Aquaculture pond management

TECHNICAL TEAM

29/04/2019

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Revision History

Date	Reason for change(s)	Author(s)
3/05/2019	*Creation of document*	*Nikhil*

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Introduction

The Aquaculture industry, while very much necessary and profitable, has a lot of problems in India. Especially those who fall in the middle level operation among the 3 tiers. One day of bad unpredicted weather could completely destroy a crop of fish or one unchecked disease can wipe out the entire school of fish.

The highest tier have an industry like setup with high-end equipment and technology that complement the operation.

The lowest level/tier of farmers have 1 pond mostly and hence do not necessarily require any equipment to aid in the daily upkeep of the ponds.

But the middle level farmers are ones who need the equipment, that helps them with the maintenance and observation of the multiple ponds they own, at an affordable price. Suffice to say, they cannot afford the equipment that the industry scale farmers can.

We, at **life9sys,** have a solution for these middle level farmers to aid them in their daily operations and help reduce loss of profits wherever it may be possible.

Industry challenges and Problem statement

The current problems faced by the aquaculture farming is that there is not much provision to help the farmers efficiently monitor the conditions of the ponds that they manage. Currently, most of it involves taking a bucket of water out of the pond and going to a test centre to determine if the water is suitable or not. This is not only tedious; it is also not the best way to get the entire accurate picture of all the parameters of concern in the pond.

This may lead to a complacent nature in the farmer who might skip out on testing waters and self medicate the pond based on previous experience that may be harmful and deadly. Making the process of testing and monitoring the water and health of the fish is the foremost concern.

We, at **life9sys**, add **efficiency** and **portability** to the process by bringing the testing to the farmer instead of the other way around. Our goal is to help the farmer have a constant and self-reliant method of testing the ponds at time intervals that help him optimise resources and make decisions about the pond management.

Our solution is to start out with providing the farmers with a testing kit that they dip into their ponds and get data from. This data is stored on the smartphones that is transferred from testing device to the smartphones via data/OTG cables.

Our Testing System overall benefits

- ✓ **Portability**
  - The device portability makes it so that the farmer can got to each pond and use the same device multiple times across the same pond to get the readings they need.
- ✓ **Local storage**
  - The data that is read is stored in the smartphone storage directly, eliminating the need of connection to the internet to store data on clouds. This especially helps in areas of poor network connectivity
- ✓ **Measured Parameters**
  - The parameters that can be measured are the 5 most prominent and important in the pond i.e pH, dissolved oxygen, turbidity, temperature and salinity. Provision to add is implemented into the testing device.
    - Desirable temperature for fish is between 30-35 degrees.
    - Clay turbidity in water should be below 30cms to prevent plankton bloom. Above 60cms, there is an increase in frequency of dissolved oxygen problems.
    - Dissolved oxygen desirable limit is above 5.0 ppm. Conversely, high concentration of DO leads to a state of super saturation which becomes lethal to fish.
    - pH levels between 7.0 and 8.5 is ideal for biological productivity. Fish have an average pH of 7.4.

Methodology

Resolution of pond management

Today's scenario of testing the pond water involves carrying a bucket of water from the pond to the test center which is tedious and laborious and frankly, a waste of time for the farmer. By supplying a handy testing device to the farmer, we provide them with the option of testing the water as frequently as they like while also allowing him to stay on top of the health of the pond and reacting to the changes as soon as possible.

The app on their smartphone provides a graphical representation of data read against the previous readings, helping them identify the changes and pointing out what methods and practices may have caused any drastic changes.

Overall Summary

- Wired communication between the testing device and the smartphone
- Smartphone app designed to efficiently communicate with the testing device and get data from testing device and to represent data in a graphical format.
- Testing device to be dipped in the aquaculture ponds and held in there for the recommended period to acquire readings.

Conclusion

A portable testing device presents a time efficient and convenient alternative to the farmer to test the pond waters whenever they wish as compared to hauling around buckets of water to a common testing center. The device can also be modified by adding more sensors to it to read other parameter data besides the 3 default ones that come with the device.

Thank You

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