APPLICATION OF SEAWATCH INDONESIA INFORMATION SYSTEM TECHNOLOGY FOR ENVIRONMENTAL MANAGEMENT OF MARICULTURE

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ABSTRACT

A marine environmental monitoring activity will be done with telemetric technology from the SEAWATCH Indonesia buoy data. The near real time data from the buoy (physics: current, wave and wind ; chemist : oxygen saturation, salinity, temperature, nitrogen and phosphat; biology : attenuation coefficient, for monitoring and forecasting algae blooms) will be combine with sampling, secondary and numerical modelling data.

Mariculture is one of the marine activities which can be used buoy data for monitoring and forecasting the marine environmental condition. Before the mariculture activity begin, the buoy data are also can be used for site selection of the net cages in the sea.

Environmental monitoring and forecasting activities will be done before the mariculture begin, at the mariculture periods and after harvesting time to know the changes of marine environmental condition if there is a mariculture activity. The water quality sample from the mariculture site will be taken from the inner part of the net cages, around the net cages and from the bottom or sediment, depend on the current speed and direction.

1. Introduction

Mariculture is one of the solution that can fulfil the need of food and increasing the income, especially in this monetary crisis. Later years, fish fat has received much attention for its polyunsaturated, so-called Omega 3 fatty acids which has been known protect against cardiovascular desease.

Activities in marine environment need an integrated system because marine sector has too many interests from many sectors. A clean marine environment is needed in mariculture to rise a good production.

SEAWATCH Indonesia as a co-operation project between Indonesia and Norway has started to developed a mariculture programme to culture fin fishes, such as grouper and sea bass at Seribu island with net cages. In this mariculture project, there are three aspects to be assessed :

1. Environmental monitoring and forecasting (includes physics, chemist and biological data)
2. Fisheries aquaculture
3. Socio-economical aspect.

With a *near real time* data technology, the SEAWATCH system will be take a role in deciding the site selection and monitoring and forecasting the environment.

There are 2 (two) buoys have been deployed around Jakarta bay to support this research : Pluit and Tanjung Kerawang. In the next plan, it will be one more buoy will be deployed near to Seribu Islands.

2. Application of SEAWATCH System to Monitoring the Environment of Mariculture Area

Fin fish has a specific environment condition to live. For example sea bass and grouper need some specific environmental condition as follows (Santosa, A.D., 1997):

1. Salinity : 30 - 34 ppt
2. Temperature : 27 - 32^0 C
3. Brightness : 3 - 4 m
4. Current speed : 5 - 15 cm/s
5. Spared from heavy metal waste, pesticides, oil spill and industrial waste
6. Spared from desease, bigger predator and rodent animals.

Besides of the specific environmental conditions above, to choose the right location for net cages needs to avoid some risky problems such as :

1. monsoon wind and high wave
2. Sea traffic
3. Thieves and other criminal condition
4. Conflict of interest

SEAWATCH Indonesia as a monitoring system, can give some of the data needed above and take a role for continue monitoring, make a forecast, and make some simulation to know the phenomena of the marine environment to the mariculture.

Combining the data obtain from the buoy with manual sampling, secondary data and modelling result can give a good reason to decide the right place for the net cages location. The environmental monitoring and forecasting activities in and around the net cages location also will be done with buoy data combine with secondary data, manual sampling and modelling result.
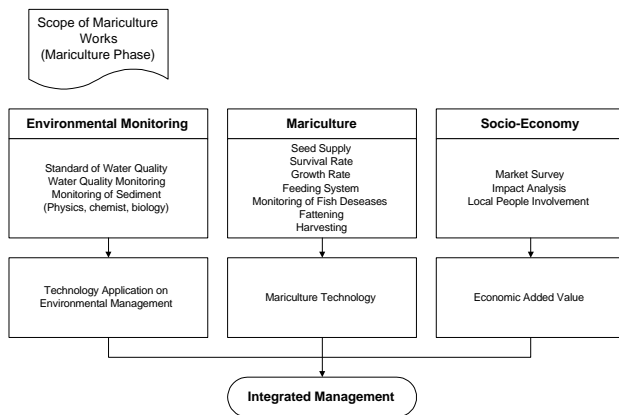
3. Scope of Mariculture Works

This mariculture activities will be started from site location study until post production phase. It will be includes :

A. Preparation steps :
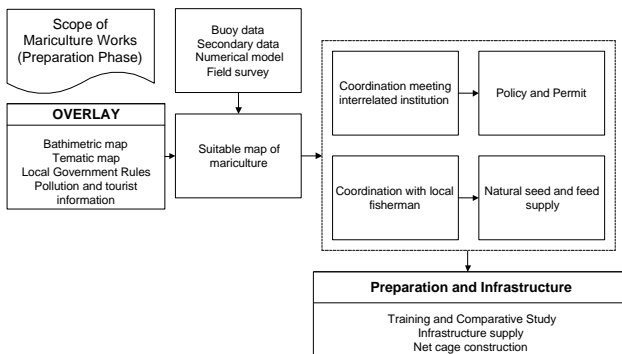
B. Mariculture steps :

For mariculture activities, there are three aspect which are will be done together :

4. Technology Application on Environmental Monitoring and Forecasting

As describe above, in this mariculture activity, the SEAWATCH Indonesia project concern is in the site selection before the mariculture begin and the environmental monitoring during and after mariculture. The monitoring and forecasting of the environment in and around the net cages will be done with manual sampling and direct measurement in the site location.

It is known that the main waste from a fin fish mariculture activity is the faeces from the fish and the feed. It can be influenced the oxygen saturation, nutrient concentration and become a potential condition for algae blooms.

Before the mariculture activity begin, the site selection will be done with combining the SEAWATCH buoy data for current, wave, salinity, temperature, coefficient attenuation (for monitoring and forecasting algae bloom) and nutrient (Nitrate, Phosphat), with the secondary data from other institutions (also for the current, wave, tidal, salinity, temperature and algae potential), numerical modelling for current, wave and tidal pattern and overlay map with geographic information system technology (based on bathimetric map, navigation map, pollution and tourism information).

While the mariculture activity getting started, the environmental monitoring and forecasting are also begun, includes :

1. Sampling data :
   a. Physics: current, wave, tidal pattern, wind.
   b. Chemist: salinity, oxygen saturation, temperature, nutrient (Nitrogen and Phosphat).
   c. Biology : plankton, benthos.
2. Site location for the sampling activity will be choose around the net cages, in the cages and at the sediment (bottom), depend on the current pattern.
3. The sampling data will be combine with the buoy data, modelling and other secondary data to forecast the environmental condition.
4. Some primary data from sampling activity will be analysed in the laboratory (like plankton and benthos), while the plankton data from the sample will be combine with the attenuation coefficient data from the buoy.

5. Conclusion

1. The best mariculture production can not be achieved without clean environmental condition
2. Marine monitoring and forecasting activities are needed to know the changes of environmental condition which have a mariculture activity.
3. The data from SEAWATCH Indonesia buoy can be used for one of the data sources to monitor and forecast the marine environmental condition.

6. Bibliography

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