



Functioning of a joint Vietnamese-European laboratory
on water and environment
CARE-Asian Centre for Water Research
Hochiminh city University of Technology

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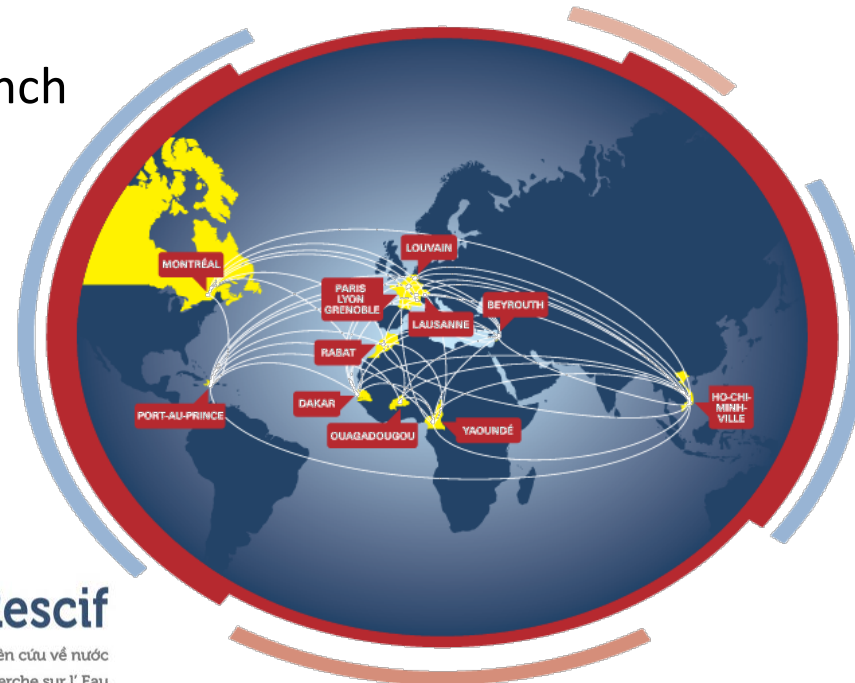
- 1- Deputy Director,
- 2- Scientific Director
- 3- Adviser





Resulting from a consolidated cooperation between France and Vietnam, CARE (Asia Center for Water Research) was set up in **2014**

- under the umbrella of Vietnam National University and Grenoble -INP and
- in the frame of **RESCIF**, a network of French speaking universities from North and South, with active participation of Polytechnic Lausanne (EPFL), Polytechnic Montreal and IRD, the French Institute of Research for the Development



CARE Rescif

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Centre Asiatique de Recherche sur l' Eau

Organization

A dedicated building on the campus of HCMUT, with access to instrumental and computer resources of 5 faculties of the university (Chemistry, Environment, Civil Engineering, Geology and Computer Sciences)

About 40 persons, among them 5 full time Vietnamese, 3 full time French researchers from IRD , in conjunction with 5 full time partners in Grenoble, Lausanne and Montreal



Missions

- training of young Vietnamese researchers in the field of water and environment , with the objective of 10 to 15 co-sponsored doctorate students within 5 years
- development of multidisciplinary research domains dealing with the lower Mekong system and the megacity of HCMC and addressing 3 major issues : *characterize the system- understand the evolution-assess the impacts*
- development of partnerships with Vietnamese and Asean universities, with public services and with private companies, at a regional scale
- development of innovative education (short courses, MOOC)



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Water and Environment management : a crucial problem for South Vietnam

- * **Risks of submersion** (floods, sea level elevation), impacts on economic development
- * **Contamination of rivers**, impacts on health and ecosystems
- * **Flow regime of Mekong River**, impacts on fish production and erosion of sea shore
- * **River Basin Management**, intra and inter-regional potential conflicts



Rural area: 72%
 Urban area: 28%



Hochiminh city and the risk of flooding



65% of megapole at an altitude below 1,5m above sea level
Surface of 800km², 90% being impervious
Expected sea level rise due to climate change: 1m end of century
Actual subsidence in central area: 4cm/yr

Challenges:

Develop numerical models for **prediction of flooding risks**

Redefine **urban planning development** with a redevelopment strategy in implementation of major infrastructure project (more space to green and blue belts, development of urban multifunction parks)

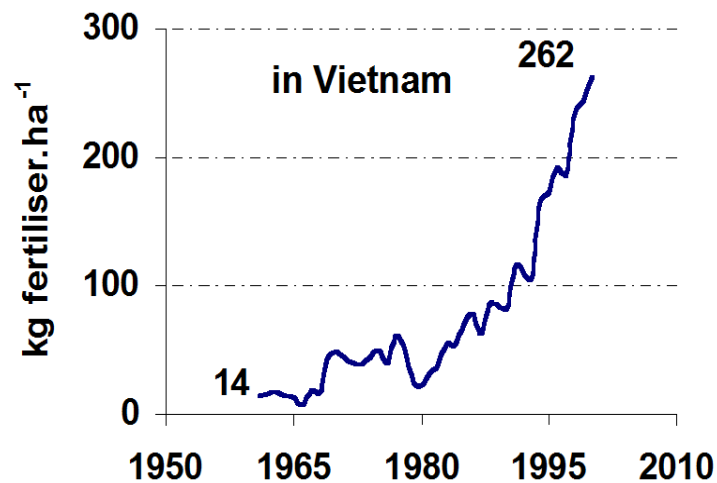
A research project in collaboration with PADDI (HCM city Urban Development Management Support Center) – a joint structure between the Grand Lyon Metropole & the Peoples's Committee of HCMC

Contamination of rivers, impact on human health and ecosystems

Cities HCMC: 900.000 m³ /day, 90% untreated



Countryside: Increased use of fertilizer and pesticides



Scientific questions and associated projects

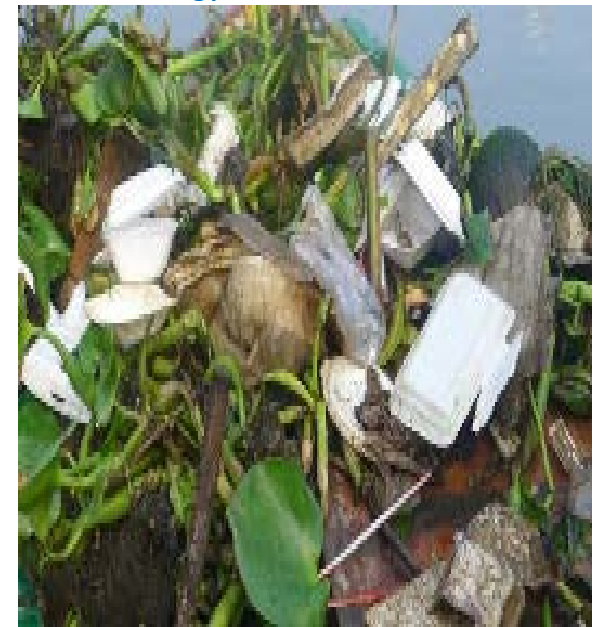
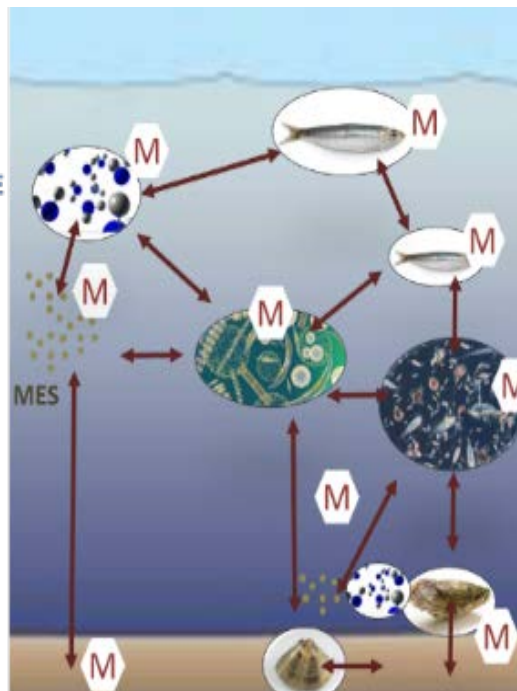
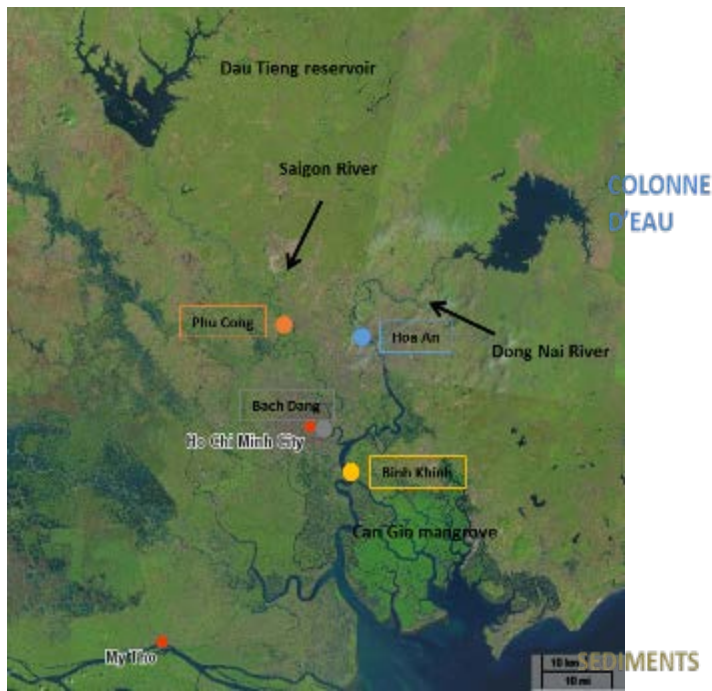
How HCMC impact the Saigon river water quality?

(bi-monthly sampling upstream and downstream HCMC, analysis trace metals, physico chemical parameters)

Do we observe **metal bioaccumulation** in aquatic species downstream HCMC?

Do we observe **microplastic** in the Saigon river and the canals, and can we estimate the flux of **macroplastic**?

Microplastics (<5mm, fibers, fragments, spherule) are ingested by many marine species and have large toxicology



Transfert of suspended particulated matter & the degradation of Lower Mekong Delta

Outcomes:

- (1) To know how much the estuarine zone is trapping or supplying sediments to the ocean;
- (2) To predict the pluri-decennial evolution of the estuarine & nearshore zone (river and coastal erosion);
- (3) to reconstruct the evolution of sources supplying sediment to the Mekong river over the last several decades at the regional scales.



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Contribution of the CARE joint laboratory

- Give a chance to a multidisciplinary approach
- Allow a coherent and global way to deal with water resources management at a catchment scale
- Allow to have permanent researchers in the unit
- Allow greater ease to researchers mobility



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Need for River Basin Management

Based on the European Water Framework Directive

Develop **Integrated Water Resources Management** schemes (IWRM) at nation and international scales to obtain “**reasonable and equitable use**” of water based on:

- water fees for polluters, addressing pollution from urban water waste, from industry and from agriculture
 - Impact of sediments on ecosystems, fertility and sea shore erosion
 - unified quality standards for protection of aquatic ecology and habitat
 - coordination of water quality monitoring methods
- with the objective of **cleaner, safer , and available water for all**

Involve strongly **the public participation** to balance the interests of various groups and enforce the acceptability of measures

Get **adequate water pricing** acts reflecting the true costs but still affordable