

PEMSEA NETWORK LEARNING CENTER (PNLC) FACULTY OF SCIENCE, BURAPHA UNIVERSITY Department of Aquatic Science praparsi@go.buu.ac.th

PRAPARSIRI BARNETTE





Faculty of Science Department of Aquatic Science



PNLC-BUU was established in 2016 after the MOU with PEMSEA at Danang city, Vietnam in 2015

Faculty of Marine Biotechnology

Burapha Institute of Marine Science (BIMS)

PEMSEA Network Learning Center at Burapha University (PNLC-BUU)

Board of Director: BUU president, Mayors of relevant sub-districts, Chief executive of PAO, DMCR representatives, Deans of relevant faculties, BIMS Director

Marine Biodiversity

- Coral reef ecosystem
- Mangrove ecosystem
- Seagrass ecosystem
- Beach ecosystem

Environmental Science and Management

- Pollution monitoring
- Water Quality analysis
- Nutrient monitoring
- Eutrophication/Hypoxia

Fisheries and Aquaculture Management

- Alien species management
- Aquaculture biotechnology
- Aquatic animal health

GIS/RS technology

- Ocean current map and modeling

Training Researches (information in seaknowledgebank.net) Laboratory analysis services Consultancy

Science Innovation Facility : SIF

Since 2013



Faculty of Science Burapha University, Chonburi, Thailand

The Objectives

Scope of Services

1. Providing scientific instrumental services for research & teaching

2. Offering consultation on analytical work as well as R&D related services for government and industrial sectors

- tailor-made analytical service
- analytical method development
- training in instrumental analysis
- etc.,...

 Scientific instrument services
Analytical services for R&D works & Method development

- Chemical Fingerprint for Pharmaceutical or Nutraceutical products

- Nanomaterial sciences service
- Biological sciences service
- Environmental quality service
- 3) Training for instrumental analysis
- 4) Purified water for laboratory work

Scientific instrument services





Microscopic Center (TEM and SEM)

Nuclear Magnetic Resonance Spectroscopic Laboratory

Microbiology Laboratory (analyze and test sample)

Research and Instrument Laboratory



IltraShield

Research and Instrument Laboratory

Analytical Instruments

- Real time PCR (qPCR) ; Model BIO-RAD , CFX96
- High-performance liquid chromatography (HPLC);
 Model Agilent Infinity 1260
- UV-Visible spectrophotometer; Model : Shimadzu with ISR-2600
- UV- DAD(Agilent 8545)
- Fluorescence spectrophotometer; Model : Agilent Technologies, Cary eclipse
- AAS ; Model Perkin Elmer : F900
- Etc.







National/Local Seminar and Instrument Training















INSTITUTE OF MARINE SCIENCE BURAPHA UNIVERSITY











Laboratory and Research





Aquaculture Research Unit Marine Biodiversity Research Unit





Marine Environmental Research Unit

Marine Biotechnology Research Unit

Education and Training: Professional Training





Clownfish Farming

Immunology Workshop, Institute of Aquaculture, University of Stiring, Scotland



Babylon Snail Farming



Live Feed Production

Education and Training: Marine Science Camps













Faculty of Marine Technology

Burapha University, Chanthaburi Campus

RESEARCH AREA

Applied research at our Faculty can be classified into the following areas:

1. Aquaculture Technology (Shrimp, fish, bivalve mollusk)

Knowledge relevant to aquaculture and biology, with special emphasis on economically important marine animals such as shrimp, fish, bivalve mollusk, etc.

2. Conservation, Ecology, Environmental Science and Marine resources management (aquatic animals, mangrove area)

Conservation and sustainable utilization of natural resources and biodiversity. Environmental protection and remediation.

3. Emerging, Infectious diseases and Parasites, diagnostics and prevention

Knowledge associated with emerging and remerging infectious diseases. Development of diagnostics and disease prevention technology such as molecular/ immunology technique and vaccine technology. Using of probiotics and immunostimulants for improving the aquatic animal immunity.

4. GIS and RS Technology

Development GIS and RS technology for marine resource management.

FACILITIES & RESEARCH UNITS

- Classroom
- Microscope room
- Laboratory room in 3rd-4th floor of Central building
 - Water quality Laboratory
 - Microbiology Laboratory
 - Marine biodiversity, taxonomy laboratory and equipment





***Each research laboratory contains specialized apparatus and support equipment for conducting experiments.

FACILITIES & RESEARCH UNITS

Marine Technology Research Center (MTRC)

Indoor: Molecular laboratory, Environmental lab., Algae Laboratory, Ornamental zone and Wet lab

Outdoor: Sea farm





FACILITIES & RESEARCH UNITS

- Agriculture Inspection and Certification Laboratory
 - Diagnosis of infectious diseases in fish and shrimp by Polymerase Chain Reaction (PCR) and histology technique
 - Shrimp health assessment: Bacterial count in shrimp hepatopancreas, and shrimp pond (soil/water)
 - Immune response evaluation
 - Detect residue from agriculture products





-Aquatic Animal Release Program is to Strengthen Community by Integration Aquaculture laboratory to produce shrimp and fish larva by students and give to local government and community to release them to ocean

- Annual Marines

Faculty of Science - Waste Management education Project. Provide waste sorting equipment, labeling supports garbage sorting. signs to educate students to reduce the amount of waste.

- 25% of Tree areas compare to Faculty total land.





SUSTAINABLE DEVELOPMENT GOALS

PNLC – BUU/PSU contributing to SDG 14 and other related ocean and coastal goals? Consultancy for the UNDP/GEF/PEMSEA SDS-SEA/ICM Scaling project



Tool and Key for sustainable development for SDS-SEA and ICM implementation in demonstration/pilot sites of THAILAND To achieve Healthy and Resilient Coastal and Marine Ecosystems



Capacity building Training/workshop. Supporting DMCR:

- Stakeholder consultation: Strengthening inter-agency and multi-sectoral coordination

- Baseline and vulnerability assessments

- SOC of 4 provinces

- Case study/good practice
- Publication
- Sharing platform
- Transfer knowledge
- Learning pilot site

Previous workshop organized by PNLC-BUU

- Assist DMCR in organizing the SDS-SEA scaling preparation workshops (12-18 June 2016) – governors of the 3 provinces agreed to participate in the project
- Panel discussion "Marine environmental issues from seaport around Sichang municipality water" (25 Aug, 2017)
- Co-host training workshop (Marxan-Z, Aug 2017)
- Co-host SDS-SEA scaling up inception workshop (Jan 2018)
- On-site meetings (follow up to the inception workshop for 4 provinces)
- Preliminary baseline assessment (up to present)

Food Security Research related to Chonburi ICM programe: Loss of production of Green Mussel due to flatworm infection Example from Research to support practical guideline/policy decisions



Recommend to fisherman for management

- \circ Use only uninfected seeding
- \odot Keep space among hanging ropes
- \odot Harvest mussel early to stop the spread of infection











Artificial mussel monitoring

From research to raise awareness of information/knowledge transfer and capacity building for stakeholders in coastal management

- To determine heavy metal contaminant to recreation and fishery area on Bangsaen beach (Saensuk Municipality).
- Partnership between BUU-PNLC and Saensuk Municipality under MOA.
- Dr. Praparsiri Barnette, a chair of BUU-PNLC and leader of research project, has a 2017 grant with co-researcher with Prof.Dr.Rudolf Wu. from Hong Kong.
- Deploy and retrieved in March 2017 and repeated in July 2017.
- During deploy AM in the field, activity includes demonstration of gel cast and cage assemble to participants from Municipality, fishery community, Institute of Marine Science and Provincial environmental office to demonstrate (see picture). Using Municipality boat to work in the sea.





Participants

- Saensuk Mayor
- Vice President of Burapha University
- 3 Fishery communities of Saensuk
- Environmental scientists from Faculty of Science, Marine Science Institute. Burapha University, municipality, office of Environmental regional 13 (Chonburi)



Oil Pollution Monitoring/Assessment

Ex. From Local solution to develop research

 Oil slick and Tarball from unknown source washed up on Bangsaen beach and aquaculture area (frequent)

Emergency Response

- Analysis of PAHs concentration in fishes and **g**reen mussel for food safety and petroleum hydrocarbon in water for recreation standard (decision-making)
- Detecting biological responses of fish and mussel exposed to PAHs and heavy metals (Biomarker development)

Funding from ICM program and

National Research Council)

Monitoring of PAHs and heavy metals in fishes and green mussel (comparison between Chonburi and Rayong)

- Wet and dry season
- Early warning





Environmental challenges (Sichang Municipality)

• Multiple use in the Sichang-Siracha Bay











International Conference on Integrated Coastal Management and Marine Biotechnology (ICM-MBT 2018), 23-24 October

Panel discussion "Environmental problems of ship-to-ship bulk transfers at the Siracha Bay and Sichang coast" (25 Aug 2017)

- Complex environmental issues from ship-to-ship transfer, oil spills, wastewater from communities and garbage, wastewater dumping from ships.
- Impacted aquatic and marine resources, traditional fishing practices, and community health.
- Involved multiple agencies at the national, provincial and local levels.



- The panel discussion provided forum for experience sharing and promoted understanding international law and international practice on pollution management in the sea.
- Led to the interests in marine spatial planning





Ongoing international activity of PNLC-BUU

- Developing a joint-research with Xiamen University, P.R.China
- Submit a proposal to MOST, P.R.China
- Entitle of "Evaluation and integrated management for the watershed-coast ecosystems under global change"
- Announce funding in March 2019

Xiamen, CHINA: Jiulong River-Xiamen Bay

Chonburi, THAILAND: Bapakong River-Thailand inner bay



 Cooperation with the Center for Southeast Asian Studies at the University of Hawaii at Manoa on its proposal being prepared for the Henry Luce Foundation Initiative on Southeast Asia

CONCLUSION

Educational program in Natural Resources, coastal and Ocean Science

What existing initiatives in core activities of respective institutions contribute to ocean and coastal goals?

Strong research areas and interests in education, training and research support the proposed collaborative initiatives under the PNLC framework

- Research in coastal and ocean topic
- National symposium and Local training
- Short course training

- "ICM for sustainable coastal community and ecosystem services"

- "A Regional Training on Global Warming and Its Impact in Southeast Asia"

- International/national Joint-research
- **Teaching systems**: E-learning, active learning (national and international)
- Laboratory analysis services ex.

- Environmental monitoring program for the petroleum production facilities in the Gulf of Thailand (since 2011-present)

- Population genetics aquaculture species, marine endangered species, fish/shrimp/species with conservation interest, and phylogeny of copepods/ mollusks/ jelly fish

1 Pollution monitoring/assessment: Artificial mussel to detect metals, Biomarker contaminant exposure, nutrient and water quality analysis

2 Marine habitat evaluation of coral reef, seagrass, mangrove, plankton & benthos and beach biodiversity (ex. Marine biodiversity on Bangsaen beach, Saensuk, Chonburi)

3 Fisheries and Aquaculture (diagnostic & aquatic animal health research unit; breeding center) management

4 Ocean current map and modeling

5 GIS and RS technology for marine resource management



Thank you for your attention and sharing experience

Publications of BUU-PNLC in the EAS Congress 27-29 November, 2018 at Iloilo city, Phillippines

Barnette, P. and N. Wiwekwin. 2018. Integrated Coastal Management Implementation and Scaling Up in Chonburi Province, Thailand. In: Local Contributions to Global Sustainable Development Agenda: Case Studies in Integrated Coastal Management in the East Asian Seas Region. Edited by T.-E. Chua, L.M. Chou, G. Jacinto, S.A. Ross, and D. Bonga. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and Coastal Management Center (CMC), Quezon City, Philippines.

Barnette, P., S. Pokhum, and V. Khunplome. 2018. Innovative Coral Reef Restoration through Public and Private Sector Partnership in Chonburi, Thailand. In: Local Contributions to Global Sustainable Development Agenda: Case Studies in Integrated Coastal Management in the East Asian Seas Region. Edited by T.-E. Chua, L.M. Chou, G. Jacinto, S.A. Ross, and D. Bonga. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and Coastal Management Center (CMC), Quezon City, Philippines.

Wiwekwin, N. and P. Barnette. 2018. Community-based Crab Conservation Initiative in Chonburi, Thailand: Engaging Local Fishers and Communities in Marine Conservation. In: Local Contributions to Global Sustainable Development Agenda: Case Studies in Integrated Coastal Management in the East Asian Seas Region. Edited by T.-E. Chua, L.M. Chou, G. Jacinto, S.A. Ross, and D. Bonga. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and Coastal Management Center (CMC), Quezon City, Philippines. Tropical Coasts 13

Building Resilience in Chonburi: Lessons in Scaling up ICM

By Ms. Praparsiri Kanchanopas-Barnette, Department of Aquatic Science, Faculty of Science, Burapha University, Chonkuri, Thailand, Mr. Chatchai Thimkoajang, Sriracha Municipality, Chonkuri, Thailand; and <u>Kashane</u> Chalermwat, Department of Aquatic Science, Faculty of Science, Burapha University, Chonkuri, Thailand.



Chonburi is a coastal province in Thailand 80 km southeast of Bangkok. Situated along the inner Gulf of Thailand, it has a 160 km-long coastline and is rich in natural resources and well known for its manufacturing industry and tourism. Apart from its industries, the province is the center of marine fisheries and aquaculture in the inner Gulf of Thailand. It has a rapidly growing local and migrant population of 1.3 million living within the confines of its 4,363 km² area, considered to be a moderately high population density for a Thai province.

The economic significance of the province is evident through the Thai government's commitment to develop the province's infrastructure from the early 1980s to the present. A major industrial manufacturing center, Chonburi is also a gateway for imports and exports with the Laem Chabang deep sea port. It is a new energy hub for the country. The Eastern Seaboard Project of Thailand is aimed to develop the region as the new economic zone, based on major manufacturing industries, seafood resource and agricultural business. The development envisages distributing economic and industrial growth at the local levels.

Grab Gondominium คอนโดบูไป (ปูม้า)

Generalização Bara Construindo Marco Aracita
Generalização Bara Construinte Academica A

ICM Solutions

Community-based Crab Conservation Initiative in Chonburi, Thailand: Engaging Local Fishers and Communities in Marine Conservation Efforts through Practical and Innovative Measures that Address Local Needs

- The blue swimming crab is an important local and export product in Chonburi, and a key source of livelihood for local fishers.
- As part of the Province of Chonburi ICM program, a crab conservation initiative was implemented, which demonstrated an innovative approach in:
 - marine conservation with the local fishers and communities as main implementers;
 - protection of the gravid female crab (crabs with eggs) to enhance production (i.e., "protecting the mother," as opposed to the conventional approach of protecting the young); and
 - educating fishers and the public, and engaging their participation in the protection and conservation of marine and coastal resources.
- The crab conservation method demonstrated in Sriracha Municipality has been successfully replicated in seven other municipalities in the province.
- Crab catch has increased across the province since the crab conservation program started in Chonbur, resulting in direct benefits to the fisher community.