Urban Populated Areas***

**Beston Faiek Nore and Syazana Binti Abdullah Lim\***

*Food Sciences and Technology Programme  
School of Applied Sciences and Mathematics  
Universiti Teknologi Brunei  
Brunei Darussalam*



# Introduction

- Current issue: Increasing world population, particularly in urban centres (from 50.46% in 2010 to 68.70% in 2050).
- Food and nutrition insecurity (safety and availability), stress lifestyle, poverty and unemployment are major phenomenon in increasing urban population.
- Lead to space shortage in urban areas.



# Introduction

- Aim of our project - encourage farming and/or gardening in urban populated areas.
- Our concept is a new advancement toward feeding the populated urban areas and improve ecology of cities.
- Focus – micro ecological farming in urban areas.
- Micro urban farming *collectively* helps communities, regions and contribute to national food security programme.



# Objectives

- ❑ Farming in the cities – not new. Been around for centuries.
- ❑ The major focus of this research is to revitalize urban micro-farming and ecological cultivation, improve food safety and promote plastic recycling.
- ❑ Objectives: to develop simple, affordable and replication system of micro farming in urban populated areas (e.g. homes, restaurants, schools).



# Micro Ecological Urban farming



## Problems:

- Not easy to assemble (Need crafting skills)
- Not portable
- Requires backyard (Not suitable where space is very limited)
- Affordability



# Concept of urban micro farming for sustainability

- Easy/Ready to assemble
- Module assembly concept for versatility (size)
- In/out-door
- Low labour
- Accessibility
- Easy maintenance
- Plastic recycling
- Takes up small area
- Easy common watering system
- Wheels for mobility
- Affordable to EVERYONE



# First model of vertical $\mu$ Farming

## Concept: Portable vertical farming

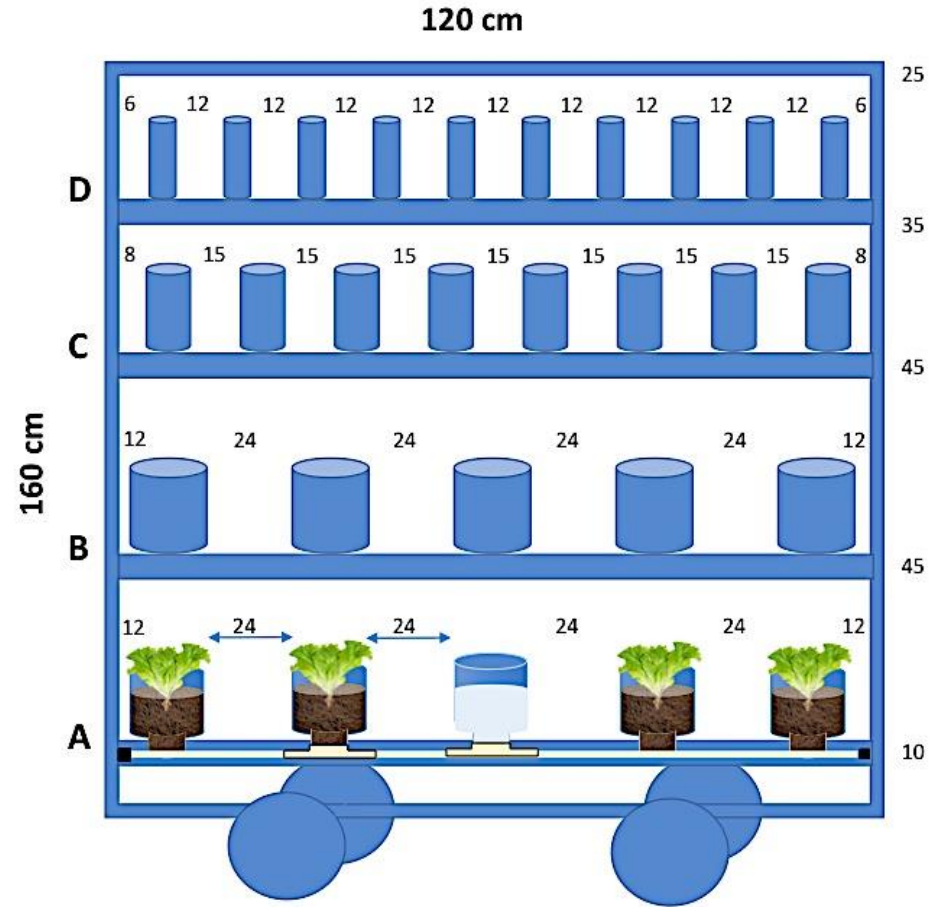
A vertical four section (level) plantation structure, 120 cm wide and 160 cm high frame.

Each section will be decorated with 4-10 empty recycled-plastic bottles of different sizes.

Each bottle will accommodate enough soil for a variety of cultivations according to the plant-size.

Additional bottles used for watering.

A single horizontal water-pipe for every level.



All the scales are in centimetres

## ***A micro vertical plantation model for 25 sowings***

*Each level allows 8 bottles of 5L-sizes (section A and B); 7 bottles of 1.5-L sizes (section C); and 10 bottles of 0.5-L sizes (section D).*



# A way forward



Concept similar to IKEA furniture store.

The IKEA Concept starts with the idea of providing a range of home furnishing products that are affordable to the many people, not just the few.

Function, quality, design and value - always with sustainability in mind.

Our project:

- Design-your-own concept where each micro farm is highly unique and personal to the location to ensure everyone can afford
- Designed with different sizes, adaptable to fit indoor and outdoor environment and different locations.
- User-friendly and simple/ready to assemble
- For those with creative mind and spirit- appealing to the young generation





# Future Development

## Installation of smart features:

- Controllable/Automatic electronically (mobility, watering, temperature control and pH regulation)
- Employ mini-solar panel(s) for sustainable energy consumption.
- Auto warning system, mini alarm (sensor) system in case of any unexpected events.
- Nutrients' supply and monitoring
- Monitoring of pH, water and nutrient level through smart phones



# Work Plan

Two-phased development plan:

- (1) An experimental phase - at UTB campus in order to optimize and validate the concept. A number of prototype models will be produced and a broad spectrum of vegetable varieties will be tested.
- (2) A translational phase - aimed to establish the practical implications in the society as whole. We are also looking to the commercialization potential of this concept, including additional upgrade and/or adjustments for the best efficiency and efficacy.



# Connections scope

- Contribute to helping home owners - equip household with own farm.
- Work with engineers from various fields and also designers.
- New possibilities toward broader agriculture collaborations between SEA regions, utilizing ICT connection, for ecological agri-food strategies.



# Conclusion

- The micro-farming solution has a great potential, suitable for climates in Brunei and also the rest of South East Asian Countries. Also achieve healthy (organic) agri-food production.
  
- Affordable system, covering some of domestic food supply that create stable food supply for own consumption – sustainability.
  
- Hope to progress towards food security at the most local levels.

***“Urban agriculture is just now coming into its own. We haven’t even scratched the surface yet.”***

**James Brady**

**(Founder, Con10u2farm L<sup>3</sup>C )**

***Grow better than organic foods for healthier communities all over the world***

**THANK YOU**