Key Points

1. Aquaponics vs Hydroponics
2. Uses of Tech in both
3. Use of Tech in traditional farming
4. IOT future scopes

**IoT enabled aquaponics** helps to constantly monitor and analyze the conditions of fish and plants, Take automated corrective actions to balance the variations based on data from the internet and learnings from the collected data to maximize the yield and reduce risks and manual intervention. The Solution gives a complete realtime overview of the various parameters collected from system like Temperature, PH, soil moisture, O2 content etc. The user can control the various systems like heaters, lights and fish feeders remotely using the app. All the collected Data can be analyzed to get an insight into the growth as well as the Energy/systems utilizations.

The controlled mini ecosystem you have to create, and the potential for year round crop production, leaves a tremendous opportunity for optimization of the greenhouse through instrumentation, data collection and automated actions.

Slide topics:

1. Aquaponics
2. Hydroponics
3. 1 vs 2. Which is better, in terms of
   1. Yields
   2. Healthy
   3. Costs
4. Significance of technology
   1. Physical Monitors
      1. Advantages/ Disadvantages
   2. Analytics
5. Future Scopes

Contents:

1. Aquaponics:

Aquaponics also can be considered as a hydroponic system. In aquaponics fish raised water is used as the nutrient solution for the plants. In this method, water in aquaculture tanks (fish tanks) are pumped to plants containing reservoirs. These reservoirs contain [bacteria](https://www.differencebetween.com/difference-between-protozoa-and-vs-bacteria/) that can convert [ammonia](https://www.differencebetween.com/difference-between-ammonia-and-vs-ammonium/) and [nitrite](https://www.differencebetween.com/difference-between-nitrate-and-vs-nitrite/)in the fish water to nitrate. Plants take up this nutrient rich water and filtered clean water is again returned to the fish tanks.

Aquaponics can be considered as more sustainable ecosystem that facilitates symbiotic relationship between fish and plants. That is plants can take up water that is purified by bacteria for their growth while acting as natural filter to fish.

1. Hydroponics:

Hydroponics is a technique of growing plants in nutrient solutions that contain [water](https://www.differencebetween.com/difference-between-mineral-water-and-vs-distilled-water/) and [fertilizers](https://www.differencebetween.com/difference-between-organic-and-vs-inorganic-fertilizer/)with or without using an artificial medium such as sand, gravel, coir etc. Since hydroponically grown plants are not embedded in a soil medium, they absorb required nutrients from the provided nutrient solution given. Artificial medium provide mechanical support, aid moisture and retain nutrients.

To focus on building an IOT

Optimisations in whole scenario:

1. Sensors & Actuators: Uses:
2. Pumps: Uses: Water & Air
3. Lights: Amount of lights
4. Water Pumps:
5. pH check
6. Air Pumps: Using a microphone, by capturing the audio and doing spectrum analysis if the exhaust fans are running. (if they sound bad, it predicts failure)
7. Humidity
8. Nutrients check
9. Fish Check: Ultraviolet Sterilizer for water to clean it
10. Monitor Temperature and amount of sunlight (solar water heater to up/down temperature)
11. pH check
12. Metabolism of Fish: Depends on the amount of food they eat and temperature of water (optimal 85\* fahrenheit)
13. Transmitter: To transmit data to server through IOT controllers
14. Receiver: To modify water flow, air flow
    1. Water Flow:
       1. Increase/decrease water flow
       2. Open/Shut valves
       3. Get the amount of water
       4. Warning levels for water
    2. Air flow:
       1. Maximise/Minimise the air flow

Checks:

1. Feed fish more without making the environment toxic
   1. How to check for aquarium toxicity – Nitrate and Nitrate levels on fish tank (check for sensors, chemical lab test done on weekly basis as of now)
   2. S
2. Amount of light plants get, No. of plants, How big they are, - These factors changes as plants grow and harvested (if 10% are harvested, increase/decrease the amount of above? - Indication)

Analytics

1. DM
2. ML

References & Links:

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<https://www.instructables.com/id/IAquaDesk-Iot-enabled-Aquaponis-using-Intel-galile/>

<https://www.iotforall.com/iot-driven-aquaponics-greenhouse/>

Tialpia

<https://lakewaytilapia.com/How_To_Raise_Tilapia.php>