Sustainable options for PEople, catchment and Aquatic Resources

SPEAR

INCO-CT-2004-510706
01/12/2004 to 30/11/2007
(36 months)

http://www.biaoqiang.org/
http://www.spear.cn

1. What has been communicated (and how) to diverse stakeholders about integrated resources management and/or sustainable food production and associated concepts integrating knowledge in interdisciplinary ways?

Several informal meetings with stakeholders (ranging from local farmers to aquaculture managers) were held since the project first meeting until the present date.

A decisive meeting to communicate with stakeholders was held from 15-18 April 2007 in Zhouzhang during the 29th month of the project:

Stakeholders were invited to represent all main interests towards sustainable aquaculture within each bay studied by the SPEAR project. The stakeholders included representatives from both industry and regional management.

Objectives agreed between all in advance of the meeting were:

1) SPEAR scientists to present the SPEAR objectives, especially the work carried out to date on integrated aquatic resources modelling, providing examples of how integrated modelling can be useful for management;

2) Stakeholders to consider the above, and advise upon modelling scenarios of local relevance and urgency that can be addressed by the SPEAR project.

3) All to agree means of sharing and disseminating the findings and benefits of modelled scenarios upon completion of the SPEAR project.

The meeting objectives were successfully achieved, with outcomes and actions that are fully documented.

2. How have the ideas, skills and tools developed through the project enhanced the development or implementation of locally consistent and sustainable management of aquatic resources or aquatic food production? You may wish to rank stakeholder feedback (satisfaction) on a scale from 0 = none to 10 = excellent.

Although the SPEAR project is still running and the final set of tools is still in preparation, stakeholders have clearly recognised and were inspired by the potential for those tools to enhance the sustainable management of aquatic resources within the bays of interest but also in a wider scale. In particular, stakeholders valued the range of both economic and ecological tools being developed in order to address aquatic resources at different scales ranging from individual growth (e.g. ShellSIM and MOM) to farmscale (e.g. FARM) and ecosystem models (e.g. EcoWin2000).

We believe that partner skills developed during the SPEAR project have a good potential (perhaps as much as 8/10) to satisfy stakeholders' interests, on the basis that stakeholder feedback was very positive, evidenced by their enthusiastic and professional engagement in the development of scenarios that are being addressed.

Those scenarios are entirely consistent with local sustainable management, as they address specific concerns on the sustainable development of the bays under study. The scenarios chosen are all examples of real-world trade-offs between further economic growth and visibly emerging ecological thresholds. It is clear that Chinese managers need to be informed on the consequences of alternative scenarios, a facet that SPEAR, with its approach on integrative simulation modelling of biophysical, ecological and socio-economic components of the coastal system, can assist in.

3. Has your project been able to make connections between traditional and culturally embedded knowledge and technological research findings (please rank on a scale from 0 = none to 10 = pervasive throughout project activities) and if so, which?

The SPEAR project is making exciting and valuable connections between cutting-edge technology (state-of-the-art modelling approaches, scaled data integration and state-of-the-art socio-economic integration) and ancient traditional Chinese farming practices, such as integrated multi-trophic aquaculture (IMTA), where aquaculture waste is reutilised and environmental costs averted. This entails applying integrated

physical/biogeochemical/social/economic models to simulate effects on and of IMTA over a range of scales in chosen sites of specific interest.

4. Have such ideas been taken up by managers, policy makers, educators? Please rank stakeholder feedback on a scale from 0 = none to 10 = excellent level of up-take. If so, please elaborate and explain.

Enthusiasm for the project by stakeholders can be ranked highly (9/10), and we are confident that outcomes from our modelled scenarios will provide practical help for managers and other stakeholders as exemplified below:

Scenarios – Huangdun Bay

Three mandatory, one wish-list.

1. Assess impact of change to fish cage numbers and sizes
2. Assess impact of nutrient discharge reduction from WWTP
3. Combined (1) and (2)
4. Wish list scenario: Assess impact (D3D, ECO, EcoWin2000 depending on scale) of power station emissions on reduced growth of Chinese oyster (tentative hypotheses: direct thermal effect, indirect thermal effect e.g. on phytoplankton growth/composition due to removal of algae by intake, mortality due to chlorination. Requires temperature simulations from a fine-scale model, providing aggregated temperature data for the relevant ECO/E2K boxes. This to be done by EIA consortium with those data the ecological models can simulate change in oyster growth.

Scenarios – Sanggou Bay

Three mandatory, one wish-list.
For the next 5 years. 1Mu=800m^2

1. Reduce culture densities for shellfish alone by 50% (achieved by increasing distance between longlines and/or droppers, to assess consequences for total production value (not profit), immediately (EcoWin2000 model)
2. Alter species composition, immediately: currently there are 450 Mu of fish cages, 50,000 Mu of *Laminaria*, 40,000 Mu of shellfish, proposed change to a 70:20:10 (kelp:filter:finfish) – coarse-scale models (EcoWin2000 model)
3. Replace oyster culture (1500 Mu) with abalone culture (1000 Mu) and fish cages (400 Mu), immediately - local models (FARM model, MOM model)
4. Wish list scenario: Stop/reduce the function of sewage treatment to increase primary production. Sewage treatment plants potentially purchase nitrogen emission credits from the aquaculture farms.

Outside of China, the insights gained into the benefits of IMTA may be applied in Europe where monoculture is still common practice.

It is expected that the application of the project findings in the project case studies are going to be used by the managers for future decision-making in ICZM, with a focus on aquatic resource and coastal eutrophication management.

5. Has the project contributed to capacity building legacy? Please rank on a scale from 0 = none to 10 = excellent level of capacity building. If so, how?

Throughout the 30 months of the SPEAR project to date, several capacity building actions were held and are still ongoing. Presently, the capacity building score is 7/10.

- Training course for the key project field of study and tools. The participants were Chinese students appointed by the SPEAR local partners. The training session occurred in Xiamen, March 2006, all materials are documented and available at http://www.biaoqiang.org/training/.

- Training course about advanced hydrodynamic and water quality modelling focusing on marine bays, as part of the transfer of the Delft3D modelling framework and the Huangdun Bay models developed during SPEAR. The participants were 6 trainees from the Chinese partners' institutes, 2 from each of them. The training provided by Delft Hydraulics occurred in Delft (The Netherlands), 22 January – 2 February 2007. A report with the programme is available at http://www.biaoqiang.org/training/.

- Supervision of Chinese ERASMUS MUNDUS students by both Chinese and European partners.

- Funding and supervision of post-doctoral students.

- Bi-lingual version of several SPEAR tools and publications to ensure that the Chinese public is on board.

- SPEAR Leverage Programme (SLP), developing parallel initiatives such as the *Trophic Assessment In CHInese* Coastal Waters (TAICHI) project, for evaluation of the methodology and results of eutrophication assessment in Chinese bays (http://www.eutro.cn/).

- Many of the western SPEAR partners are new to working with China and Chinese colleagues. There has been a great deal of mutual appreciation, understanding and

respect generated between partners and between the project partners and local and regional stakeholders, that leaves Chinese partners and other partners more appreciative of each others values and ethics and will facilitate future project and cooperative development.

6. Has the project resulted in longer-term institutional cooperation? Please rank on a scale from 0 = none to 10 = excellent and elaborate.

The project is still ongoing but there are clear links already in place.

7. What do you think is the most enduring legacy of the project (political, social, economic, scientific, connections to traditional knowledge, young scientists trained)? Please rank each on a scale from 0 = none to 10 = excellent and explain.

The project is still ongoing.

8. Do you have any specific local, 'grass-root' experience that would be valuable as case material for communicating learning and empowering experiences from engagement with stakeholders to a wider public?

Stakeholders need to be brought onto the project early enough to make practical recommendations to the modelling efforts and resulting recommendations; but not too early as to lose credibility. Sufficient meeting time should be given to a stakeholder process, all presentations and hand-outs translated in the local language and stakeholders given sufficient time to present their own views and engage in smaller working groups. A well-prepared and executed stakeholders' process is a vital ingredient towards ensuring social relevance of the project.

9. Would you like to recommend any specific type of approach arising from the experience of having (or not) impact on discourse and action outside science to be taken into account for future research (e.g. FP7)?

The strategy used in this project to make people feel part of the project rather than an elected, maybe even esteemed audience, pays its dividends. This process can be further improved by making stakeholders (managers, academia and public) even more part in solving their problems through an integration of science and participation through the use of mediated systems modelling or group modelling techniques. It not only deepens the relevance of scientific work but also empowers all participants.