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POPULAR ARTICLE

Into the Blue Through the Blue

Shruti Sinha*[1]

[1]College of fisheries, Dholi

Correspondence

Shruti Sinha, College of fisheries, Dholi

Email: ssshrutisinha05@gmail.com

Conflict of Interest

The authors assert that the manuscript was developed without any commercial or financial associations that could be interpreted as a potential conflict of interest.

Authors Contribution

All listed authors have contributed significantly, directly, and intellectually to the work and have endorsed it for publication.

Abstract

This article dives into future prospects and gains of unmanned aerial vehicles in aquafarming, in the title into the blue refers underwater happenings which can be monitored by drone through the blue i.e. sky. In today's world it is critical to keep up with the technology to flourish and integration of drones makes numerous aquacultural tasks like monitoring, sample collection, designing and others untroubled.

KEYWORDS

Drones, unmanned aerial vehicles, aquaculture, water quality, feed, sampling

INTRODUCTION

Current trends of population increase imposes humongous pressure on authorities and farmers for meeting the food requirements not just of agriculture but for aquaculture sector as well. On the other hand, fulfilling food fish demand is becoming tedious task due to decrease in wild population followed by decline in catches not just because of overfishing but also due to environment degradation and pollution as a result of anthropogenic activities all this cumulatively expresses dependence on aquaculture for addressing future food requirements, hence aquaculture is the sole way of ensuring sufficient seafood for world in near future. The bottlenecks involved in aquaculture is its proper management and its impact on environment. For its intensification some technological aid is required and one such aid is drones or unmanned aerial vehicles are flying robots which can operated remotely and fly autonomously using software that works together with sensors and global positioning system (GPS). Uplifting aquaculture by shooting up its efficiency as well as production, making data collection, sampling and monitoring activities hassle free and cutting down the chances of human error as well as labor could now be achieved with a device levitating over water surface or soaking under water, all credit goes to drones.

APPLICATIONS

Water quality management and sampling: In large fish farming units like Marine cage/pen culture and others due to distant cage or pond location monitoring of water quality parameters become troublesome that's when drones come to a rescue now a days China is developing cage materials such that various sensor are embedded in it, if any change in parameters occurs, they instantly transfer this information to drones and ultimately to the farmer over their monitoring or smart phone screens. Under water drones are invented in such way that they are even capable of bringing sediment samples to check water quality attributes. The silver lining about it is that it creates a real time tracking system which helps farmers to take immediate action for solving a problem and preventing chances of losses.

Feed distribution and tracking: Evenly and efficiently distributes feed in gigantic fish farms and saves human labor as well as time. Manual feeding often leads to underfeeding or overfeeding, former results in retarded growth and latter ends with detoriation of water quality and monetary loss. Drones prevent such situations by carefully analyzing the feeding time, pattern and intervals.

Underwater inspection: Underwater drones have great surveying skills which can scan cages and pens to check any deformity or damage which will eventually lead to escape of cultured species. Also, to Inspect shrimp and seeds, drones with the help of their camera displays the real time picture or video of them on farmers mobile screens.

Security or physical site monitoring: Helps In detection of unfamiliar vessel approaching towards cages which might cause theft or damage to units i.e. suppresses the chances of illegal fishing.

Monitoring undesirable impacts of aquaculture on environment: Sensors employed are also responsible for detecting pollutants like antibiotics, pesticides etc emitted by aquacultural activities if it surpasses a certain bracket owner are informed so that they can take appropriate measures to avoid environmental degradation. And access its impact on native and local ecosystem.

Plotting and designing units: Drones with underwater coverage can provide details about bottom conditions, topography, space etc... which helps to plan the arrangement and create a layout pattern or a map ultimately helps in construction of detailed models of specific sites. This helps in maximum resource utilization.

Control undesirable organisms: Problematic organisms like birds and other wild animals are source of contamination and threat to stock, drones can work in the same manner as scarecrow for fields. They produce special noise, vibrations or lights which acts as non-lethal barrier for them and protects the produce from infelicitous creatures.

During crisis: Provides rapid insight of critical or emergency situations to farmers like when toxic substance is sensed or destructive fishing practice is noticed and in case of oil spills or may be loss of sensitivity in major sensors.

Disease surveillance in aquatic organisms: Management of underwater resources is very difficult but drones have made the job easier by providing close view of cultured species, detection of disease is easy as farmers could spot any physical deformity, discoloration or alterations in behavior.

Stock assessment: Helps to keep an eye on cultured population to frame feed cost structures, predict final yields and calculate appropriate stocking density and stocking area.

LIMITATIONS OF DRONES

- Stable and fast internet connectivity is required, as aquacultural farms are mostly situated in remote and rural areas where internet facilities aren't up to the mark use of drones becomes difficult and inefficient.
- There are few regulatory constraints involved in use of drones in certain areas for the matter of national security.
- If farmers and worker aren't comfortable with technology they can't use in effectively and integration of drone system with present farm conditions becomes difficult.
- Sometimes wind and water currents are not in favor of employing drones i.e. won't let its smooth sailing.

CONCLUSION

Like drones had earlier revolutionized agriculture sector now it's on the path of revolutionizing aquaculture sector hence promoting blue revolution. By filtering data, they have simplified and speeded up the decision-making process. They also can deliver weather conditions and forecasts so farmers could plan regular activities and harvesting accordingly for maximum benefit. Drones have also become integral part of precision aquaculture and helped to move ahead in sustainability practices. Overall drone technology provides more cost effective and structured way of up leveling farm management methods and increasing productivity.

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