Project N°: 036992

ACRONYM : **S**cience **P**olicy **I**ntegration for **Co**astal **S**ystems **A**ssessment

DELIVERABLE D.13_7

Training Content Report
(Review Report)

WORK PACKAGE : WP13 (Professional Training)

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D13.7 SPICOSA Training Content Report

1. Aim

The aim of this report is to critically analyse the outputs of SPICOSA training activities. It builds on D13.3 by developing ideas related to the SAF module and other aspects of the project and considers how these influence the wider sphere of professional ICZM practice.

2. Objectives

Objectives of this report are therefore to:

1. summarise the aims of the training outputs
2. assess whether aims have been achieved
3. comment on why or why not aims have been achieved
4. using key themes from D13.3, make suggestions on how the rest of the project can influence ICZM professional practice.

3. Summary of Professional Training Outputs

The following workshops have been delivered as part of WP13s contribution to the SPICOSA project.

1. Cork: pilot workshop, 24-25th June 2008, (List of attendees in Appendix A)
2. Gdansk: pilot training workshop, 7-8th October 2008, (List of attendees in Appendix B).
3. Sweden: Improving ICZM Using a Systems Approach. Training of Trainers workshop, 24-25th November 2009. (List of attendees in Appendix C).
4. Cascade workshops planned for 3 SSAs before Month 40. Details to be confirmed.
5. WP13 also assisted with organisation of DST (Deliberation Support Tool) workshops at Algarve (September 2009), Copenhagen (October 2009) and Istanbul (February 2010). WP1 will report separately on the delivery of these workshops.

4. Aims of Training Outputs

The aim of the workshops was to trial the SPICOSA professional training approach at Cork, refine it at Gdansk and train the trainers at Stockholm. They would then cascade their learning and experiences via local workshops at their own study sites.

5. Achievement of Aims

Wokshops have succeeded in their aims in so far as they are meant to distribute information to an audience, in this case, mainly the SPICOSA community and other interested stakeholders. Feedback from workshop activities has been collated and this is summarised below:

Detailed feedback from the Cork and Gdansk workshops was reported in D13.5, so this will not be repeated here. In summary, workshops were well received, although attendees were few. Also, it was considered difficult to train the entire SAF in just two days, therefore attention focussed on training aspects of it, such as:

- "Mapping the worlds"
- How to engage stakeholders
- DPSIR (Drivers- Pressures- State of Environment- Impacts- Responses: organising information about the state of the environment), and
- CATWOE (Customers-Actors- Transformations- Worldview- Owners-Environment: exploring functional relationships between stakeholders relevant to a specific issue).

The following section summarises feedback from the workshop held in Stockholm in November 2009.

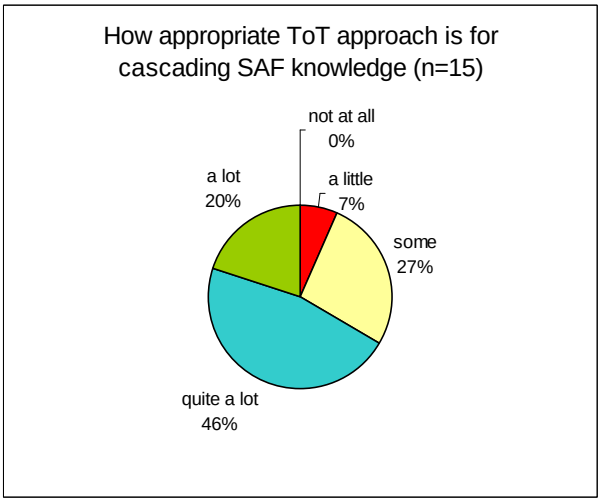
5.1 Appropriateness of Training of Trainers Approach

The Training of Trainers workshop (ToT) held in Stockholm, Sweden, 2009 used SPICOSA experts to explain and demonstrate how the fundamental building blocks of the SAF- ecological systems, economic systems and social systems could be applied in practice. A detailed case study was also presented and participants were given an opportunity to discuss issues and undertake SPICOSA related exercises. Appendix D shows some of the Powerpoints that were presented. A complete set of powerpoints may be viewed on the SPICOSA and SETNET webpages.

When participants (n=15) were asked about the appropriateness of the training of trainers approach for cascading SAF knowledge, they responded as follows:

Figure 1. Appropriateness of Trainers of Trainers Approach

46% quite a lot
20% a lot
27% some
7% a little
0% not at all



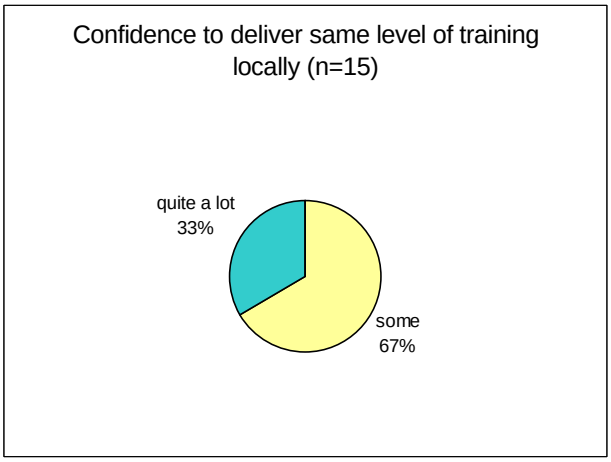
Conclusion: the majority of respondents agreed that the training of trainers approach was appropriate for cascading SPICOSA knowledge.

5.2 Confidence to Deliver Same Level of Training Locally

When the same group of participants were asked whether they had the confidence to deliver the same level of training locally, their responses were:

Figure 2. Confidence to Deliver Training Locally

33% quite a lot
0% a lot
67% some
0% a little
0% not at all



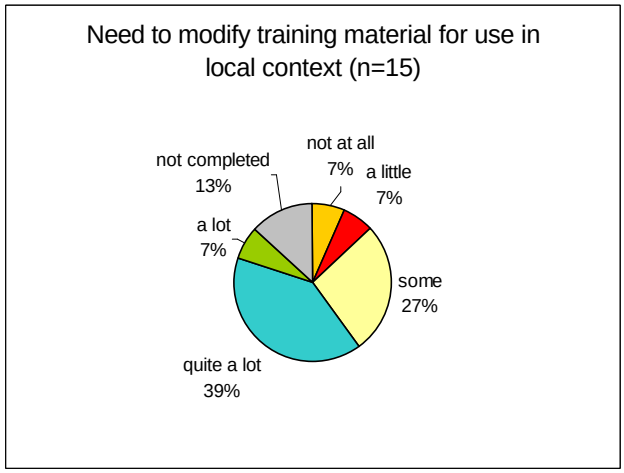
Conclusion: the majority of respondents only had "some" confidence in their ability to deliver the same level of SAF training locally.

5.3 Need to Modify Training Material

When asked whether they thought training material would need to be modified for use in a local context, workshop participants (n=15) responded:

Figure 3. Need to Modify Training Material

39% quite a lot
7% a lot
27% some
7% a little
7% not at all
13% not completed



Conclusion: the majority of respondents thought that material would need to be modified quite a lot, for use in a local context.

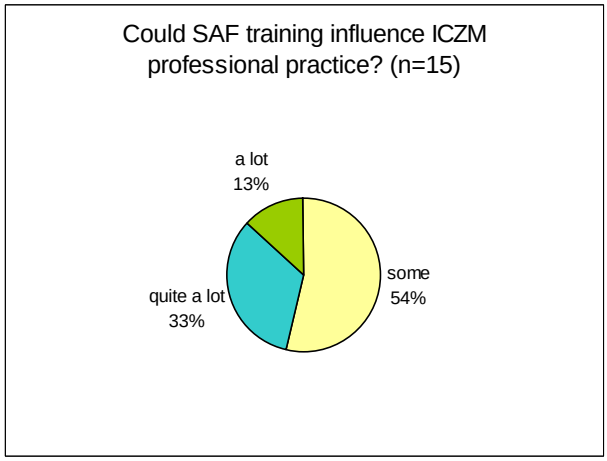
When asked how training material could be modified, respondents suggested that:
1. The SAF should be simplified to make it understandable to non-scientists and non-SPICOSA audiences
2. training material should be adjusted to suit the local context/ language/ conditions/ perspective/ audience
3. training material should include more specific activities and descriptions of the local economic, social and ecological components.

5.4 Whether SAF Training Could Influence ICZM Practice

Finally, when asked whether they thought SAF Training Could Influence ICZM professional practice, workshop participants responded:

Figure 4. Whether SAF Training Could Influence ICZM Practice

33% quite a lot
13% a lot
54% some
0% a little
0% not at all



Conclusion: all respondents thought that SAF training could influence ICZM professional practice, although the degree to which this might occur appeared to be limited. This was because:

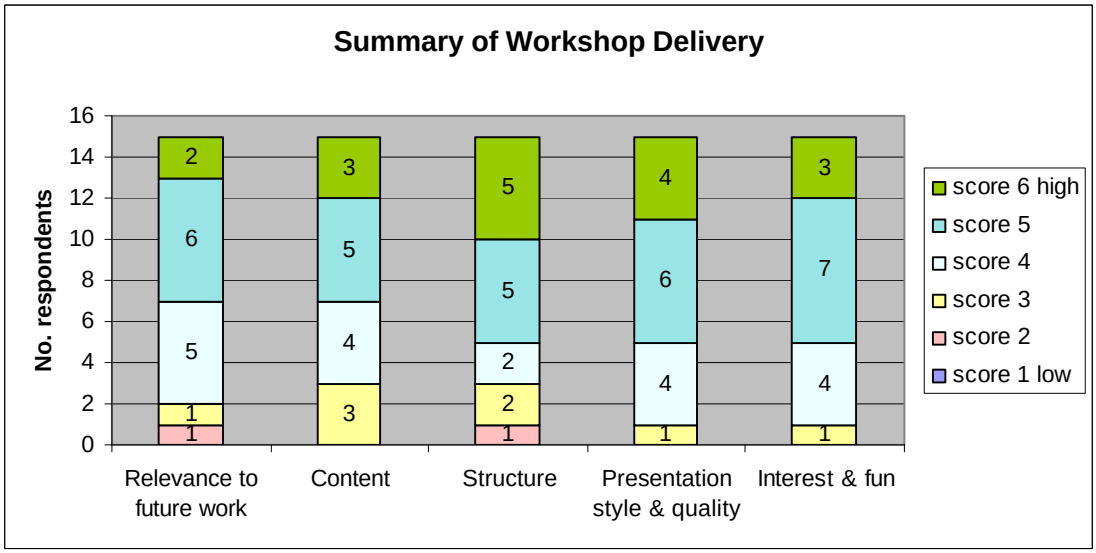
1. more cohesive description of the SAF manual is required
2. it takes a long time to change the view of policy makers and routines
3. there is a lack of demonstration of short and longer term benefits.

5.5 Summary of Workshop Delivery

Figure 5. Scores for Workshop Delivery

	score 1 low	score 2	score 3	score 4	score 5	score 6 high
Relevance to future work		1	1	5	6	2
Content			3	4	5	3
Structure		1	2	2	5	5
Presentation style & quality			1	4	6	4
Interest & fun			1	4	7	3

Figure 6. Graph of Scores for Workshop Delivery



Conclusion: Overall, the workshop was well received, with a mode score of 5 out of 6 for relevance, content, structure, presentation style and quality, and interest. The structure was scored most highly, followed by presentation style and quality. Interestingly, one respondent stated that the workshop would not be relevant to future work.

According to participants, the best things about the workshop were:

1. Very good leadership. Keeping our minds and discussions on the right focus and not letting us lose ourselves (and our time) in detailed discussions. Envision was also very well informed about SPICOSA and the SAF and did the most clear explanation about it that I've heard
2. being able to build a common view of each part of SAF
3. having an honest debate of the weaknesses
4. group exercises
5. SSA 4 complete ESE model
6. presentation- pulling the SAF together
7. SWOT of the SAF
8. bringing folks together and seeing how your guys conduct and deliver a workshop (which is more important than content)
9. participatory exercises, because reflective and strategic
10. the presentations- very clear and helpful
11. it was interesting to share ideas in the exercise . Everyone was able to share experiences and opinions
12. to lift the view from the SSA groups to SAF as a package that can be applied in other areas and other projects
13. I liked the group exercises and the balance between theory and activities
14. new information, new way of thinking, new friends discussions and focus on stakeholders, managers and the real world.

The worst things were:

1. How can we talk to local farmers about this project? What is relevant to tell them? What are they going to do with the information? We cannot talk to

relevant bodies/ stakeholders about SAF- that is latin to them. How can we get away from our scientific language?
2. not being able to have more moments of interaction with participants
3. the theoretical examples
4. system output was not addressed
5. few solutions suggested to fill the huge communication gap between stakeholders and research community
6. lack of guidance on how to deliver a SPICOSA spiel in real life (ie. it's not lecturing, but a very simple, communication skill required). Could do with guidance on presentation skills, timing etc. The front ended delivery and "skip" over the meat and "rushed conclusions" syndrome
7. the exercises- we should have spent more time on discussions after the presentations
8. lack of confidence and knowledge in all parts of the SAF to be able to cascade it out for others
9. too much scientific material repeated from other meetings
10. lack of educational details and materials
11. material was not appropriate for training to non-SPICOSIANS
12. lack of links to the Water Framework Directive which should be highly topical for all study areas.

6. The Wider Impact of SPICOSA on ICZM Practice

6.1 Building on D13.3 Findings

Six key points were discussed in D13.3, which at that time (December 2008) were found to inhibit the effectiveness of SAF implementation by coastal management practitioners. In summary these were as follows:

1. the benefits of learning about the SAF must be clear, otherwise attendance at training courses is unlikely
2. not feasible to effectively train coastal professionals on all the tools, techniques and theories encompassed in the SPICOSA SAF in just two days
3. the SAF manual is too academic for coastal professionals
4. the SAF does not take into account previous coastal management activities and does not easily lend itself to partial implementation
5. there is a lack of evidence to convince coastal managers that re-organizing and re-communicating existing knowledge via the SAF is a worthwhile activity
6. the SAF is not proven in a coastal management context.

The issue of clarifying the benefits of learning about the SAF (point 1) was discussed in SETNET Newsletter 3 (August 2009). Appendix E shows the article. This was distributed to the SPICOSA community, as well as via EUCCs e-News, therefore can be considered to be addressed within SPICOSA, but not necessarily beyond it.

Points 2,3 and 4 have not been addressed since D13.3 and continue to be issues that impede the implementation of the SAF to the broader coastal professional community. Although the Stockholm training event gave an overview of the key SAF principles and demonstrated examples of where they had been applied, the majority of the SAF steps were omitted as there were just two days available for training activities. In addition, although detailed content guidelines were given to presenters to tailor material for training purposes, only one actually delivered the presentation that had

been requested. The “raw materials” for the training manual are therefore absent. There remains a significant amount of work to be done before the SAF is simplified enough for use by coastal management professionals.

Points 5 and 6 are beginning to be addressed via project review activities, although the SPICOSA project cannot as yet prove that applying the SAF improves efficiency or effectiveness of coastal management practice.

6.2 SPICOSA Partner Feedback

Drawing on feedback from workshop activities and evaluations, it is concluded that SAF training could potentially influence coastal management professional practice, although the degree to which this might occur, is at present limited. Reasoning for this is as follows:

Strengths and Opportunities

1. The SAF is particularly useful for visualising systems, promoting conversation and reflection
2. It provides a means of integrating stakeholders, policy makers and scientists from different disciplines, linked to the “real” world
3. The research community has been particularly enthusiastic
4. The SAF permits new project development and is potentially self-sustainable
5. There is political demand from policy makers.

Weaknesses and Threats

However, there are also a number of weaknesses and threats, including:

6. There are too many steps involved in the SAF, and these need to be reduced if the SAF is to be implemented into professional coastal management practice
7. Language and terminology should be less scientific
8. Not all SPICOSA partners (mainly scientists) are comfortable or competent at training coastal management professionals in the SAF
9. Although the SAF is supposed to integrate stakeholders and sciences, in practice, this has not always been the case and barriers still exist
10. The SAF is dependant on adequate resourcing in terms of time, money and data- in particular, time can run out before the projects have been implemented and data is often lacking.

Points 6 and 7 are beyond the current remit of WP13, but would significantly improve the likelihood of the SAF being implemented into professional practice. It is suggested that Phase 3 of the project focuses on joint working between WPs 1-6 and WP13 on producing material and training activities that are more appropriate for dissemination. Additional resourcing would be required.

Options for mitigating Point 8 include a) providing training for scientists and academics on training methods, or b) using professional trainers to facilitate workshops. Once again, additional resourcing would be required.

6.3 Application of the SAF to Integrated Coastal Management Barriers

The EC ICZM Recommendation (2002) identified 8 principles for ICZM. Three groups were asked to identify to what extent the SAF design overcomes the barriers to ICZM and fulfills the 8 principles of ICZM identified in the EU ICZM Recommendation. Reporting back of the exercise involved a "yes" or "no" answer with supporting comments where appropriate.

Figure 7. Participant Review of the SAF and ICZM Barriers

ICZM principle	Group 1	Group 2	Group 3
Broad perspective	Y / N (multidisciplinary approach….but not all SSAs successful)	Y (in theory)	Y
Long-term	Y	Y (how long…SPICOSA laying seeds)	? (can do it potentially using scenario approach and useful for monitoring)
Iterative	Y (post-project?)	Y	Y
Local specificity	Y (stakeholder involvement in formulation stage - differs)	Y	Y (enough local resources?)
Natural processes	Y	Y	Y
Involve stakeholders	X	Y (in reality – questionable)	Y / X (need representation and maintain interest and motivation)
All relevant bodies	X (much time needed to build relation…half way there)	Y (not easy)	X
Combination instruments	Y	Y (different methods in SSAs)	Y

Conclusion: The SAF overcomes the majority of barriers to ICZM and is particularly effective at being iterative, locally specific, focussing on natural processes and using a combination of different instruments. It's major weaknesses are in the involvement of stakeholders and inclusion of all relevant bodies.

Appendices
Appendix A. List of Attendees at Cork Workshop

List of participants

1st SPICOSA WP13 Pilot Workshop
"SPICOSA Professional Training Pilot Workshop"
24-25 /06/ 2008

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Cork, Ireland

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Mark Mellett	Naval Service of Ireland	c/o J.Gault@ucc.ie

Appendix B. List of Attendees at Gdansk Workshop

List of participants

2nd SPICOSA WP13 Pilot Workshop
"SPICOSA Professional Training Pilot Workshop"
7-8/ 10/ 2008

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Appendix C. List of Attendees at Stockholm Workshop

List of participants

WP 13 SAF Training of Trainers Workshop

24-25 November 2009, Stockholm, Sweden

hosted by University of Stockholm

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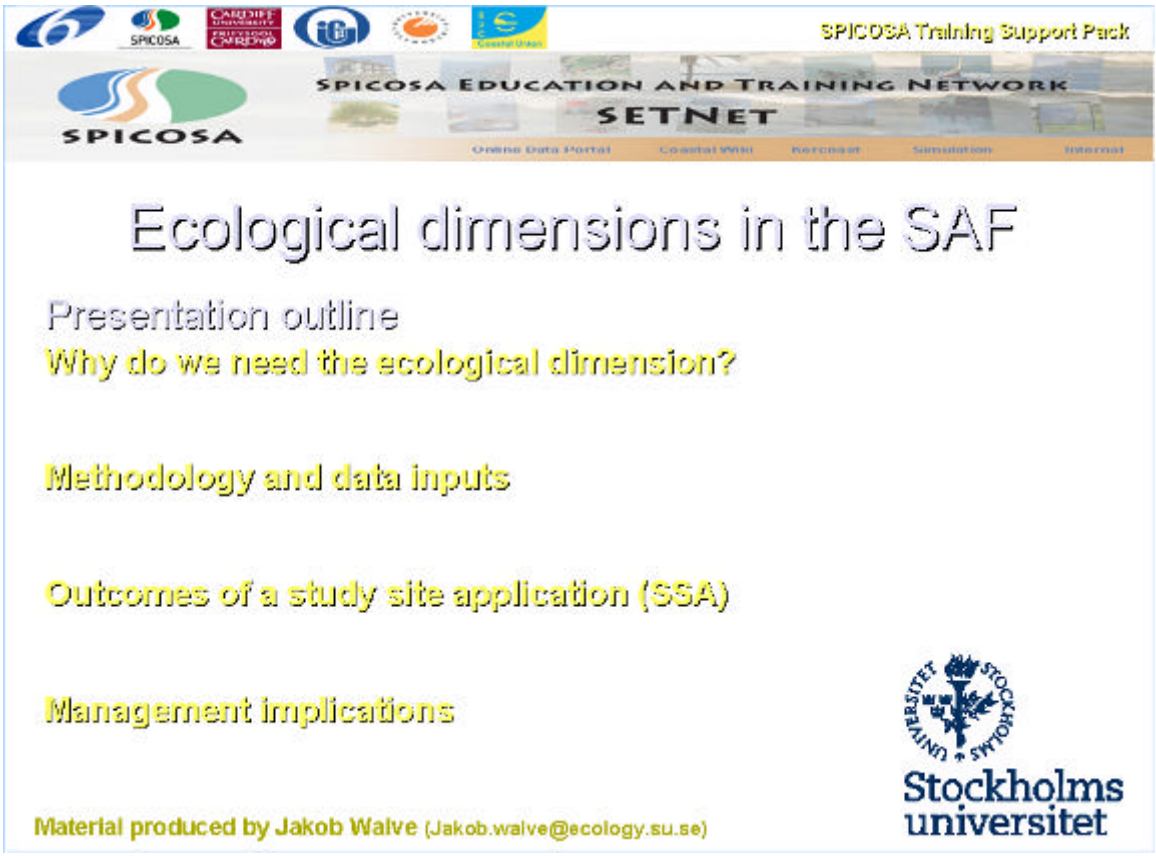
Appendix D. Stockholm Presentations

D.1 Ecological Systems, Jakob Walve, University of Stockholm



Methodology: Systems thinking is the key

Issue resolution: What is the problem? What are the objectives?

System definition: System boundaries? Key ecological processes?

Data needs / availability: What data are available or can be made available? What will available data allow or restrict? What new data can be collected? -The main idea is to make better use of existing data.

Conceptual Model: description of relationships between system components, from expert knowledge. Forms the basis for the problem solving through numerical modelling. Often has to be simplified: problem scaling.

Formulation and Appraisal, i.e. Mathematical and Numerical modelling: Inputs from data are modulated by ecological transformation processes, described by mechanistic (process) or empirical (relational) knowledge, in a modelling software. Usually the objective is to determine the response of a few system properties to certain management options. Important steps are Calibration and Validation of the model using data from the studied system.

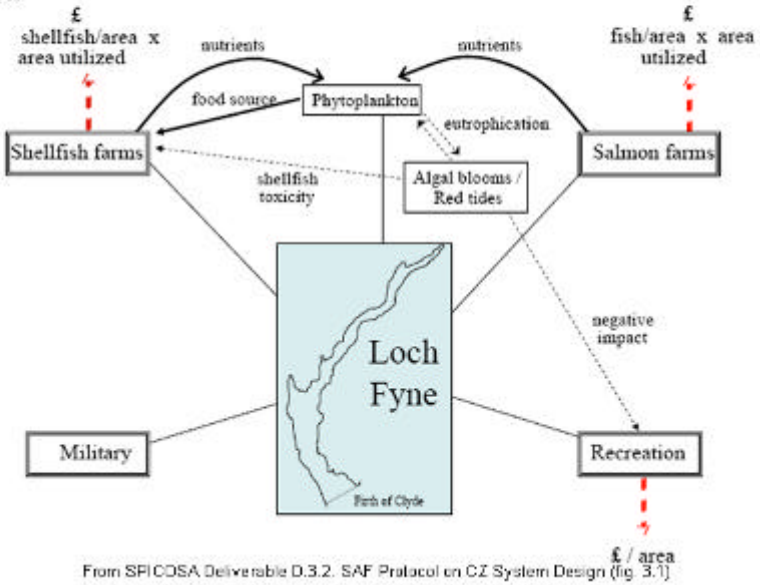
SPICOSA Training Support Pack

Issue resolution and System Definition

Example of Policy Issue and important ecological processes illustrated with Overall Conceptual model:

Loch Fyne, a 60 km long fiordic sea loch on the west coast of Scotland

Example Policy Issue "Managing Loch Fyne so as to Maximize the Value of Ecosystem Goods and Services to the Local Economy"



From SPICOSA Deliverable D.3.2. SAF Protocol on CZ System Design (fig. 3.1)

Methodology: Systems thinking is the key

Conceptual Model: an example

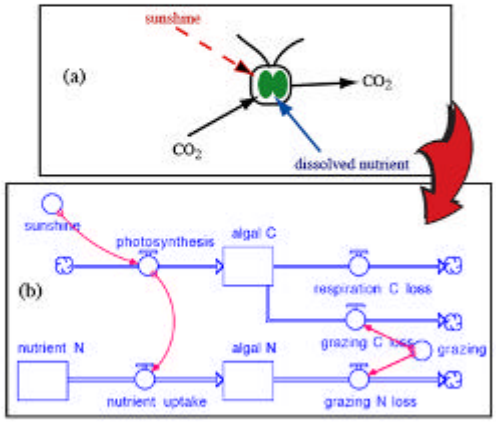


Figure 6.1: Conceptual models of micro-algal growth

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Methodology: Systems thinking is the key

Conceptual Model: example expanded to include a feedback loop

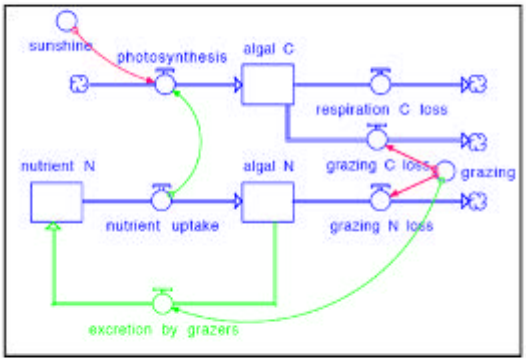


Figure 6.4: Example One expanded to include a feedback loop

Methodology: Systems thinking is the key

Conceptual Model: expanded to include boundary conditions

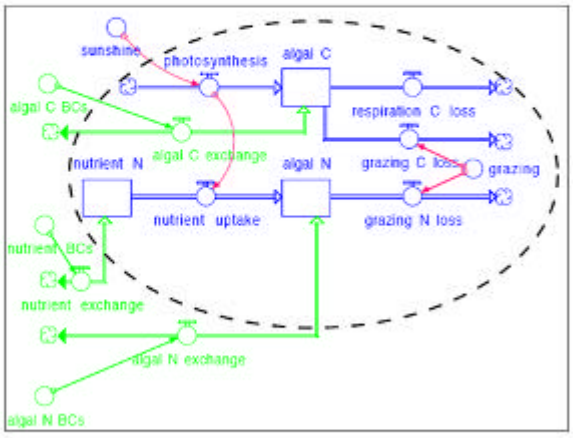
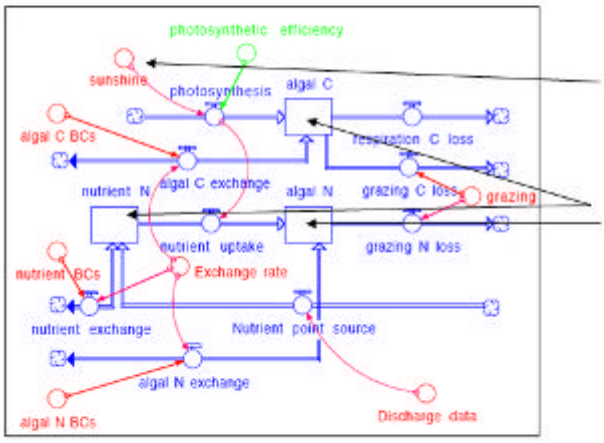


Figure 6.5: Example One expanded to include boundary conditions

SPICOSA Training Support Pack

Methodology: Systems thinking is the key

Data needs/availability: identifying the data needs in the conceptual model for *phytoplankton*



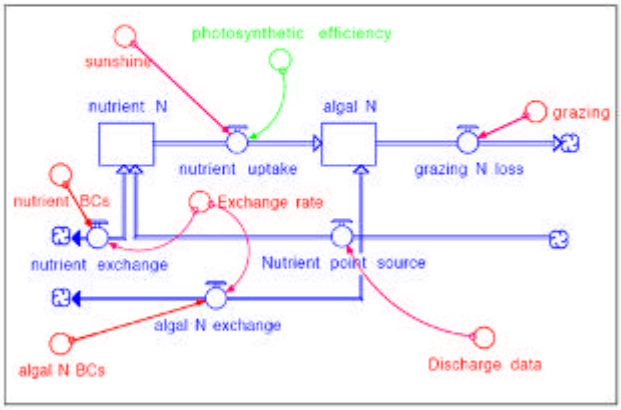
Identifying data needs in the conceptual model for phytoplankton.

From SPICOSA Deliverable D.3.2. SAF Protocol on CZ System Design

Figure 7.1: Illustrating data needs for a conceptual model of micro-algae

Methodology: Systems thinking is the key

Conceptual Model: simplified version



Methodology applied in a case study

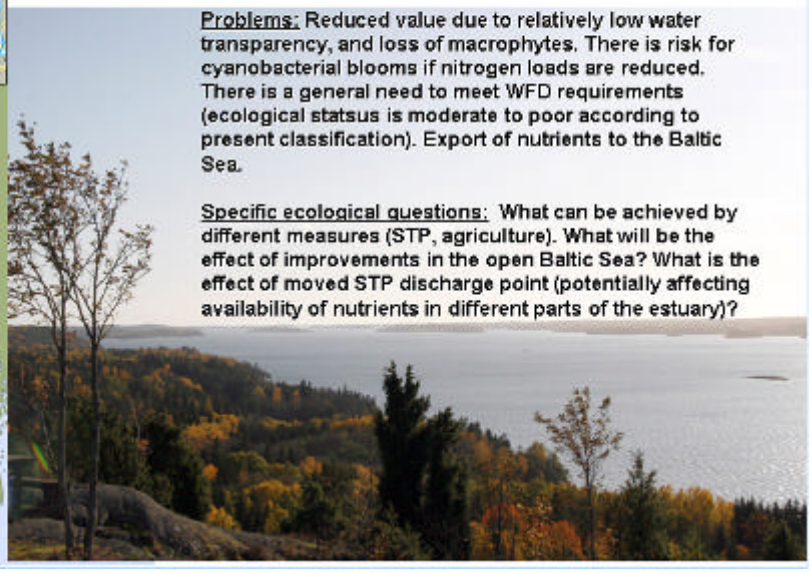
Issue resolution: Example
Himmerfjärden SSA, Sweden

Himmerfjärden: A brackish estuary in the Baltic Sea

- Water area 232 km^2
- Mean depth 17 m
- Maximum depth ~62 m
- Salinity 4-7
- Freshwater from 9 brooks and diffuse runoff 10 $m^3 s^{-1}$
- From Lake Mälaren 7 $m^3 s^{-1}$
- From large sewage treatment plant (STP) 1.5 $m^3 s^{-1}$

10 km

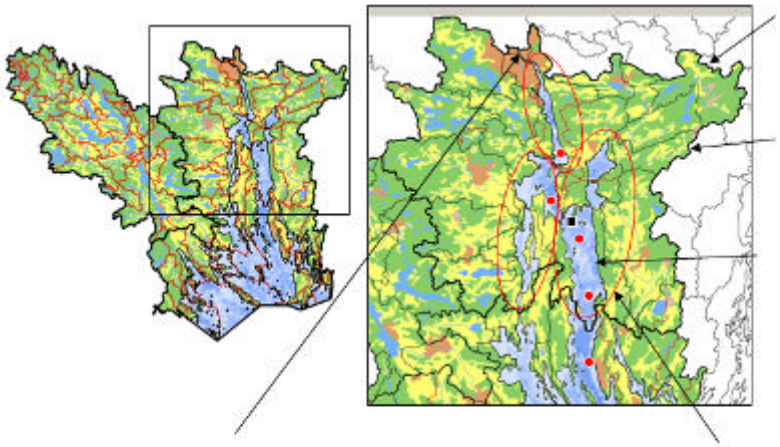
Open Baltic Sea



Problems: Reduced value due to relatively low water transparency, and loss of macrophytes. There is risk for cyanobacterial blooms if nitrogen loads are reduced. There is a general need to meet WFD requirements (ecological statsus is moderate to poor according to present classification). Export of nutrients to the Baltic Sea.

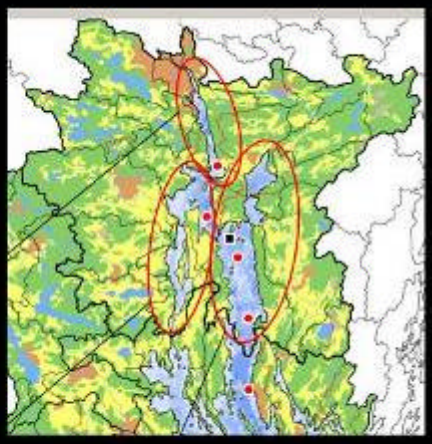
Specific ecological questions: What can be achieved by different measures (STP, agriculture). What will be the effect of improvements in the open Baltic Sea? What is the effect of moved STP discharge point (potentially affecting availability of nutrients in different parts of the estuary)?

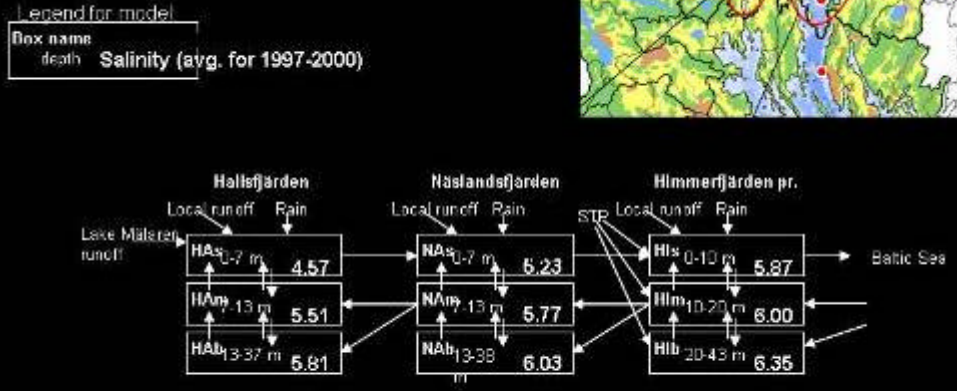
System Definition: Example Himmerfjärden SSA, Sweden



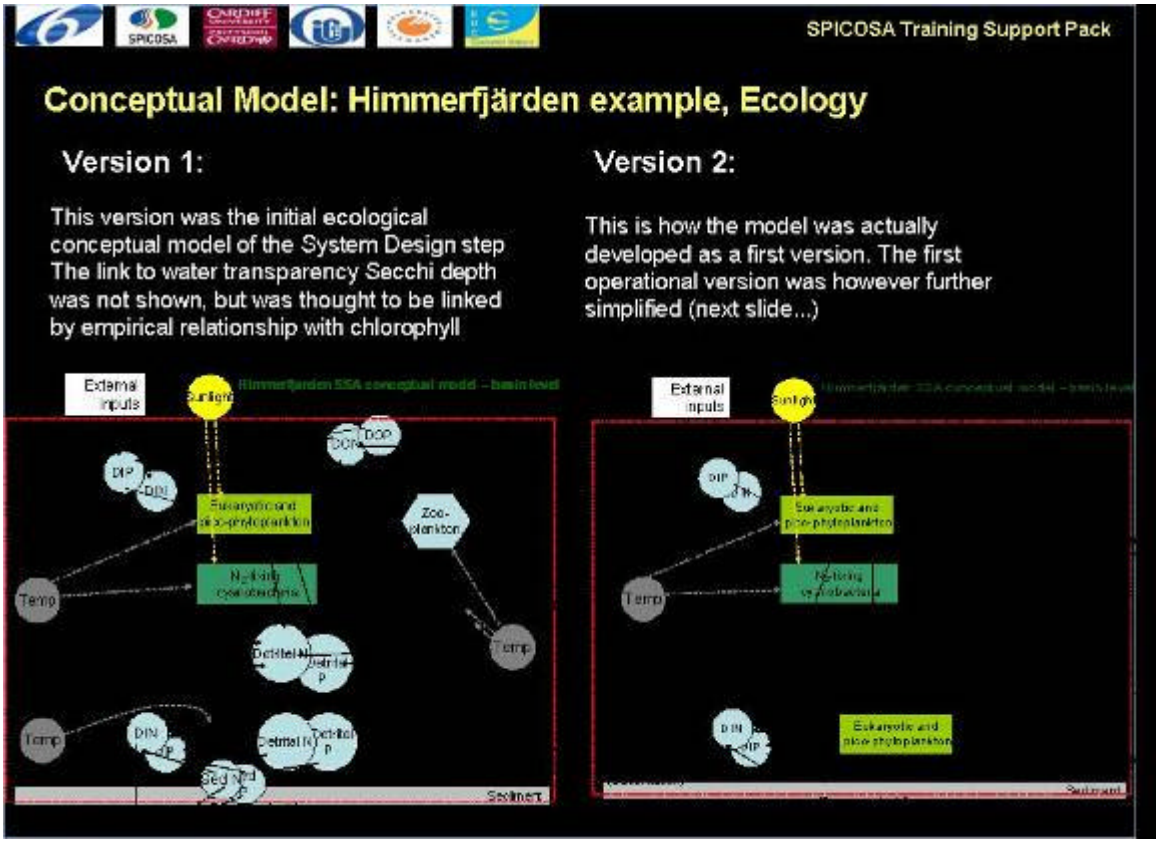
Conceptual Model: Himmerfjärden example, water exchange

The water exchange conceptual model for the three sub-basins was first divided into only two depth layers, but was later developed into a three-layer model. This gave a more realistic model reflecting the actual sill depths between the basins. Still, of course, it is a simplification of the real world.



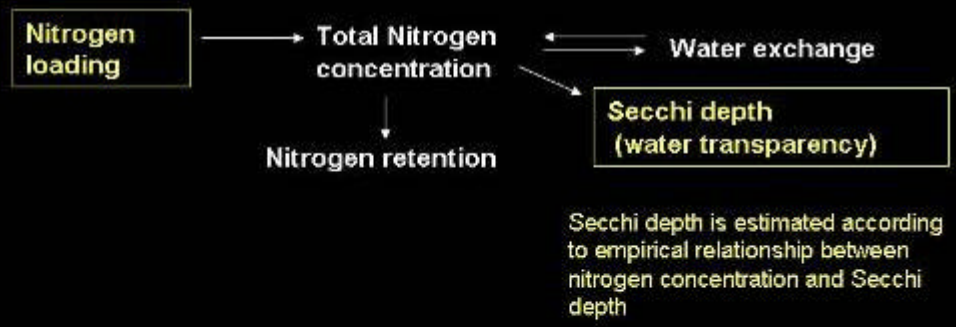


The numerical water-exchange mocel is heavily data-dependent. Salinity data is used to calculate flows according to mass-balance.


SPICOSA Training Support Pack
Conceptual Model: Himmerfjärden example, Ecology
Version 1:
This version was the initial ecological conceptual model of the System Design step The link to water transparency Secchi depth was not shown, but was thought to be linked by empirical relationship with chlorophyll
Version 2:
This is how the model was actually developed as a first version. The first operational version was however further simplified (next slide...)
External inputs
Sunlight
DOP
DIP
DIN
Zoo-plankton
Temp
Detritus P
Detritus N
Sediment
External inputs
Sunlight
DIP
DIN
Temp
Eukaryotic and pico-phytoplankton
Sediment

Conceptual

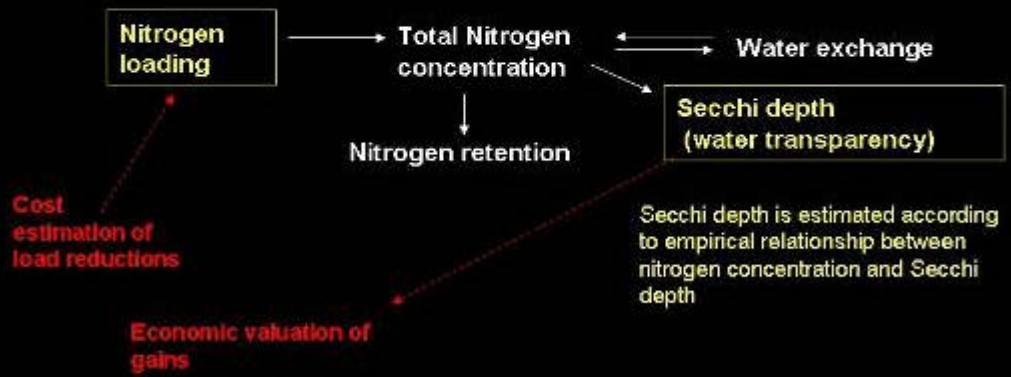
Model version3:



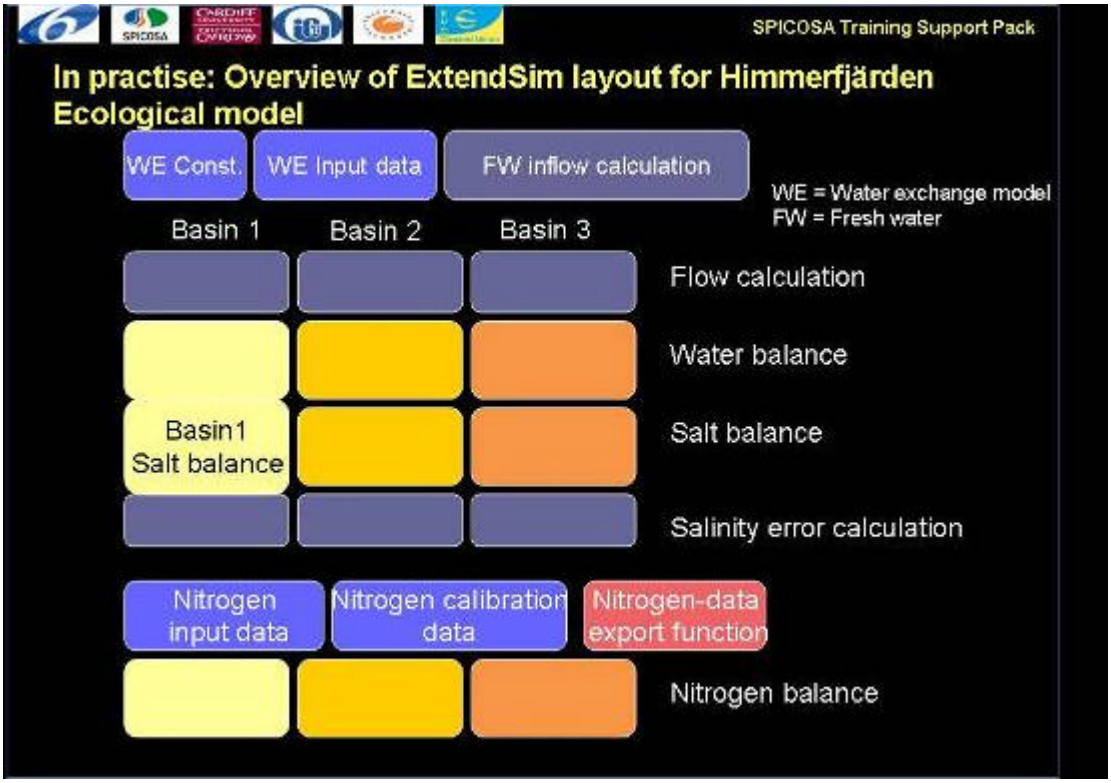
Secchi depth is estimated according to empirical relationship between nitrogen concentration and Secchi depth

Conceptual

Model version3: with main links to socioeconomic model shown



Secchi depth is estimated according to empirical relationship between nitrogen concentration and Secchi depth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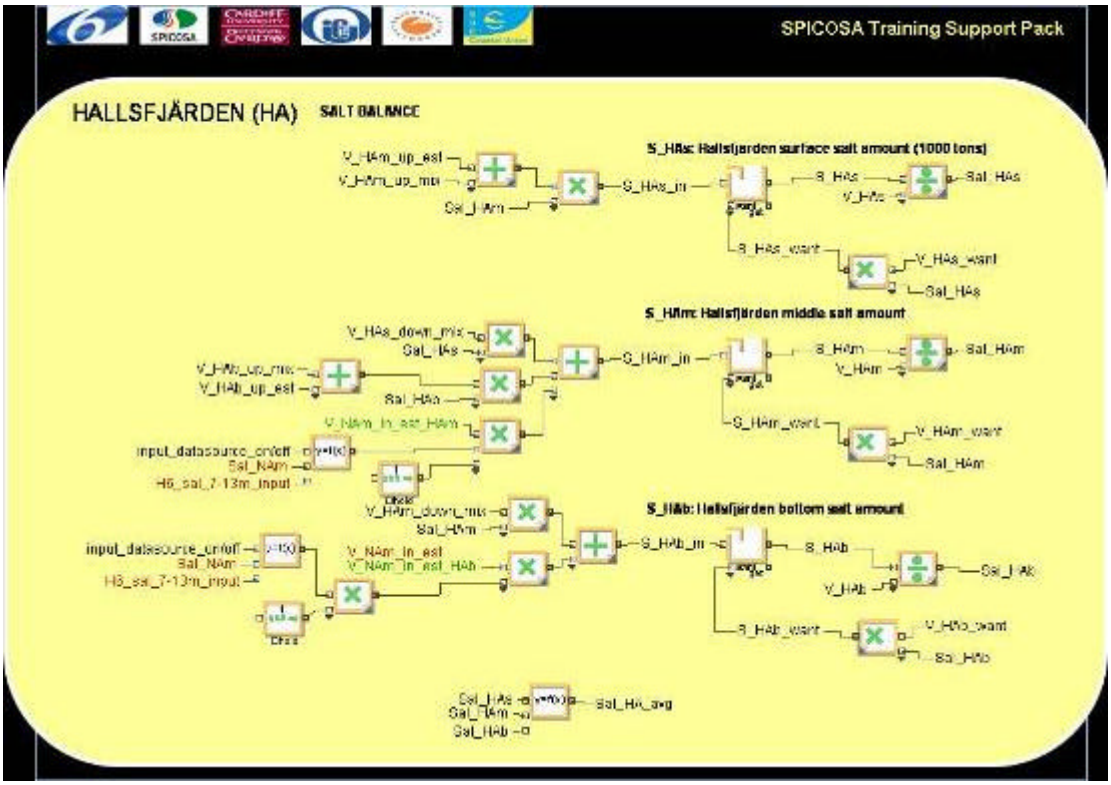
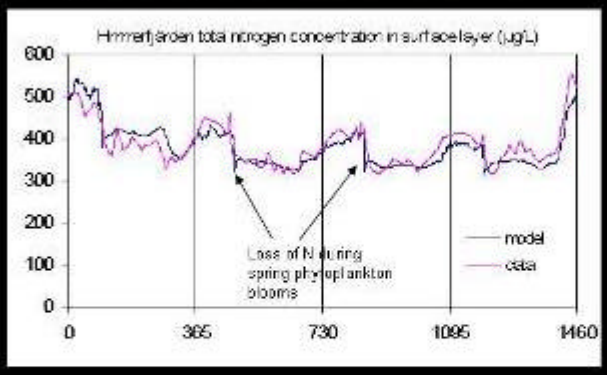
In practise: Overview of ExtendSim layout for Himmerfjärden Ecological model
WE Const.
WE Input data
FW inflow calculation
WE = Water exchange model
FW = Fresh water
Basin 1
Basin 2
Basin 3
Flow calculation
Water balance
Basin1 Salt balance
Salt balance
Salinity error calculation
Nitrogen input data
Nitrogen calibration data
Nitrogen-data export function
Nitrogen balance


SPICOSA Training Support Pack
HALLSFJÄRDEN (HA)
SALT BALANCE

Hindcast (validation) results: **Himmerfjärden example**



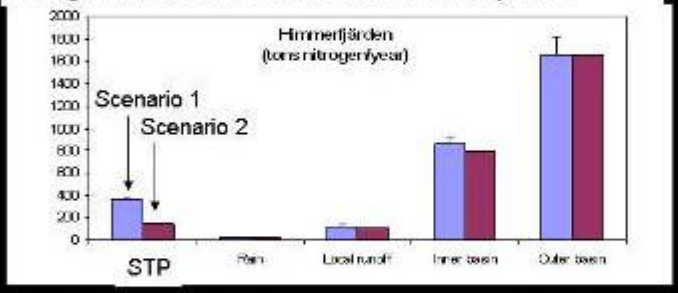
Variations in boundary conditions, nitrogen input and water exchange explain most of the variations in total nitrogen concentration.
The biology added is a loss of nitrogen during the spring bloom, seen as a sudden drop in modeled nitrogen concentration (blue line) in spring.

This model serves mainly one purpose: to calculate total nitrogen concentrations and from these the water transpareny (Secchi depth)

Results of two scenario runs in the preliminary version of the water-exchange/ecological model

1. Reference scenario: 10 mg nitrogen per liter from sewage treatment plant (STP)
2. Improved sewage treatment scenario: 4 mg N/ L from STP

Nitrogen loads to the model basin Himmerfjärden



Nitrogen load → **Total nitrogen concentration** → **Secchi depth** → **To Socio-economic model**

Load from STP reduced from 10 mg/l to 4 mg/l

Total nitrogen reduced from 390 to 320 µg/l in Himmerfjärden, the largest basin

Secchi depth increased from 2.8 to 3.5m

The model will have to be developed according to the Conceptual model version 2 (or some other idea with a simpler model) to answer questions about nitrogen fixing cyanobacteria and chlorophyll concentrations

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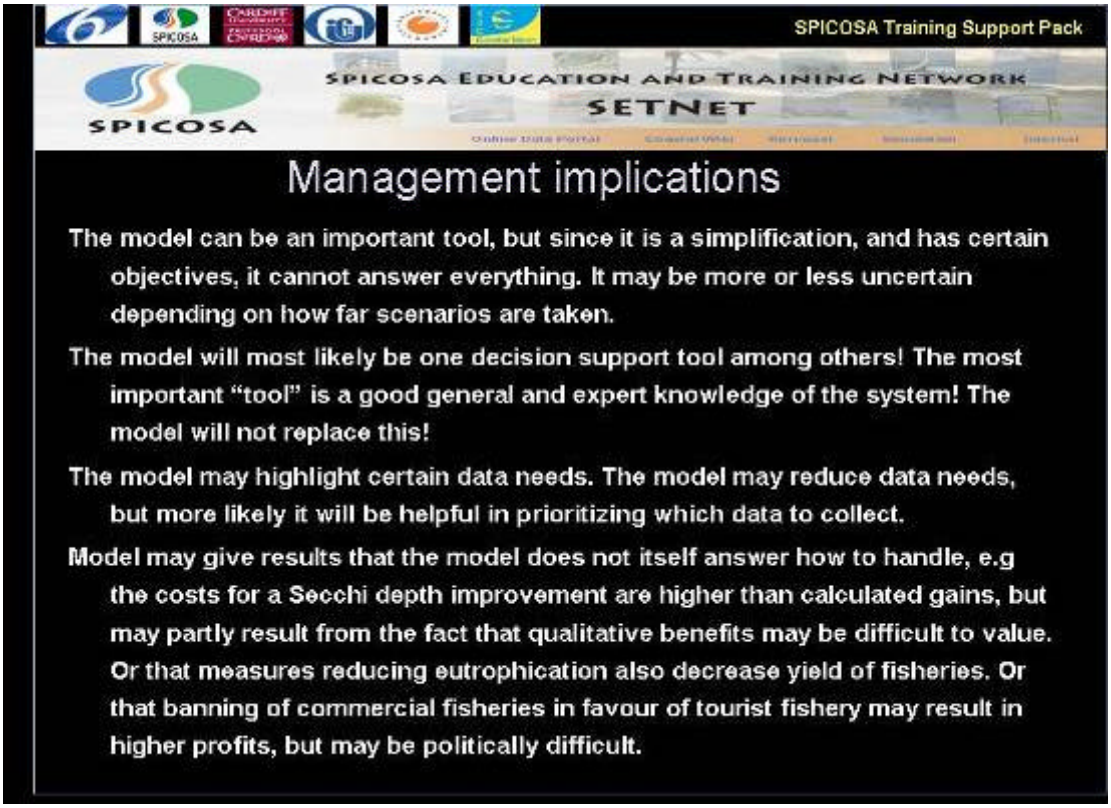
Numerical modelling: Lessons learnt

- **Start simple: construct "Ball-park model" that works (is possible to run) and that is successively developed to a more advanced stage with tests at each stage**
- **Save new versions, and document the changes (at least briefly)**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Management implications
The model can be an important tool, but since it is a simplification, and has certain objectives, it cannot answer everything. It may be more or less uncertain depending on how far scenarios are taken.
The model will most likely be one decision support tool among others! The most important "tool" is a good general and expert knowledge of the system! The model will not replace this!
The model may highlight certain data needs. The model may reduce data needs, but more likely it will be helpful in prioritizing which data to collect.
Model may give results that the model does not itself answer how to handle, e.g the costs for a Secchi depth improvement are higher than calculated gains, but may partly result from the fact that qualitative benefits may be difficult to value. Or that measures reducing eutrophication also decrease yield of fisheries. Or that banning of commercial fisheries in favour of tourist fishery may result in higher profits, but may be politically difficult.

D.2 Economic Systems, Johanna D'Hernoncourt, ULB

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Why include an economic dimension?

- "To ensure environmental decision making is sustainable, efficient and equitable it is essential that all social, economic and environmental impacts of a development, both short and long term are identified and measured" (Beaumont et al. 2007)

⇒ Economics = one of the three pillars of sustainability

- Systems approach particularly adapted to highlight sustainability issues
- Models provide a common language for sustainable management

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How to include an economic dimension?
1. Describe how actors benefit from the ecosystem to get a first picture
➢ Ecosystem services approach (Millenium Ecosystem Assessment):
Provisioning services
Regulating services
Cultural services
Supporting services
➢ Typology of uses of environmental economics approach
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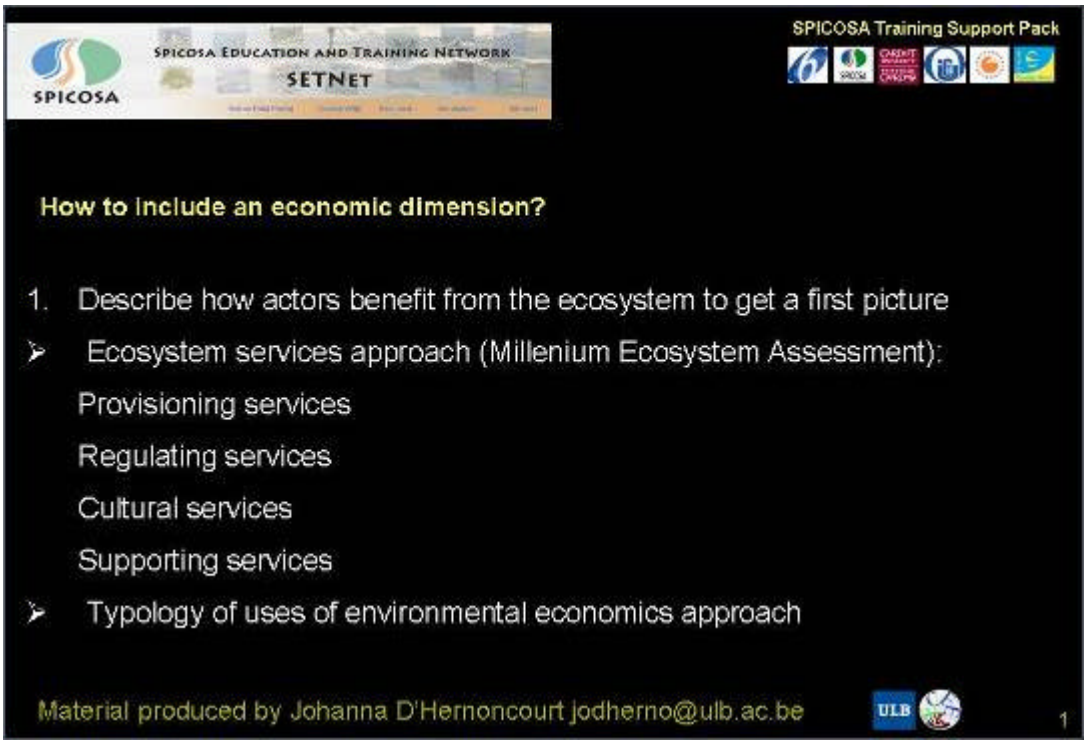
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How to include an economic dimension?

2. Translate the interaction actors – ecosystem into an economic issue for the coastal zone using simple wording

   to re-focus on the relationships and processes that will need to be included in the conceptual model

   - Fishermen *extract* fish from natural stocks
   - Farmers *pump water* for irrigation
   - Tourists and local habitants *consume water*
   - Environmentalists are keen to *protect* the ecosystem

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How to include an economic dimension?

3. Chose an adapted economic assessment tool

- Depends on the policy issue, connected economic issue and its scale
  - on the concerns of the stakeholders
  - on the scenarios and policy options to explore
- Cost-benefit analysis and cost effectiveness analysis
- Economic valuation methods
- Input-Output analysis
- Financial analysis

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Economic assessment tools and SPICOSA SSAs illustrations

Cost-benefit analysis

- Identify and measure costs and benefits related to a project or policy
- Costs and benefits in monetary terms => valuation methods
- To determine whether it will produce a gain or a loss in economic welfare for society

Cost effectiveness analysis

- To find out how predetermined targets can be achieved at least cost

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Economic assessment tools and SPICOSA SSAs illustrations

Cost-benefit and cost effectiveness analysis in Himmerfjärden SSA (SWE)

- Tool to assess policy options to mitigate eutrophication
- Costs of technical options (WWTP, sewers, pipe, wetland creation)
- Benefits of increased water clarity (recreational visits to Himmerfjärden)
- Management tool that helps stakeholders explore scenarios for improved water quality

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Economic assessment tools and SPICOSA SSAs illustrations

Financial analysis

- "Private" cost-benefit analysis
- To explain production decisions of a firm (investment, future production)
- To help determine if an activity is profitable or not
- Tool adapted to system dynamics: production decision once a year

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Economic assessment tools and SPICOSA SSAs illustrations

Financial analysis in Thermaikos Gulf (GRC)

- Tool to achieve a sustainable management option for mussel culture
- Labour cost, maintenance costs, depreciation costs
- Production depends on farm characteristics: number of lines, bunches + productivity linked with the environmental dimension

- Variations of profitability to different management options to regulate farming activities

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Economic assessment tools and SPICOSA SSAs illustrations

Input-Output analysis

- Input Output Table = an economic map which traces how any expenditure works its way through the economy
- Direct expenditure has indirect and induced economic impacts (= downstream impacts) in terms of jobs and expenditure
- Matrix calculation to derive "multipliers"
- To assess local or regional economic benefits from an economic activity and distributional impacts

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Economic assessment tools and SPICOSA SSAs illustrations

Input-Output analysis in Sondeledfjord (NOR)

- Tourism development while minimizing impacts on cod stock and minimizing conflicts with locals
- Local economic benefits from tourism
  = Number of tourists*Average spending by visitor*Multiplier
- Tool to highlight the connections between factors and trade-offs between objectives

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Conclusions

- Good results in terms of economic analysis and assessment
- Estimates and assumptions raise uncertainties but…
- … purpose of Systems Approach to simplify reality and find key-indicators to describe it
- Highlight the integration between dimensions
- Important to design tools that answer stakeholders needs

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Thank you for your attention!

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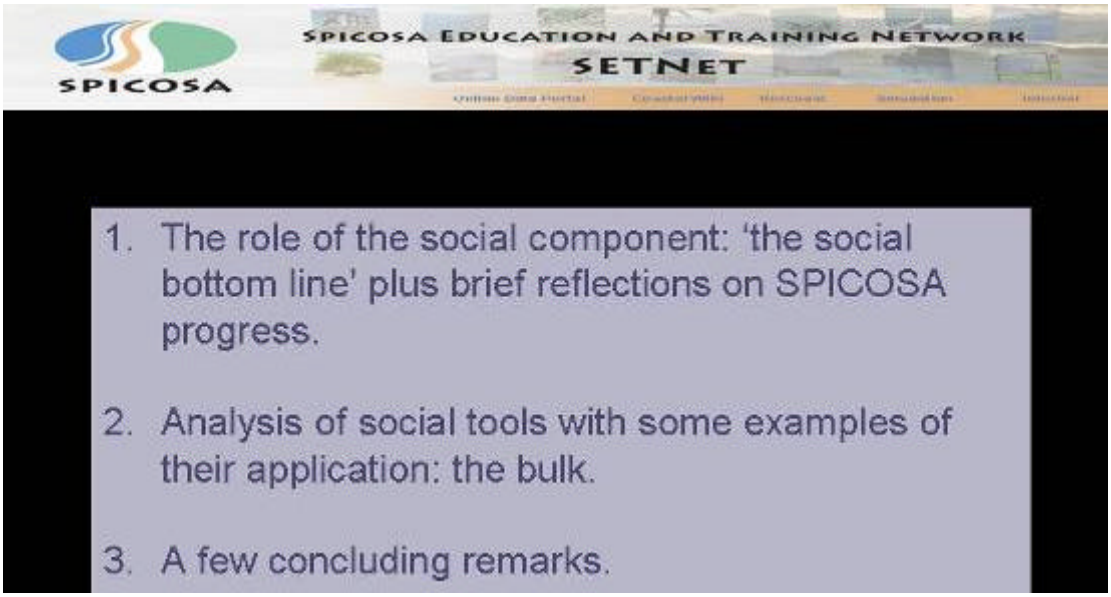
D.3 Social Systems, Loraine McFadden, FHRC



•ICZM
•Science and policy integration

The social bottom line

1) ICZM is primarily a social process

A social process describes a series of interrelated social changes:

•in patterns of thought and behaviour in society over time

•in the way society is organised including rules and regulations

•in the relationships among individuals, groups, organization, cultures and societies

•of behaviour patterns, social relationships, institutions and social structure over time

ICZM community of scientists, practitioners, professionals, other stakeholders who can interact with the system.

Management is always about managing and steering each other: not steering algae or any other component of the biological or ecological world.

•ICZM
•Science and policy integration

The social bottom line

2) Social science: the critical enabling role: promoting learning

By applying knowledge on structuring our thinking and investigation into social behaviour, we can move towards a better understanding of the linkages of the ecological-social-economic (ESE) system and better integration of the sciences within the continued developmental process of SAF protocol.

Social System: continually changing patterns of behaviour and relationship

Roles are recognised by the participants,
Expectations of behaviour in a role are the social norms
Values are the standards by which behaviour in a role is judged

Embodied in a society's laws, institutions, and government as well as informal structures

- ICZM
- Science and policy integration

The social bottom line

Examples of what we must do better……

Building some understanding of social processes within the SSA – the dynamics of the society - one area that could be substantially strengthened across the study areas.

Systems thinking is all about dynamic systems: it is important that our analysis of each part of the system focuses on interrelated change within that system.

A key message is that all society reality is pure dynamics. We need to be better at facilitating this idea within science-policy research and its application

- ICZM
- Science and policy integration

The social bottom line

- The importance of focusing more on complexity as key in social as well as physical systems
- The importance of moving away from linearity in terms of causality

What lessons learnt can be reflected on from positive experiences from within the project?

- Learning from stakeholders (data and knowledge of relationships) can interface with the scientific process to develop new methods and models for understanding and managing environmental problems.

- Interdisciplinary research can initially be a slow process and caution needs to be exercised that the validity of each of the scientific approaches is maintained. However, doing this at the beginning of the process can significantly increase efficiency as the process proceeds.

Methodology and data inputs

1. Multi-stakeholder dialogue/Stakeholder engagement
2. DST- Deliberation Support Tool
3. Conceptual mapping
4. Institutional mapping
5. CATWOE (soft systems modelling)

Examples from within the recently completed SAF step (appraisal):

- Social components within the simulation models
- Social processes outside of the simulation model

Multi-stakeholder dialogue/ Stakeholder engagement

Central to the success of the SAF process

Understanding social relationships, social structures etc and how these might change. Theory of Communicative Rationality (Habermasian).

Stakeholders as actors

Why is multi-stakeholder dialogue so important within the SAF?

- Increasing knowledge about the coastal zone
- Constantly negotiate and challenge each others views and perceptions
- Transparency, legitimacy and efficiency within the SAF process
- Conflict negotiation and consensus building

A word of warning……there is a danger in romanticising stakeholder engagement – procedural equity.

Multi-stakeholder dialogue/ Stakeholder engagement

Three overarching rationales for engaging stakeholders (Stirling, 2006)

Rationale	
Normative	considerations of democratic principle – as an end in and of itself
Summative	increasing the breadth and depth of information – mechanism to gather more diverse, extensive and context-specific knowledge - fostering social learning
Instrumental	sustaining or restoring trust in the process and decisions – raising awareness of the issues

Multi-stakeholder dialogue/ Stakeholder engagement

Mechanisms for stakeholder engagement

Examples: a number of different types of groups used within SPICOSA including

- Existing ICZM forums
- New stakeholder forums
- Expert group and secondary user group
- One to one engagement

Interviews, focus groups, participatory workshops and discussion forums

Multi-stakeholder dialogue/ Stakeholder engagement

Throughout the SAF…..some examples

Stage of the SAF	Role of stakeholder engagement	Key Advantages/Value
Design Step	•Selecting Policy Issue •Development of Inst. Mapping and Conceptual Modelling	•Selecting a relevant PI •Process legitimacy •Greater knowledge and understanding of CZ processes
Formulation Step	•Selecting indicators •Validation of quantitative data •Providing additional social data	•Best representation of system – based on s'holder priority indicators •Increased confidence in the data •Additional data – e.g. Survey/Interview
Appraisal Step	•Constructing scenarios which are as robust as possible within the social and institutional framework	•Increased efficiency later on in process as problems/expectations established •Critical to achieving 'meaningful strong science'
Output Step	•Broad discussion of results/implications •Decision-making on management options	•Wide feedback on research results •Process legitimacy •Policy utilisation of research outputs

DST – Deliberation Support Tool

Information Communication (IC) Tool fulfil not only substantive functions, but can also contribute to social interaction and may make uncertainties of expert knowledge more explicit

Positive elements of employing the DST

- Provides a framework for and focuses deliberative efforts.
- Filters the complexity of the deliberative processes
- Provides a mechanism for making explicit the positions, opinions and agendas of different stakeholders - thereby providing the opportunity for tensions and conflicts to be observed and potentially resolved.
- Provides a starting point for discussions and knowledge exchange
- Can be used both independently and then ideas brought together as a group.

WP6 to follow

Conceptual mapping

The purpose of conceptual models is to generate high quality discussion and discover or create new of more useful insights in the behaviour of the system.

Are conceptual models constrained to only be 'first hazy sketches' of possible mechanistic cause-effect links?

Don't be afraid to make and use conceptual maps even if you don't have all the data!

Conceptual mapping

Conceptual model building as a critical learning process

First,
challenge our existing perceptions and the limits of our knowledge by exploring the range of behaviour and organisation within the system: emergent behaviour, feedback loops and non-linearity.

Second,
not so easy a thought to absorb, as it moves away from the idea of a 'model' being some representation of some part of the (real) world.

Within social systems, with its focus on human action or social change, conceptual models are an intellectual devise whose role is to help us structure how we explore 'solving' the policy issues/problem situations.

In relation to human activities, there are many different ways to interpret a problem situation – different conceptual models to be built

Conceptual mapping

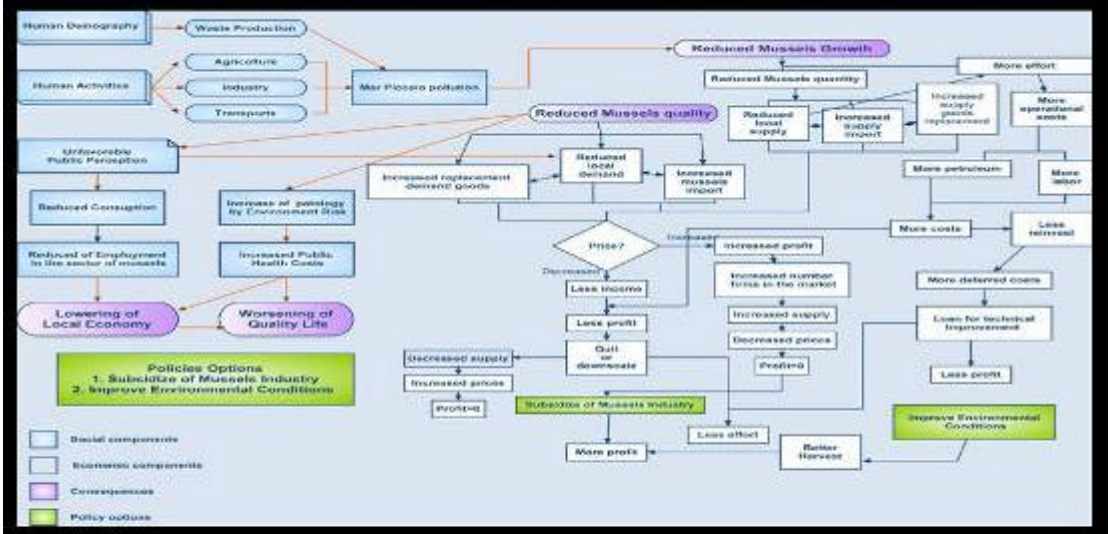
A conceptual model of human activities related to a policy issue can be used to structure a debate within a stakeholder group about possible change in human activities

(e.g. for the current SPICOSA process, the context of WP6 deliberation forum: although this could be initiated much earlier in SAF process).

This can be initiated by putting on a chart a series of questions derived from the model. The questions should not only focus on the nature of the management options but what needs to be done in human activities, policy and legislation to enable that change to occur.

When these questions are answered from the different perspectives of those stakeholders in the situation – science-policy deliberation moves towards teasing out the complexities of 'reality' and options for feasible and desirable change.

Conceptual mapping



Questions focused on what needs to be done to enable management options:

- What combination of structural, process and attitudinal change is required?
- What enabling action is required?
- Who will take these actions?

CATWOE

Core of CATWOE is the worldview, the perspective, which makes it meaningful to the people concerned.

This is based on the fact that different perceptions of, and around, any policy issue will likely exist within a stakeholder group and across SSA scientists. Hence, for any human activity, there is very rarely only one worldview – but in fact there is a series of sub-systems of human actions and relationships.

Himmerfjorden

Eutrophication (**Issue**)

Conventional Agriculture	Biodynamic Agriculture	Sewerage Treatment	Private Sewers
Is important For the Landscape And for Employment: Biodynamic is Too expensive	is better for the environment and human health: it is worth the cost		

Four different perspectives: four subsystems of stakeholders and actions.

CATWOE

It worth referring this framework as it can:

1.help provide an understanding of the human actions relevant to the policy issue
2.aid toward ensuring that thinking being done regarding human activities is in a systems framework
3.also help differentiate those stakeholders are sources of information for the systems approach and those who directly interact with the system.

Wider system (why) CAP	Landowners, government
System (what)	Agricultural production
Sub-system (how)	Conventional agriculture activities Bio-dynamic agriculture Sewerage Treatment Recreation/private housing effluent

Institutional mapping

Institutional mapping is a tool used to explore the governance structure within a study area. Institutions are clusters of rights, rules and decision-making procedures.

Governance is a:

- process that brings together actors
- from the public and the private sphere
- to steer(parts of) societies
- by a variety of mechanisms
- that include institutions, but also, e.g., partnerships, networks, belief systems, etc.

(Biermann, 2009)

Governance covers a wider area of phenomena that are crucial for understanding steering systems in the field of human dimensions, which are not completely addressed through the notion of institutions.

Institutional mapping

Why is institutional mapping important within the SAF?

- Identifies the **functional, power** relationships and inter-linkages between institutions and organisations.

- Provides insight into institutional and governance structures for integrated coastal zone management.

- If the process is carried out with the participation of stakeholders, the procedure can also be essential for building legitimacy and policy ownership.

- It may also may provide important information about the viewpoints of stakeholders

- It can contribute to increasing understanding of what are 'just' relationships between individuals and between individuals and organisation.

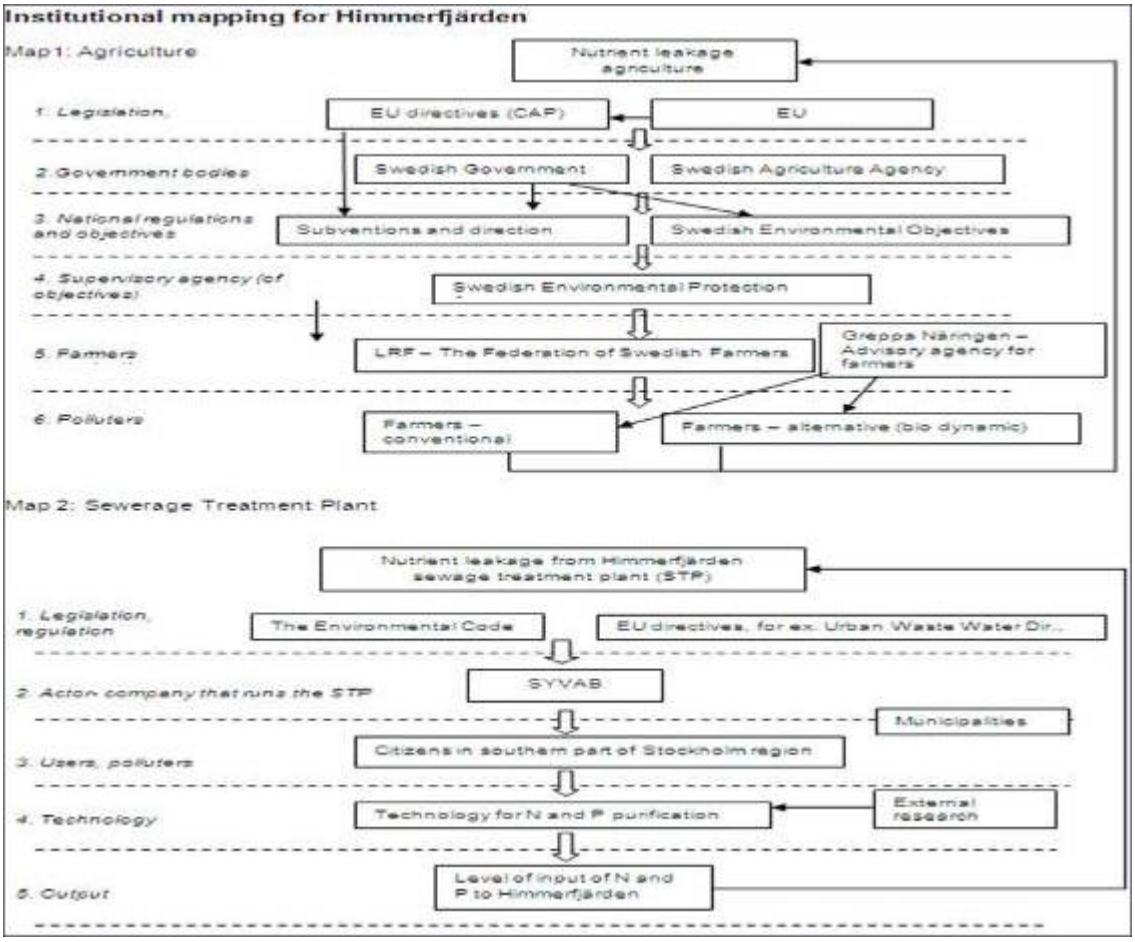
Institutional mapping

Approach to institutional mapping and analysis	Number of SSAs
No institutional map developed: a basic statement of national/regional governance	Two study sites
A list of management plans, institutions, and regulations presented not in the form of a map so little attempt at defining relationships Critically, no functional connections and no discussion of roles and responsibilities	One study site
A map of local-regional-national organisations was developed usually accompanied a list of regulations. The maps were developed on basis of different geographic scales but no real functionality as no discussions on roles and responsibilities	Six study sites
A list of management plans, institutions, regulations with no map However, there was some discussion of legal responsibilities and basic roles. This gave some overview of functionality.	Four study sites
An institutional map which included some functionality, responsibilities and rules in use	Four study sites

Institutional mapping

The challenge for the study sites was recognising the centrality of focusing on purpose and including relationships between the institutions and rules identified.

An institutional map will not emerge until the power relationships – in SPICOSA terms cause-and-effect relationships - among organisation and institutions begin to be explored.



Institutional mapping

Case-study Himmerfjärden

A number of characteristics of the institutional can be highlighted as important to the SAF process:

- Different institutional maps have been developed for each of the key human activities which link to the policy issue i.e. three different maps.
- Key formal rules, the legislative and regulatory environment relative to the policy issue have been identified.
- Geographic scales have been implicitly identified within the institutional maps.
- The institutional map identifies functional boundaries, those which relate to the responsibilities given to various organisations and agencies in the law

Some further issues that could be explored:

- Some identification of how the different action spaces currently interact
- It is useful to distinguish between formal rules which are mandatory and non-mandatory regulations.
- Institutional history could be important and this should be explained where it is believed to be relevant.
- Can the most important scales and their relative power be identified?
- The informal rules can be identified and added to the institutional map.

Institutional mapping throughout the SAF……some examples

Stage of the SAF	Role of Instructional mapping	An example of an advantages/value
Design Step	•Provides the basis for understanding the roles, functional relationships and powers within the social system • Linking with DPSIR	•Where pressures, forcing or impacts occur at a discrete place in the system – there will most likely be a series of formal and informal rules which guide what can and cannot be done at these interfaces
Formulation Step	•Assists in identifying functional relationships between organisations •Frames all of the legal responsibilities/requirements	•Can provide a link with extend modelling e.g. thresholds based on legal limits •Contribute to identifying appropriate indicators – reflection on what is 'success' criteria
Appraisal Step	•Identification and selection of scenarios and management options that are feasible within the existing institutional context	•Increased efficiency later on in process as infeasible scenarios are discounted early
Output Step	•Understanding the responsibilities of the stakeholders plus the power relationships between them	•Better appreciate the constraints and opportunities for management •Differences can be concealed which are important in the political process of policy-making

Social components inside and outside the simulation models

Some existing SSA examples of social components from within the Appraisal Step:

1.A quantified 'participation function' in the Extend model (farmers willingness to create new wetlands).

2.A series of simple rules in the Extend model simulating the behaviour of fishermen, based entirely on knowledge of local fishing behaviour – this was gained from interviews with representatives of the fishing community

3.A proposed 'conflict level' parameter within the Extend model.

4.Surveys and questionnaires to support the analysis of stakeholder preferences and willingness to pay

5.Governance-related switches in the Extend model, based on existing legalisation and policy frameworks

Inside the simulation model

6.Governance-based (legislation and policy) scenarios e.g. Based on changes in licensing, certification, plans and policies such as WFD

7.Interviews and focus groups with stakeholders to explore different scenario options – are the scenario options feasible and desirable?

8.Broad mapping of the social landscape to produce regional variations on scenarios

Outside the simulation model

Social components inside and outside the simulation models

Social components within the simulation model

- Many are linked exclusively to economic components within a joint socio-economic scenario
- Or linked to secchi depth
- Willingness-to-pay appears to be a key variable for including social elements

Key constraints as identified by the SSAs:

- ' we need more quantitative approaches for social component'

However some SSAs have used quantitative approaches!

- Survey data collection
- Questionnaires

Statistical and mathematic approaches: not provided guidelines on – emphasis on contribution of social science to deliberation and learning.

Social components inside and outside the simulation models

Key constraints as identified by the SSAs:

- 'we need more existing social data'

Sources of indicators and data:

- EURODATA Research Archive
- Flash Eurobarometers
- CESSDA Data Portal
- British library catalogue: social science electronic resources
- ESDS International
- EU Indicator set

The availability of data – either not being available, only available at regional or country scale.

•Seeking local sources of data
•Collecting your own

Social components inside and outside the simulation models

Social components outside the simulation model

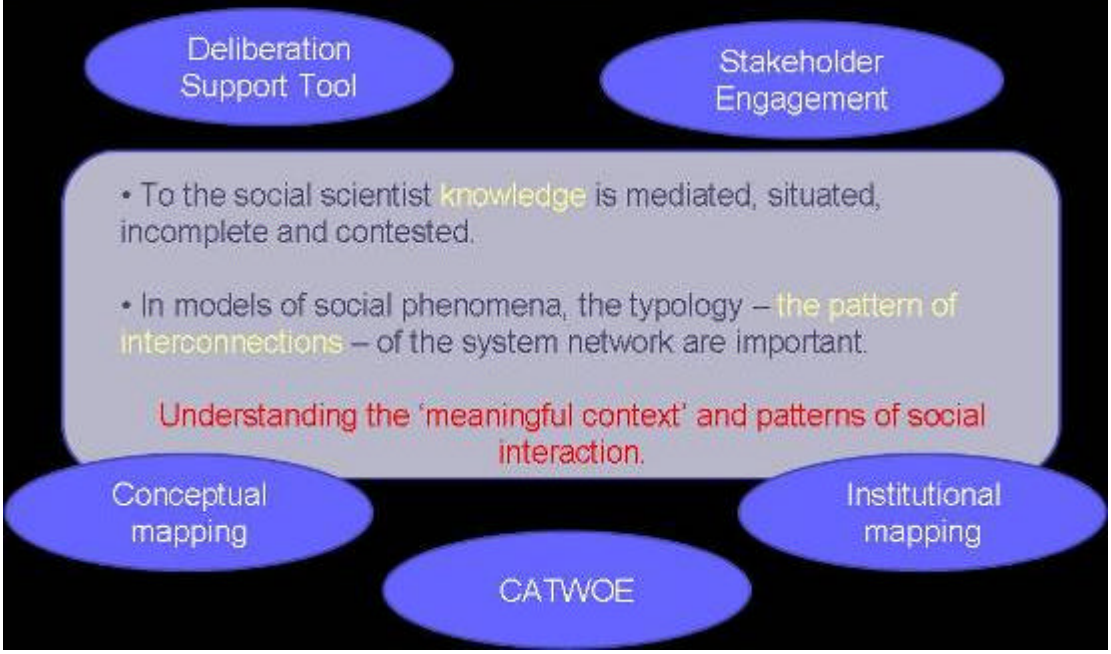
Links very closely with WP6…..Audun will pick this discussion up in some detail.

Revisiting the first two ideas I introduced at the beginning of the presentation:

1)ICZM is primarily a social process. A social process describes a series of interrelated social changes.

2)The critical enabling role: applying knowledge on structuring our thinking and investigation into social behaviour to better integrate the sciences and science-policy.

Social components inside and outside the simulation models



Concluding remarks

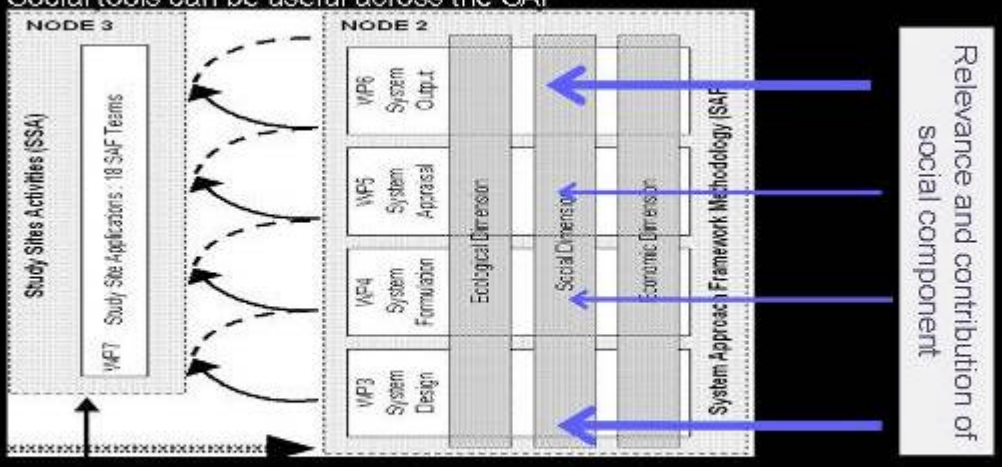
- All SSAs don't have to do use all of the suggested tools
- SSAs should use other social tools or methodology to further support the social component i.e. we've highlighted useful tools but don't claim to be comprehensive
- The social components in the SAF do have added value which combined: they do have overlaps.

Examples of links between the social elements and tools

- Stakeholder and issue mapping and institutional mapping
- CATWOE and stakeholder mapping
- DPSIR and institutional mapping
- Indicators and institutional mapping
- Deliberative forum and stakeholder mapping
- Conceptual mapping and deliberation forum

Concluding remarks

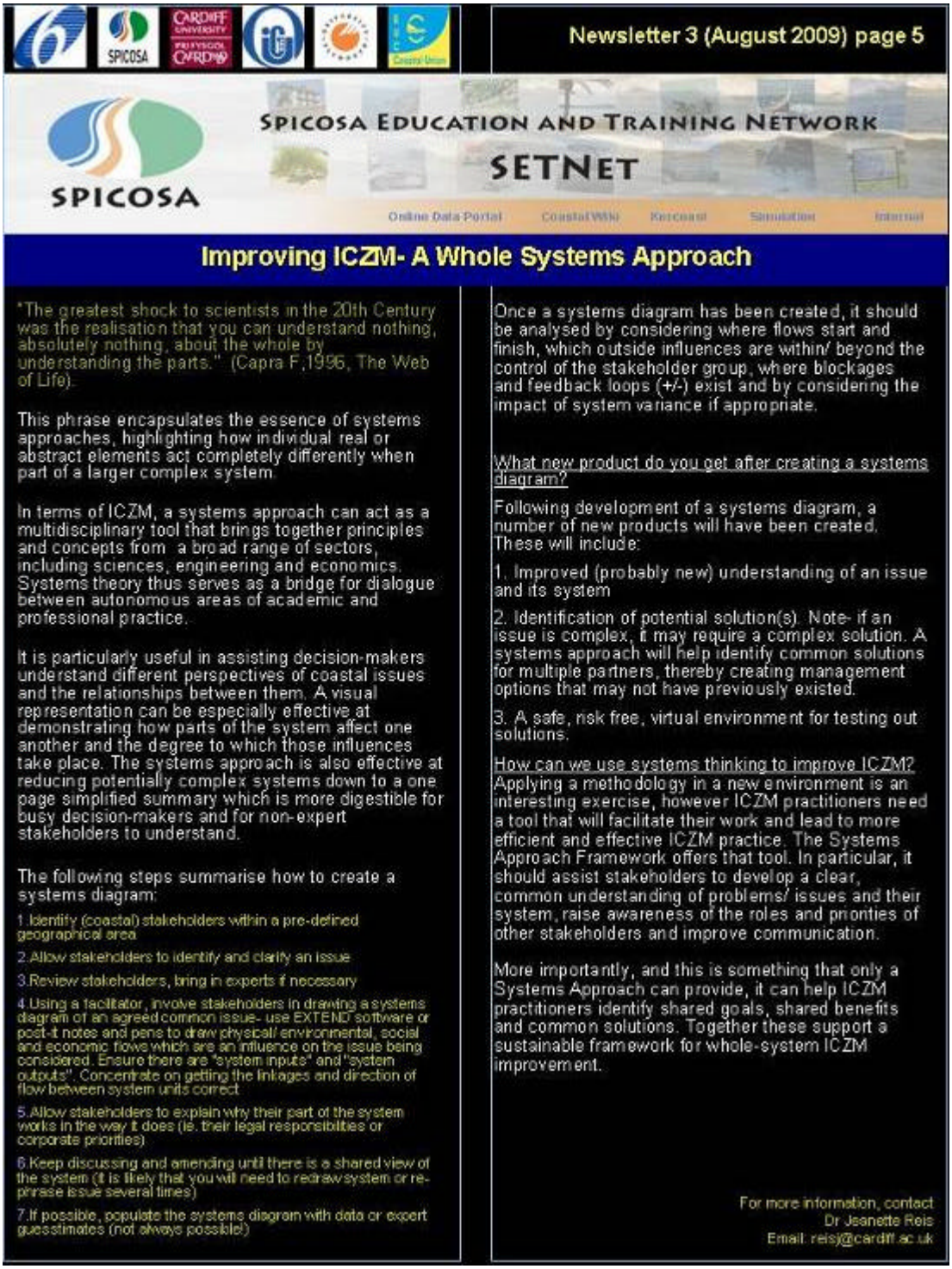
Social tools can be useful across the SAF



With only one and a half iteration of the SAF we need to face the difficulties of modelling interrelations (ESE) head on.

What can we do now to improve the interfaces!

Appendix E. SETNET Article



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SPICOSA EDUCATION AND TRAINING NETWORK

SETNET

SPICOSA

Online Data Portal | CoastalWiki | Forecast | Simulation | Internet

Improving ICZM- A Whole Systems Approach

"The greatest shock to scientists in the 20th Century was the realisation that you can understand nothing, absolutely nothing, about the whole by understanding the parts." (Capra F,1996, The Web of Life).

This phrase encapsulates the essence of systems approaches, highlighting how individual real or abstract elements act completely differently when part of a larger complex system.

In terms of ICZM, a systems approach can act as a multidisciplinary tool that brings together principles and concepts from a broad range of sectors, including sciences, engineering and economics. Systems theory thus serves as a bridge for dialogue between autonomous areas of academic and professional practice.

It is particularly useful in assisting decision-makers understand different perspectives of coastal issues and the relationships between them. A visual representation can be especially effective at demonstrating how parts of the system affect one another and the degree to which those influences take place. The systems approach is also effective at reducing potentially complex systems down to a one page simplified summary which is more digestible for busy decision-makers and for non-expert stakeholders to understand.

The following steps summarise how to create a systems diagram:

1.Identify (coastal) stakeholders within a pre-defined geographical area

2.Allow stakeholders to identify and clarify an issue

3.Review stakeholders, bring in experts if necessary

4.Using a facilitator, involve stakeholders in drawing a systems diagram of an agreed common issue- use EXTEND software or post-it notes and pens to draw physical/ environmental, social and economic flows which are an influence on the issue being considered. Ensure there are "system inputs" and "system outputs". Concentrate on getting the linkages and direction of flow between system units correct

5.Allow stakeholders to explain why their part of the system works in the way it does (ie. their legal responsibilities or corporate priorities)

6.Keep discussing and amending until there is a shared view of the system (it is likely that you will need to redraw system or re-phrase issue several times)

7.If possible, populate the systems diagram with data or expert guesstimates (not always possible!)

Once a systems diagram has been created, it should be analysed by considering where flows start and finish, which outside influences are within/ beyond the control of the stakeholder group, where blockages and feedback loops (+/-) exist and by considering the impact of system variance if appropriate.

What new product do you get after creating a systems diagram?

Following development of a systems diagram, a number of new products will have been created. These will include:

1. Improved (probably new) understanding of an issue and its system

2. Identification of potential solution(s). Note- if an issue is complex, it may require a complex solution. A systems approach will help identify common solutions for multiple partners, thereby creating management options that may not have previously existed.

3. A safe, risk free, virtual environment for testing out solutions.

How can we use systems thinking to improve ICZM?

Applying a methodology in a new environment is an interesting exercise, however ICZM practitioners need a tool that will facilitate their work and lead to more efficient and effective ICZM practice. The Systems Approach Framework offers that tool. In particular, it should assist stakeholders to develop a clear, common understanding of problems/ issues and their system, raise awareness of the roles and priorities of other stakeholders and improve communication.

More importantly, and this is something that only a Systems Approach can provide, it can help ICZM practitioners identify shared goals, shared benefits and common solutions. Together these support a sustainable framework for whole-system ICZM improvement.

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