

## Implementation systems

### Japan side

- Global Environment Centre Foundation(GEC)
- TEIJIN FRONTIER CO., LTD.
- Ritsumeikan University
- Shiga Prefectural Government

### Vietnam side

- Institute of Environmental Technology, Vietnam Academy of Science and Technology (VAST-IET)
- Quang Ninh Provincial Government

## Background

- Ha Long Bay, which is registered as a World Heritage Site, is surrounded by the coastal area of Quang Ninh Province and Cat Ba Island. It is a closed sea area with large and small 3,000 islands and strangely shaped rocks.
- Wastewater treatment facilities of seafood/food processing industries are not perfect, therefore water quality in Ha Long Bay is in bad condition. Local governments concerns to mitigate water environmental impact by industrial sectors.



## Project outline

- Feasibility study of water treatment business by bio film method (easy maintenance) with fiber carrier and vegetation will be implemented.
- Research for current condition on wastewater from seafood/food processing industries and planning for verification test will be conducted.

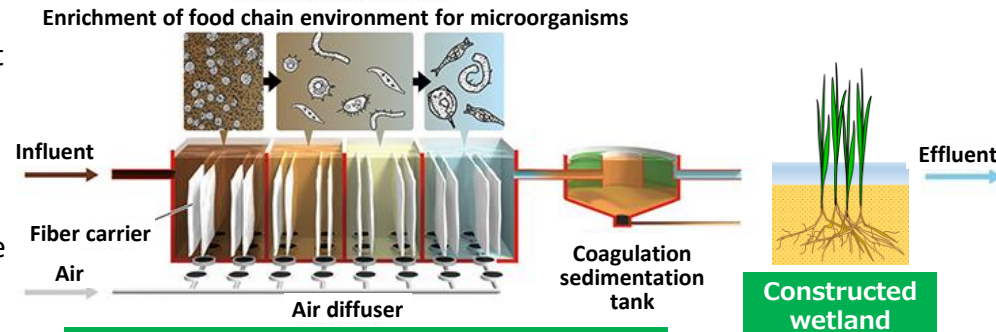
## Location

### Vietnam

Ha Long Bay area (Quang Ninh Province)

## Outline of technology

- This system treats organic wastewater by using biofilm on fiber carriers in the aeration tank.
- The biofilm process with long food chain produces less amount of excess sludge than the activated sludge process.
- The constructed wetland following the biofilm process contributes to the further nitrogen removal from wastewater.



## Multiple Compartments Biological Treatment

## Expected results and business prospects

- Decomposes organic matter efficiently and can remove 90% or more of BOD
- Due to the biofilm process, the amount of excess sludge generated is small and the disposal cost is reduced.
- Promoting removal of nitrogen from wastewater by the constructed wetland
- Establishing a business model with local engineering (EPC) companies and supplying fiber carriers and other components locally.