



Ecohydroponic trials: initial failures and success

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Assumption

- Given increased impacts of cc, vegetable production will be further difficult, with possible more risks on chemical contamination.
- HH-scale vegetable production:
 - To self-provide safe vegetables to HH consumption
 - To save resources (living wastes, water, and environment)
 - To harness ecological effects of the integrated system (i.e, aquaponics)
 - To green living environment
- Commercial-scale OA production: possible with aquaponics

Assumption

- (traditional) hydroponic vegetables are blamed for less tastes, narrowed by leafy vegetables, and still subjected to chemical inputs.
- Targeting on HHs, need systems that are more simple but allow growing many different types of vegetables/fruits, and relying on HH resources (nutrient from living wastes, local facilities that are easily to purchase).
- The systems must create agronomic conditions for vegetables as planted in soil (sufficient moisture instead of water remained or continuously flowed).

Ecohydroponic system

- Ecohydroponic system run by compost tea (made from living wastes), started from May 26, 2017
- Ecohydroponic system run by living wastes directly, started on June 20, 2017.
- Aquaponics, started on July 3, 2017
- (by product):
 - a semi-dripping system: cheap, durable, and more powerful (for crops) than dripping, operated by siphon.
 - a tool to collect sediments in water tanks

Ecohydroponic system (run directly by living wastes)



Initial system (July 2017)



Adapted system (Nov 2017), operated by siphons

- Allow to grow different vegetables
- Cut stems can be used directly (faster development than soil-based)
- Take labor to clean sediments.

Ecohydroponic system run by compost tea



Initial system, by earth worm (July 2017): FAILED



Adapted system (Nov 2017), by water & siphons

- Allow to grow different vegetables
- Cut stems can be used directly (faster development than soil-based)
- Take labor to clean sediments.
- A bit smell (Ok for top roof production)

Aquaponics



Initial system, compacted (on-going)



Adapted system (since Sept, 2017), with sediment tanks and siphons

- Allow to grow different vegetables (incl. papaya, tomato, chayote...)
- Well develop under heavy sunlight and rainfall.
- Cut stems can be used directly (faster development than soil-based)

Harvested products



- 1st fish harvest was 18/10/2017: 18.3 kg of fish in a tank of 0.5 m³ of water. Average 180gram/fish (biggest of 300 gram): fish density is of about **25 times** more than intensive single fish system (in terms of water volume)
- Vegetables/fishes: as assessed with good taste by consumers.

Byproducts



- Semi-dripping system, operated by siphon:
 - Cheap & durable: just use PVC tubes
 - Saving energy: small pump (30w pump can provide irrigation for hundreds sq.m of vegetables)
 - More powerful than traditional dripping (because of larger area under irrigation → good for root system).
 - No stuck problem (as in dripping system)
- Sediment collection tool (for water tank)

Our plan

- We are constructing 50 sq.m of aquaponics
- Combining semi-dripping into the system to enrich oxygen for water back to fish tanks (to survive new and difficult fishes).

(the system will be started by end of this month)



Ideas/assumption to promote agroecology

- There could be smth insufficient in our thinking/understanding on ecological effects (that can be transferred into economic income) generated by components (on each other) within an integrated system
- (Super plus) ecological effects of components (on each other) within an integrated system need to be better understood (i.e., allowing much higher fish raising density), than traditionally evoke simply on nutrient flows within components.
- We also need more creative approach in convincing students/farmers on super impacts of ecological services on sustaining the farm environment and economic income.

i.e., bring Malthus perspectives into pest-enemy relationship to convince for less pest risk if ecological services are remained well.