Learning Diary

We started by putting the pipes, buckets and turkey cage for the place of solar panel that will run the pumps. We decided to use catfish since it's a carnivore and probably will not eat the roots of our plants if we feed them enough.

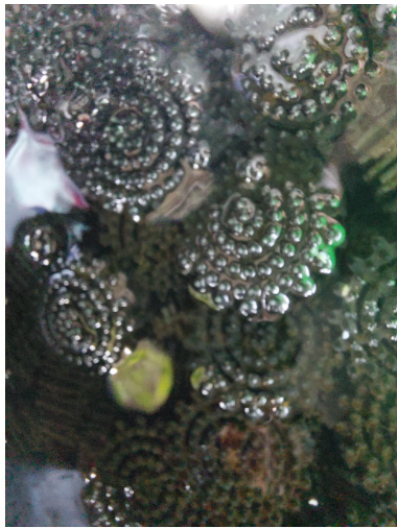
*the structure of the solar aquaponic in early development, the small white buckets were filters filled with bioballs

While Father was doing the construction, my brother and I were putting the water spinach seeds in rockwools for them to grow independent without soil. These rockwools will be the footing of plants. They would need at least 2-3 weeks to grow strong.

With father finished the construction quiet long ago, we planted the seed and this is what they looked like after couple of days. They were growing so fast.

In our attic area of 18 square meters is the place where we do our urban farming, as well as aquaponics using the RAS (recirculating aquaculture system) system. The RAS system we use is a very simple adaptation on a household scale. It is a rotating water circulation system in which we use two filter systems. The first one is microbio, namely using Nitrobacter bacteria which converts ammonia into nitrite, then converts it again into nitrate which then will be distributed to plants. These bacteria are aero bacteria, meaning they need enough air to live, that's why we created an energy-free venturi effect instead of electric aerators.

This filter uses a large bucket with a capacity of 80 liters where the first bucket contains fisherman net waste as a filter as well as a bacteria house, the second bucket contains bioball and from the second bucket part of it is channeled into the aquaponics system, part is returned directly.

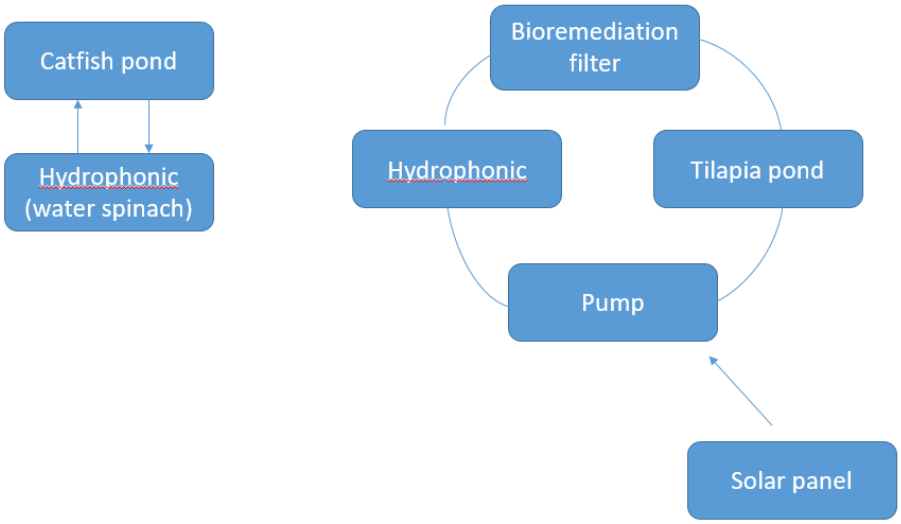


The second filter uses the phytoremediation method where the pool water is directly flowed through a pump to the water spinach hydroponics where the ammonia will be directly neutralized by the water spinach roots and flowed directly back into the pond. The microbio method produces clearer water and higher nitrogen content than the phytoremediation method.

Our aquaponic irrigation system uses solar energy. We use a 50 wp solar panel, the electricity generated by the solar panel is regulated by the SCC (solar cell controller) so that the voltage generated is in accordance with the needs of the pump.

The pond containing tilapia and catfish is housed with bacteria that convert fish waste into nutrients for hydroponic plants. The water in the fish pond is flowed using a water pump through a hydroponic pipe containing plants. The water pump requires energy to push water through the hydroponic pipes. This energy is needed by the water pump with the application of solar panels.

This is the ecosystem of our solar aquaponic. Catfish pond is separated due to their carnivorous and often prey on smaller fish, which counts as their offsprings, so we need to separate the babies unting they're big enough to survive



The ecosystem that we built in the attic is not only aquaponics, but we have our 6 sqm poultry farm which contains several turkeys and free-range chickens that are already producing eggs. We also have a small incubator which is used to incubate the eggs and are raised in other, smaller cages.

We also have some tabulampot including apple, guava and limes

We also use organic fertilizer and use banana peel. Banana peel contains a lot of potassium which is very useful for plant growth. We make it on our own and make it liquid fertilizer. From an experiment we conduct that AB mix are still more superior than banana peel fertilizer if we're not using RAS method. But banana peel fertilizer are beneficial for our potted plant

After a week of installing solar aquaponics, we often encounter dragonflies, butterflies, and even insects which are signs of a clean ecosystem. In fact, we also found the front legs of the praying mantis that seemed to take advantage of this opportunity to prey on passing insects. But since only one of its front leg was left floating on the pond, it could be concluded that he had been eaten by fish. Looks like we started to make a small ecosystem in this house.

During the pandemic period, it was difficult for us to find dragonflies that usually fly around our house. That's why we were happy when we found it among our home aquaponic plants. Dragonfly is a good environmental bioindicator, because dragonfly life cannot be separated from water. The water that the dragonfly wants cannot be arbitrary. This dragonfly dragonfly can only live in clean water. So that if the dragonfly in our environment disappears, we can be sure that our environmental ecosystem is polluted.

All in my solar aquaponic were edible. Our chicken usually become the best selling product, while catfishes grow up so fast! Vegtables are also quite popular due to their organic title. We use social media to advertise our products to sell it to our neighbours and friends from school.



So this is our development! It only goes for 3 stages but as time progressed it will be improved for who knows how long.