

Integrated and Strategic Environmental Impact Assessment of Port Developments in the Vung Tau Area (South Vietnam)

BL/00/V03

Project partners (+indicate coordination):

- Soresma nv – haecon, Ghent, Belgium (Belgian promoter)
- Free University of Brussels (VUB), Dept. of Human Ecology (Belgian co-promoter)
- Sub-Institute of Geography, National Centre for Natural Science and Technology, HCMC, Vietnam (Vietnamese promoter)

Sub-contractors:

- SPACEBEL – Da Vinci, Hoeilaart, Belgium
- Ministry of Natural resources and Environment, Hanoi, Vietnam
- Research and Development Centre for Petroleum Safety and Environment, PetroVietnam, HCMC, Vietnam

(Geographic) study area : area encompassing Thi Vai river, Ganh Rai bay, Vung Tau City (Southern Vietnam)

Science policy testsite (if applicable) : pilot project in study area (HCMC – Vung Tau)

Project period: 01-04-2004 / 31-03-2006

Funding framework: Bilateral cooperation Belgium – Vietnam, BSPO

Data used (if satellite data, specify):

- available literature and field measurement records
- conducted questionnaires
- field measurements of water quality and sediment quality
- SPOT satellite images of the study area for the years 1995, 2000 and 2005

Context and objectives (max 14 lines)

The cities of Ho Chi Minh, Bien Hoa and Vung Tau in Southern Vietnam are located in one of the fastest growing and developing areas of the country. Many infrastructure works such as ports and industries are linked to these economic developments of the area. They are, however, also located close to one of the largest natural river and mangrove systems. Each of these infrastructures, facilities and industries was developed after an assessment of their (individual) potential environmental impacts. However, none of them were evaluated in an integrated and global framework of environmental decision making.

In this respect, a strategic environmental assessment was conducted to assess the integrated and cumulative impacts of actual and future port developments on the society, economics and environment. Therefore, the following objectives were aimed for: (i) evaluation of the available master plan for port developments, (ii) evaluation of the present state of socio-economics and environment (cf. environmental impact statements), (iii) integrated impact assessment, and (iv) strategic environmental assessment on the port developments.

The ultimate goal of the project was a ranking of port development plan alternatives according to their sustenance towards socio-economics and environmental protection. An operational framework for environmental sustainable analysis of a given seaport development strategy was provided to the decision maker.

Methodology (max 10 lines)

- Evaluation of the most recent master plan for port developments
- Environmental impact statements of the following topics: air quality, noise pollution, water resources, land resources, fauna and flora, socio-economics, safety, health and monuments. The analysis is based on conducted measurements of water quality and sediment quality, acquired SPOT spatial images for land use change analysis, questionnaires completed by stakeholders and existing literature
- Integrated impact assessment: development of a Leopold impact matrix to identify the magnitude and importance of impacts, and to set up mitigation actions
- Strategic environmental assessment, including (i) a definition of port development plan alternatives, (ii) stakeholder definition, (iii) selection and quantification of decision criteria (based on the Leopold matrix), (iv) public participation to weight the decision criteria, and (v) sustainability ranking of port development scenarios.

Results (max 16 lines)

Notwithstanding, the environmental impact statements revealed different societal and environmental issues in the study area. They are all related to the bad water quality, sediments polluted with heavy metals, large solid waste production, decreasing mangrove area, urbanisation with related traffic issues, dust emissions etc...

Not only determined the Leopold impact matrix (cf. integrated impact assessment) the most important impacts to consider as decision criteria in the strategic environmental assessment, it also allowed to set up crucial mitigation measures to minimise adverse societal, economic and environmental impacts from port developments.

To obtain a ranking of the proposed port development plan alternatives (with the most sustainable or preferred scenario at the top), multi criteria decision making techniques were applied. Here, the Analytic Hierarchy Process (AHP) method was selected. AHP inherently accounts for public participation and different scenarios in the decision making process. The results indicated that port developments balance the economic benefits and negative environmental impacts in a sustainable way. Economic developments are considered as desirable by the stakeholders. However, from a sensitivity analysis it became clear that in total three port scenarios could be opted for by the decision maker, the further port developments in the Phu My area or the Vung Tau/Dinh river area, or the full implementation of the master plan by 2020. Further analysis of the results finally suggested phase-based port developments with the continuous monitoring of the environmental quality, which should result in truly sustainable developments with a broad level of public acceptance (i.e. stakeholders, potential end-users and decision makers).

Products and services (if applicable)

- Pilot application of SEA for port developments
- Field data records on water and sediment quality
- land use maps for the years 1995, 2000 and 2005
- AHP methodology for SEA for port developments

Website (with project results): nihil

Pictures illustrating the project: nihil

Discipline (select one or more appropriate disciplines)

Aquaculture	x
Environment/nature conservation	x
Food security	
Weather and climate	
Oceans & coasts	x
Geology & soil	
Solid Earth resources	x
Hydrology & freshwater resources	x
Forest & natural vegetation	x
Agriculture Environment	x
Natural hazards & disasters	
Land planning & infrastructures	x
Urban & suburban	x
Cartography	
Transport & navigation	x
Social & cultural activities	x
General Earth observation	x
Space science	
Information & communication technology	
Hardware & software /Standards & formats	
Policy & legislation	
Economic issues	x

Publications

- Hens L. & Rutten C. (2005). Integrated and Strategic Environmental Impact Assessment of Port Developments in the Vung Tau Area (South Vietnam). Workshop on Stakeholders Meeting on Strategic Environmental Assessment of Port and Related Industrial Development in the Vung Tau Area. Ho Chi Minh City, Vietnam.

- Rutten C., Hens L. & Binh D.K.N.T. (2006). Integrated and Strategic Environmental Assessment of Port Developments in the Vung Tau area (South Vietnam). Hubs, Harbours and Deltas in Southeast Asia: Multidisciplinary and Intercultural Perspectives. Phnom Penh, Cambodia.

- Rutten C., Binh D.K.N.T. & Hens L. (2005). Land Cover Changes in SEA of Port Developments in the Vung Tau Area. International Experience and Perspectives in SEA. Prague, Czech Republic.

- Huygens M. & De Clercq B. (2005). Integrated Assessment of Land Use Changes and Morphodynamics related to Port Developments in the Vung Tau Area. Workshop on Stakeholders Meeting on Strategic Environmental Assessment of Port and Related Industrial Development in the Vung Tau Area. Ho Chi Minh City, Vietnam.
- Project information fiches on the project and the SEA methodology (Soresma, 2006).