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Design of AutomatedAquaponics System

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ABSTRACT

Agriculture is one of the important sectors in India. Food is a basic need of every person. But traditional farming has drawbacks of being dependent on soil quality, climate conditions, chemical fertilizers and pesticides water. To overcome the problems of traditional farming problem there is one technique called Aquaponics which is combination of aquaculture and hydroponics. Aquaculture deals with growing of fish and hydroponics deals with growing of soilless plants by providing with necessary nutrients. Aquaponics system which will provide natural food for the country. It will provide fish as well as plants too for humans. As using this technique water is reused, it requires less space, user gets natural food. Aquaponics can be automatically managed and controlled by making use of IOT technology with the help of sensors like pH, temperature and humidity, dissolved solvents, water level sensors. Operating the sensors on microcontrollers like NodeMCU and Arduino UNO whose reading can be obtained on Blink application for monitoring purpose. This technique can be built indoor as well as outdoor system.

KEY WORDS

Aquaponics; Hydroponics; Farming; Agriculture; Technology; Environment; Sustainable; Aquaculture; Sensors; Solar Energy; Automatic food feeding; Recirculating Aquaponics System; Fish Vegetable.

I . INTRODUCTION

Aquaponics is an integrated method of growing fishes and crops in a recirculating system. In other words, it is an integrated system of re-circulating aquaculture and hydroponics in one production system. Aquaponics combines fish and plant farming in a land based, soilless system. The fish and plant components work together to create a profitable, efficient and sustainable farm.

In aquaponics farms, fish waste water is transformed by bacteria into fertilizer which is used by the plants for growth.Aquaponics can be traced back to the Aztec Indians who raised plants on rafts on the surface of a lake around 1000 AD, however, as a modern agricultural technology, it is still in its infancy.

The plants are grown in the grow bed, and fish are placed in the fish tank. The nutrient-rich water from the fish tank that contains fish waste is fed to the grow bed, where billions of naturally occurring beneficial bacteria break the ammonia down into nitrites and then into nitrates.The nutrient-rich water from raising fish provides a natural fertilizer for the plants and the plants help to purify the water for the fish.

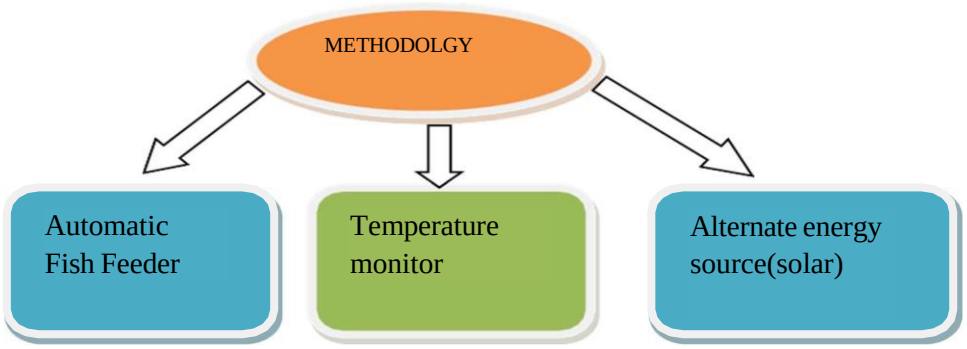
Then the over flow water is recirculated back to the fish tank. Solar panel is installed to Reduce power cost. Automatic fish feeder is installed to Provide food to Fishes at a regular interval of Time.temperature sensor is used to know the temperature of fish tank. It helps to reduce tha effect of temperature upon the fish & P.

II. LITERATURE REVIEW

STATUS AND PROSPECTS OF AQUAPONICS IN KERALA, INDIA

1. Aquaponics: A boon for income generation in water deficient areas of India like Rajasthan
2. Sustainable Aquaponics System and its Challenges: A Review
3. Aquaponics: An innovative approach of symbiotic farming
4. Aquaponics Systems: Future Food Production System

III. METHODOLOGY



IV. COMPONENT USED

- **Fish Tank**
- **Fish**
- **Pump**
- **Filter**
- **Solar Panel**

Solar PV systems is used to produce the required electricity that is stored in the batteries and used when required.

This not only helps in reducing the power consumption from the electricity supply but also saves money for farmers in the long run.

Fish Feeder

Aquarium fish feeders are electric or electronic devices that are designed to feed aquarium fish at regular intervals.

Temperature sensor

A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes.

RTDs (Resistance Temperature detector) is a type of temperature sensor which is widely preferred for its accuracy (upto 0.1°c)

V. RESULT AND DISCUSSION

1.Fish- Tilapia is growing at the temperature &PH of about 27℃ & 6-9 within 3 month.

2.Fenugreek is growing at the temperature &PH of about 30℃ & 6-7 within 2 month.

3.Fish feed like pellets or lakes is provided automaticallay per minutes.

4.Temperature water in fish tank is monitored displayed and Notified in Mobile App

VI. CONCLUSION

This system is developed to avoid the use of artificial fertilizers and chemicals that is used to grow the crops. The farmers who face this issue of growing natural food will get solved using this system. The fish extract used here is natural nutrient for the growth of the plants. In future the farmer will make profit out of this and the loan issues might get resolved to certain exten.

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