

QUESTIONNAIRE:-

Que) what is wetland?

Wetland includes a wide variety of habitats such as marshes, peat pond, floodplain, river and coastal areas such as salt marshes, mangroves, and seagrass beds, but also coral reefs and other marine areas no deeper than six meters at low tide

Que) What is Aquaculture?

Aquaculture also known as aqua farming, is the controlled cultivation of aquatic organism such as fish, Crustaceans, mollusks, algae and other organisms of value such as aquatic plant. Aquaculture involves cultivating freshwater, brackish water and saltwater populations under controlled or semi-natural conditions, and can be contrasted with commercial farming, which is the harvesting of wild fish.

Que) What are the factors affecting shrinkage and degradation?

The shrinkage and transformation are the two dimensions of wetland degradation which are occurring by both natural and human activities after the globalization wetland loss and degradation continues due to different development activities such as

1)the transformation of wetland into fishing ponds are responsible for wetland degradation

2)Land use change and related hydrological disturbance mainly caused by human activities is a usual reason for the degradation of wetland worldwide.

3) the rapid urbanization, rapid growth of population and growing industrialization especially in urban areas are the responsible for decline the wetland and their functionality and is threatening to urban water bodies

4) excessive contamination of solid waste and sewer unplanned and agricultural practices

5) drainage congestion and waterlogging are the main physical consequences of wetland loss.

6) Use of chemical pesticide and pesticide in the agriculture field degrades the water quality and soil quality of the wetland.

7) It must be noted that many of the shallow fragmented water body is gradually transformed and some of them were being reclaimed for creating a man-made fishing pond, locally called bheri east Kolkata wetland, the effect is more devastating in the monsoonal season through heavy rainfall the sewage becomes overflow and added in the wetland. By thus the water quality degrades and biological oxygen demand in the wetland increases because of lesser dissolved oxygen and higher amount of pollutants.

Que) What are some solutions for these problems?

- Maximizing production of existing aquacultural ponds by reducing aquatic die offs (with help of AEWPD), and managing feeding practices by using organic feed to make it eco-friendly.
- Checking water quality parameters of aquacultures with the help of a device and providing temporary solutions to reduce factors like eutrophication which degrade nearby wetlands.
- Implementation of proper laws to decrease build up and waste dumping areas near wetlands.
- Controlling run-off and water logging from agricultural fields without causing erosion with the help of a surface drainage system.

Que) What are some recent innovations that have been implemented?

1) The remote sensing technique has been used for monitoring, assessing and mapping of the wetland. The remote sensing technique can detect changes in the areal extent of wetlands and it is a suitable tool to gathering data of different

time nodes for analyzing the time series pattern in a large-scale area. different attributes were used for demarcation of wetland change and monitoring.

2) Recently Government of India has taken initiative for mapping and assessment of wetland in Wetland Inventory and Assessment (WIA) program, under the Ministry of Environment and Forest (MOEF), with the collaboration of the Space Application Center, Indian Space Research Organization (ISRO), India and NDWI technique was used to prepare a National wetland Atlas. The remote sensing database and techniques are considered the most useful tools for wetland monitoring and their changing patterns as their synoptic, continuous receptivity characteristics.

3) Field survey has been done at the East Kolkata Wetland to find out the ground truth verification using GPS. The factors for loss of wetland were selected through field survey

Que) What are some different water quality parameters affecting aquatic organism in aquaculture?

1) Temperature

2) pH

3) oxygen concentration

4) salinity

5) hardness

6) Phytoplankton 7) Algal bloom 8) Essential nutrients: N, P, K

Que) why do we choose the theme understanding ecosystem and wellbeing

Natural ecosystems provide services to humans that make life possible. Life, as well as the economy, is dependent upon these ecosystem goods and services (EGS). These services also contribute to a “good” or “quality life” by influencing the well-being of individuals and communities. Understanding the relationships among EGS that contribute to and shape well-being is an important task for researchers, decision makers and policy makers. Depletion and Shrinkage of wetland is a very heat up

topic and large amount of innovation in conservation of wetland and how we can preserve it for the future is being highly need in that sector

Que) Why there is a need for this type of device in the present time?

To stop the degradation of water quality and loss of wetlands caused by aquacultures.

Que) Who benefited from this type of device?

As the device helps to maximize production in aquacultures in an eco-friendly way, it provides an alternative solution to aquacultural farmers to abide by the rules of the government against the shrinkage and degradation of wetlands and also earn a higher income at the same time.

Que) What is our main motto in this device innovation?

To preserve wetlands.

A major factor affecting wetland loss is transformation in aquacultures. The aquaculture which has been partitioned from the wetland also degrades the water quality of the nearby wetland. Therefore, it was necessary to preserve wetlands and also maintain the existing aquacultures in such a way that it doesn't affect the nearby wetland's shrinkage or degradation. As transformation of existing aquacultural infrastructures into wetlands is highly expensive and they are also a need to supplement organic food.

Que) Which innovative solution have we implemented in this device?

Measuring parameters like dissolved O₂ and pH and providing temporary solution with the help of an aerator and acid/base dispenser.

Detecting excess plankton/algal bloom with O₂ depletion and pH fluctuation at night. Presence of phytoplankton/algal bloom is detected with the help of a silicon photodiode after exciting the chlorophyll particles with a blue LED. Excess plankton is removed with the help of a plankton net in our device.

What developments can be made in the future?

Including more water quality detection and parameters like, salinity, total dissolved solids etc.

Que) Is there any similar kind of device in market if yes how it is different from our device?

Yes, a similar product is available in Japan (HORIBA U-50)

Which also measures parameters like pH, Dissolved O₂, TDS (total dissolved solids), temperature, conductivity, salinity etc.

The main difference is the cost factor, the HORIBA U-50's starting price is Rs 2,64,000 whereas our device's cost is around Rs 25,000. The HORIBA U-50 is a Japanese product which can only measure these parameters, but our device also provides temporary solutions to it instantly. Moreover, the probe cannot detect/control phytoplankton/algal bloom which our device AEWPD, has the capacity to do.

Que) What developments we can for the future time?

We know that there are factors other than pH, dissolved Oxygen levels and plankton blooms that affect aquatic ecosystem (eg: temperature, suspended particles, dissolved gases other than oxygen, poisonous nitrogenous compounds, etc). Our device provides capability of handling 3 factors only to operate on for now. Moreover temperature control in wetlands is out of our hands as :

- 1) there is temperature contrast of surface water and deep water.
- 2) seasonal change brings out wide scale temperature variation.

Further modifications in the proposed device can be made. Like, for

Excess suspended particle control: Potash alum can be used in small amounts. It removes impurities from water by coagulation of impurities and helps in the rapid sedimentation of suspended particles in water

Que) How this device will benefit our society?

As this device is checking the water quality which is a main factor for the aquaculture this will increase the production such as fishes, etc. which will economically help the farmer to a great extent.

Que) Why do we choose the aquaculture related problems in conservation of wetland?

As most of the part of wetland in which we are focusing has been covered by aquaculture and aquaculture is a shrinkage factor for wetland it is very important for us that how can we conserve the rest of the wetland by making it ecofriendly and minimising those factors which are the reason for the degradation in wetland caused by the aquaculture.

