**Session T10: Tips and tricks to combine multiple methods to assess ES and their trade-offs**

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**Conclusions of the session T10**

Ecosystems or landscapes provide multiple ecosystems services. Sometimes the simultaneous delivery of several desired/demanded ES is not possible, strongly inhibit each other, or initiate conflict: we talk about “ES trade-offs”. On the other hand, the delivery of some ecosystem services enhance the delivery of other ecosystem services: in that case, we talk about “synergies”. A trade-off can potentially result in a conflict between users, depending on who bears the burden and who benefits from the ES supply (TEEB, 2010; Turkelboom et al., 2017). For decision-making and management purposes, it is therefore important to focus on all relevant ES, as well as to consider the relationships between them (e.g., Kandziora et al., 2013). In this way decisions can support win-win situations or can help to avoid or mitigate conflicts between different stakeholders.

Often trade-offs and synergies are quantified with ecological models or different quantitative statistical methods. These models or tools calculate only one part of the picture. But not all trade-offs are caused by easy-quantifiable biophysical factors. Social, economic and institutional factors are often at least as important to trade-offs. This type of trade-offs will usually be undetected by models and will only surface via social research. To map these trade-offs and factors social research approaches are necessary. Adding social methods to your modelling can clarify conflicting co-uses and power asymmetries. It can also bring different perspectives on the table as scientists, citizens and other stakeholders prioritize different ecosystem services. It makes the models also more appropriate for answering the questions instead of using already existing models and results that are on the shell.

On the other hand, replacing modelling by only participative approaches also entail risks. For example: stakeholders cannot always see the complexity of ecosystems and ignore some invisible ecosystem services e.g. carbon sequestration, air quality purification. Using model results within workshops with stakeholders can give them insights in the more invisible ecosystem services and brings extra information to the discussion.

Both approaches are therefore very complementary. The discussions during the ESP session illustrated that you need to integrate both to create a full picture of the impacts of a project or management decision. To combine the best of both worlds it was suggested to **set up an iterative approach:** Let the stakeholders define the questions, needs, and set the boundary conditions of the models. Run models and feed results into stakeholder consultation processes. Finetune models and communicate results. It was also found very useful to link ecosystem services results to the SDG’s.

**For doing this, social and ecological scientists need to work together, in order to use the right method in the right way.**

**Titles of the presentations**

For titles and abstracts see conference outputs

**Summary of group discussions**

1. **Which interesting results were obtained for practitioners by modelling/biophysical approaches, which could not be found by social research?**

Models can assess complex processes within ecosystems. These complex system approaches are needed to better understand them, and they can make ‘invisible’ ecosystem services (i.e. often overlooked by stakeholders) ‘visible’. They can also highlight (biophysical) trade-offs, leverage points and risks. Different data could be obtained e.g. soil parameters, biodiversity details, risks…

Bringing results of models on the discussion table can bring extra info that was not shared by the stakeholders in the first place. It can help to fuel the discussion with/among stakeholders.

1. **Which interesting results were obtained for practitioners by social research, which could not be found by modelling/biophysical approaches?**

Social research is especially useful for identifying ES needs and wants of stakeholders, prioritize ES, identify trade-offs and conflicts, and finding ways to deal with them. For this purpose, there is often knowledge required from underlying social relationships, such as land ownership, economic linkages between people, power asymmetries, socio-economic impacts of proposed biophysical measures etc…. These aspects are usually not identified and addressed in biophysical models.

1. **TIPS & TRICKS (How did you combine these results? How did you deal with contradictions in results?...)**

**Where to start from?**

* Depends on the research question and the objective.
* If one start with what do the practitioners/users want (needs/question analysis), then the chances are higher that they will also use the results of the research.
* Needs/question analysis to define the boundary conditions of the models.
* Set up projects that include social & natural sciences.

**Iterative process that combine both methods:**

* Co-production of models and/or use an iterative circle, for example:
	1. Consult stakeholders: needs, values, issues, questions, boundary conditions of the models, … -> stakeholders guide the questions for the model
	2. Built models/scenarios based on that, or feed questions into models
	3. Present model results: gives new insights into the discussion
	4. Fuel discussion: consultation and discuss/reflect with stakeholders
	5. Adapt model if necessary
	6. Communicate final results, which include both modelled results + narrative on issues/values (which were not modelled).

Remarks:

* “Try to translate models to the questions stakeholders have, instead of just use what is on the shell: some models do not match the issue at stake”.
* “If the models don’t follow what the stakeholders expect, we adapt the models until they are logical”.
	+ “Feeding results back to local stakeholders is important: This step is often missing due to time constraints in projects”.
* “Important that stakeholders trust in whatever methodologies you use”.
* “More social scientists should be involved in this environmental research, so that their methods are properly applied”.

**How to combine tools/data?**

* Collecting both [quantitative and qualitative data] for a real operational scale, by combining [quantitative and qualitative data] in a decision tree.
* Multi-criteria optimization (Pareto-frontier) + stakeholder interviews for preferences.

**Process design**

* Need for professional/trained facilitators for the participatory process, who take into account power imbalances and can anticipate and handle strategic agendas of certain participants.
* Informal exchange: include a lunch [in the participatory process], this can be culturally important for the stakeholders.

**Advantages of combining methods**

* Different methods show different values. A combination of different methods is needed to have the full picture.
* To get the broad picture you also have to bring all stakeholders together.
* Combining both methods can raise awareness for different perspectives.

**Communication of results**

* Communicate success stories where both stakeholder involvement and models/data were used to change behaviour.
* Communication: using easy to understand language to communicate with participants, keep the maps and models simple and very user friendly.
* There is a link with SDGs:
	+ Using ES to reaching the SDGs
	+ Trade-offs between ES are comparable to trade-offs between SDGs
	+ Municipalities are more familiar with SDGs, than with ES