



Vietnam Institute of Geosciences and Mineral Resources



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**Environment and Natural resources management; Lecturer
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1. Aquatic Resources Management;
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4. Educational cooperation project in marine fish parasites with University of Rostock, Germany.



ENVIRONMENTAL POLLUTION IN VIETNAM AND ITS RELATION WITH AQUACULTURE AND ECOSYSTEM MANAGEMENT

(Prepare for the OORI event in Belgium, December 2018)

By

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SOME IMPORTANT FRESHWATER FISH IN NHUE-DAY RIVER SYSTEM ARE UNDER THREAT FROM HEAVY METAL POLLUTION

By

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INTRODUCTION



One of the most common types of pollution in the river basin in Vietnam is heavy metals (e.g. Zn, Cu, Pb, Cd) pollution.





INTRODUCTION



1. Why choose the subject area

1.

Cd, Pb, Cu, Zn are highly toxic and dangerous to organisms once they surpass a certain threshold

2.

Nhue-Day river basin are burdened with domestic and industrial wastewater from surrounding areas

3.

There are no research in this river basin that focus on investigation of bioaccumulation of metals in aquatic organisms.

4.

Investigation of metals bioaccumulation in *Cyprinus carpio* and *Oreochromis niloticus* in Nhue-Day river basin



INTRODUCTION



2. Objectives

1

Assessing the concentration of Cd, Pb, Cu and Zn in water and sediment.

2

Assessing bioaccumulation of Cd, Pb, Cu and Zn in gills, liver, kidney and muscle of common carp and tilapia.

3

Assessing the correlation between concentrations of four heavy metals (Cu, Zn, Cd, Pb) in water and sediment with their accumulation in the investigated fish.



METHODOLOGY



1. Sites and sampling

- The rivers are important for water supply for production and daily life of the residents.
- This area is facing serious environmental problems

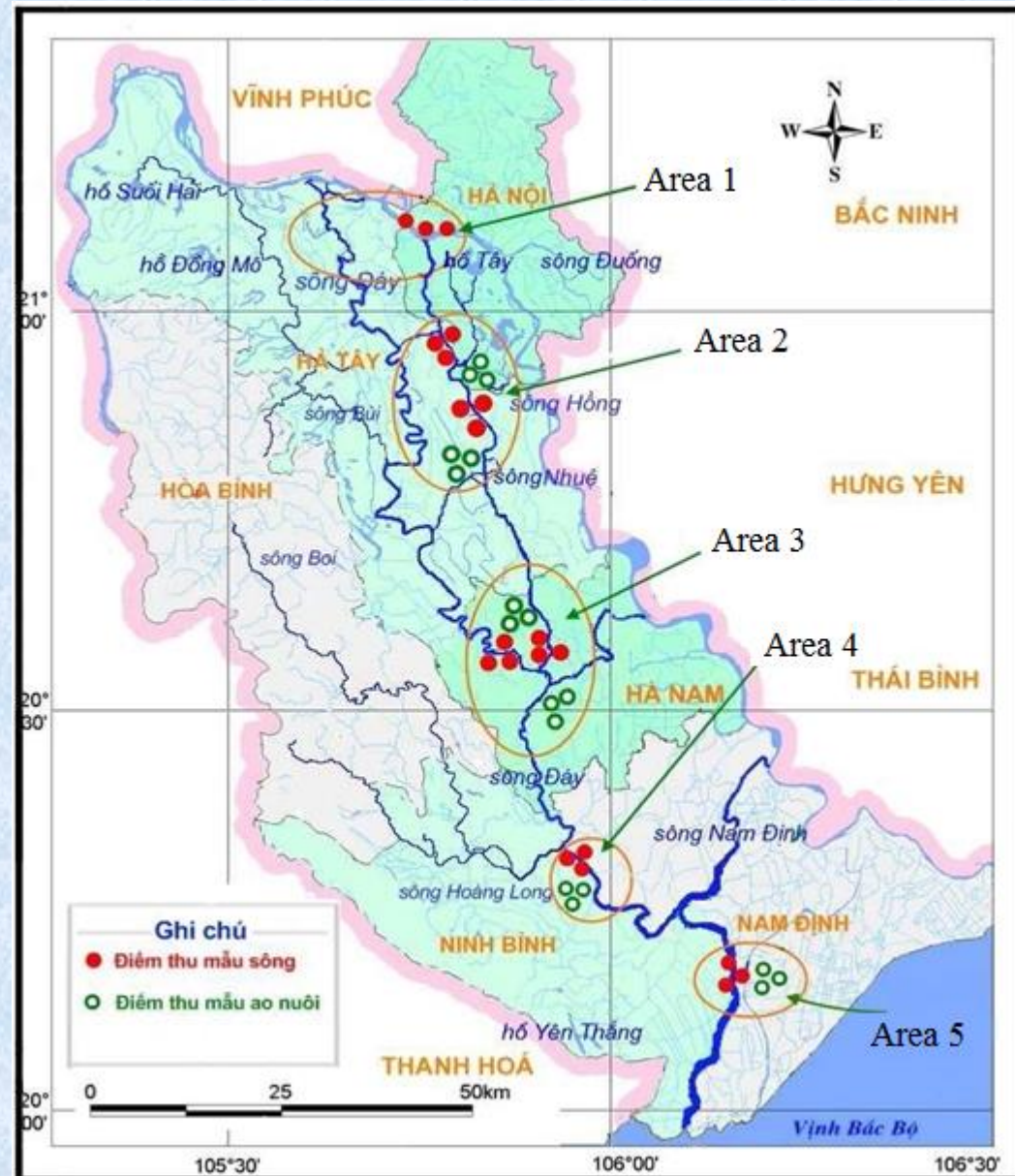




METHODOLOGY



- Water, sediment and fish samples in five different areas with the total of 42 sampling sites.
- Samples were in four seasons.





FINDINGS



- HMs levels in water and sediments of the river basins are not safe for protection of aquatic life, environmental and human health, higher than standard from 1.2 up to 10 times.
- Heavy metal concentrations were higher in area 1 and 2 → their bioaccumulation are higher in area 2 and 3.
- Levels of HMs pollution is as following: $Pb > Zn > Cd > Cu$ → their bioaccumulation were in similar trend.
- HMs accumulated more in kidney, except for Cu (more in liver).
- Levels of HMs accumulation in fish tissues, especially in gill, kidney and liver (and Pb in muscle) exceeded the Vietnamese and WHO standards for human consumption.
- Corremation between metals accumulation in fish and in the environment were found.
- Metal accumulation in fish tissues negatively correlated to the physiological health of the fish.



RECOMENDATION & PERSPECTIVES



Caution should be taken when consume the fish caught from this river basin.

Recommend people to remove the liver, kidney and gills completely when consuming fish.

Water and sediments from river basin should be immediately remediated.

Measures to prevent discharges of untreated waste waters should be implemented.

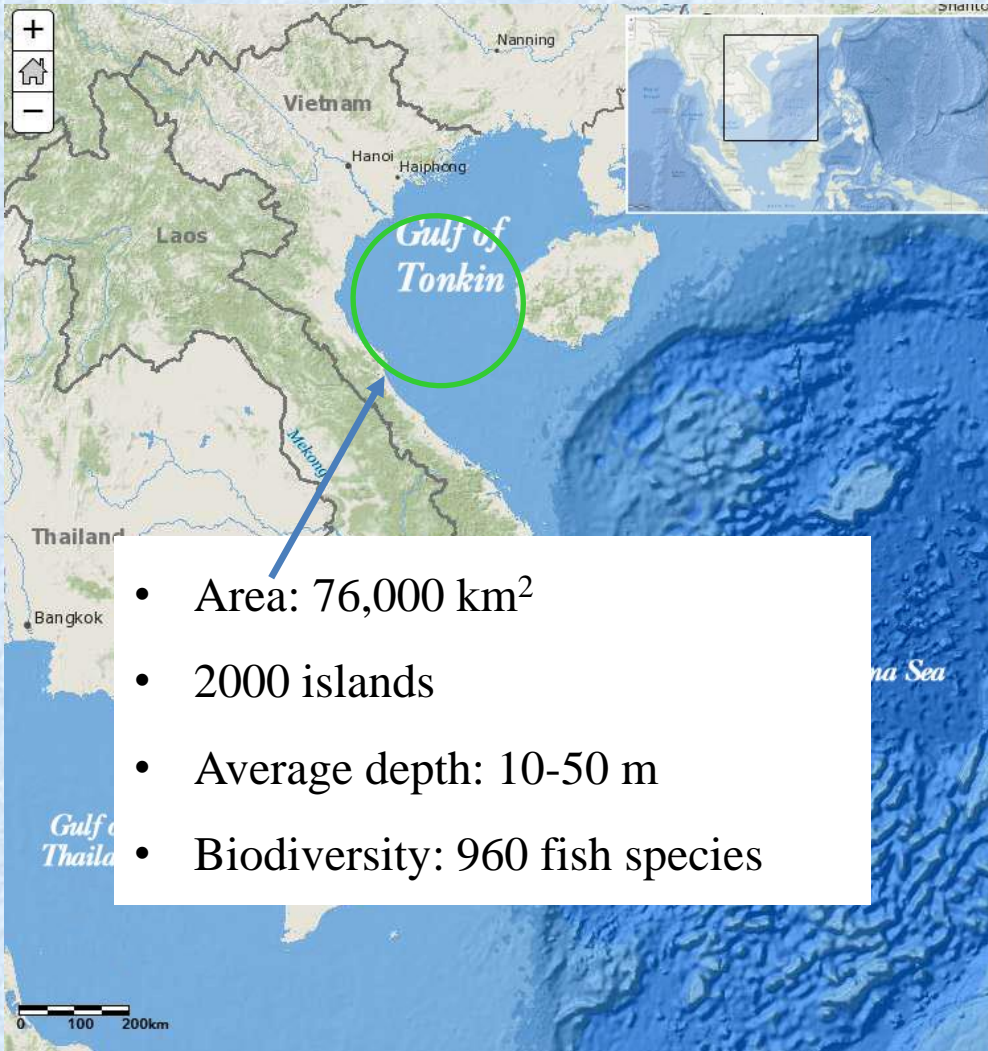
Include also other HMs, i.e. As, Hg, Cr, Ni....., and also metal speciation in water into the future investigation of HMs in this river basin.

Marine fish parasites from the Gulf of Tonkin, Vietnam, with a parasitological assessment of *Epinephelus coioides* (Hamilton, 1822) aquaculture systems

Thuong Van Truong

Supervisors: Prof. Harry W. Palm & Dr. Huong T.T. Ngo

VIETNAM'S FINFISH MARICULTURE



Google map, 2018

ROLE OF MARINE FISH PARASITES

- An important part of marine ecosystems (e.g., biomass contribution parasite/fish ratio in Hawaii 2.2);
- Significance to human health (e.g., food borne disease, allergic reaction);
- Cause of disease outbreaks in mariculture fishes;
- Useful biological indicators (e.g., fisheries tags, pollution indicators).



Disease outbreak by *Cryptocaryon irritans* in *Protonibea diacanthus*, net-cage culture, Ha Long, 2013

STATUS OF VIETNAM'S MARINE FISH PARASITOLOGY

- First marine fish parasite reported in Vietnam by Oshamarin et al. (1961)
- 190 marine parasite species have been reported by Russian researchers during 1960-1980 (Arthur & Te 2006)
- Around 257 marine fish parasites have been reported from 140 fish species in Vietnam so far (Arthur & Te 2006, Nguyen 2011)
- In Vietnam, marine parasitology still focuses on basic parasite identification and systematics



➔ **Comprehensive marine fish parasite studies and fish parasitology applications are still rare in Vietnam**

17.12.2018

FINDINGS

1. The Gulf of Tonkin harbours a diverse parasite fauna, consisting of a range of subtropical and tropical species.
2. Detailed studies can detect endemic or new parasite taxa in the Gulf of Tonkin.
3. Many parasite taxa have been less sampled, requiring future detailed investigations to analyse the real biodiversity.
4. Fish parasitology measures can be applied in aquaculture management and serve as biological indicators for the ecological status.
5. Several fish parasites are of commercial importance, with relevance to fisheries and aquaculture.



IMPLEMENTING PROJECT:

FIELD-SCALE APPLICATION OF VETIVER GRASS TO
MITIGATE DIOXIN CONTAMINATED SOIL AT BIEN HOA
AIRBASE

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INTERFACE WITH NON-ACADEMIC ACTORS



Actors at the academic sector

- *Define research problems, i.e. in the field of environmental and ecosystem's management.*
- *Establish research proposals that aim at answering scientific questions.*
- *Carry out the research.*
- *Scientific oriented outputs, i.e., Peer-review publications,*
- *Peer-review procedure for evaluation of the projects*

Actors at non-academic sector

- *Establish development policy of the sector.*
- *Review procedure and approve for the research proposals.*
- *Management and inspection.*
- *User-oriented outputs, i.e., reports, patents, products*
- *Non-academic actors in evaluation procedures, integration of criteria related to social and economic and practical outcomes of the projects*

However, the relationship between these sectors is still loose and not really effective. These should work close together to solve the problems in terms of science and practical.



FUTURE PLANS



1

Continue to work in the field of teaching and doing the research on environmental and natural resources management.

2

Continue to work in the field of phytoremediation.

3

Develop parasitology applications for the management of local aquaculture, fisheries and the environment.

4

Establish joint projects with international partners in the above mentioned fields.



THANK YOU FOR YOUR ATTENTION