



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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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

Trung tâm châu Á nghiên cứu về nước
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)

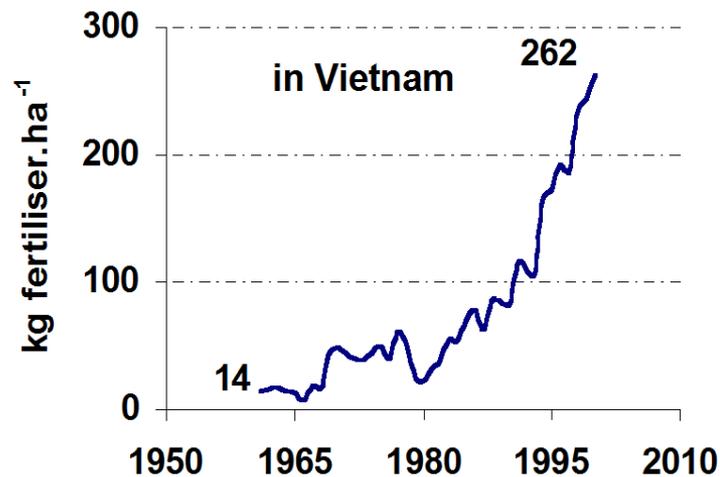
A research project in collaboration with PADDI (HCM city Urban Development Management Support Center) – a joint structure between the Grand Lyon Metropole & the Peoples's Committee of HCMC

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

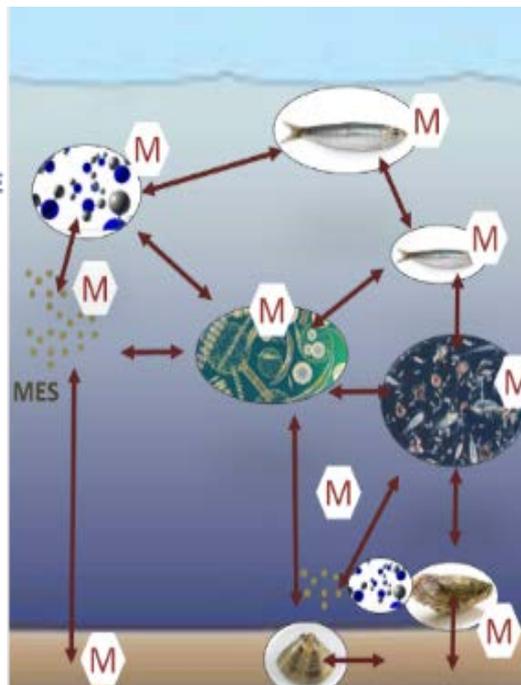
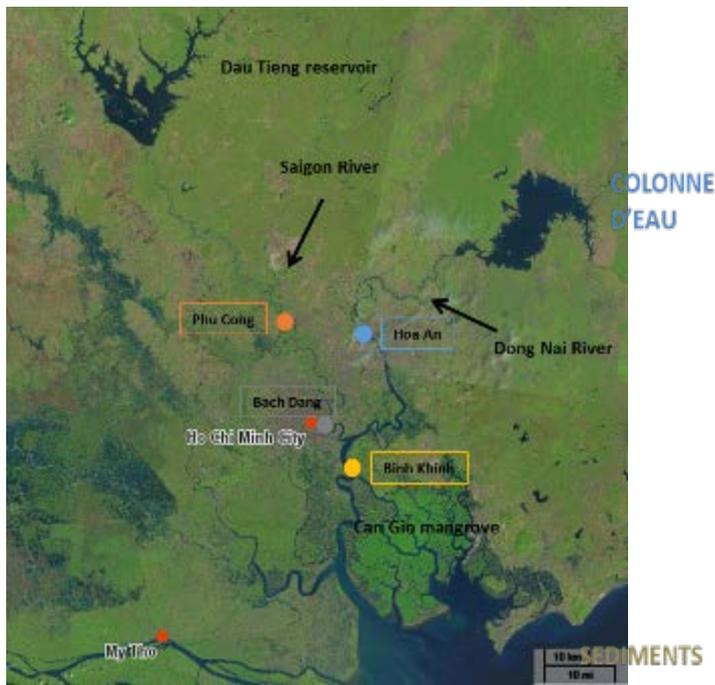
How HCMC impact the Saigon river water quality?

(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