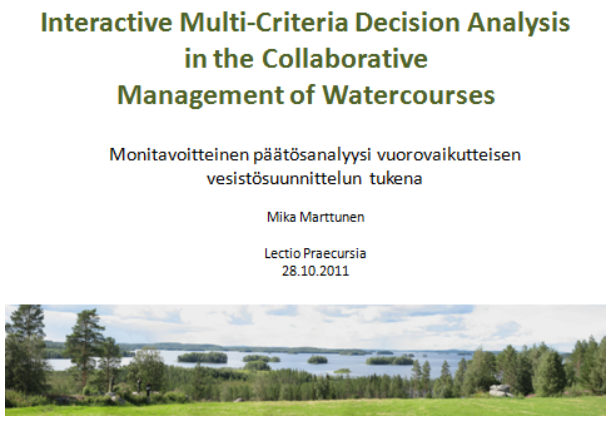
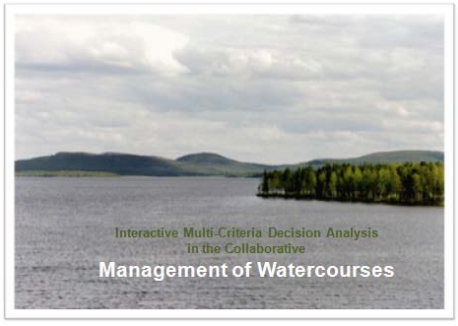
28.10.2011 Mika Marttunen

Lectio praecursoria

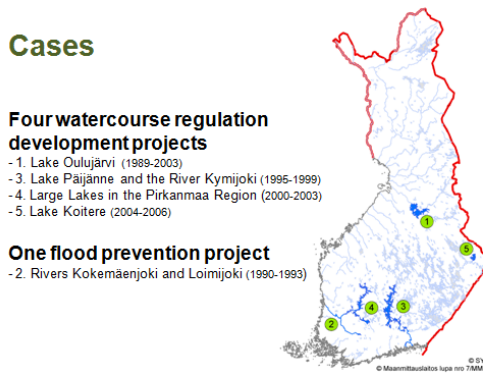


Dr. Custos, Dr. Opponent, ladies and gentlemen.

This doctoral dissertation compresses thousands working days of tens of experts, researchers, scientists, authorities and stakeholders in several organizations and projects.



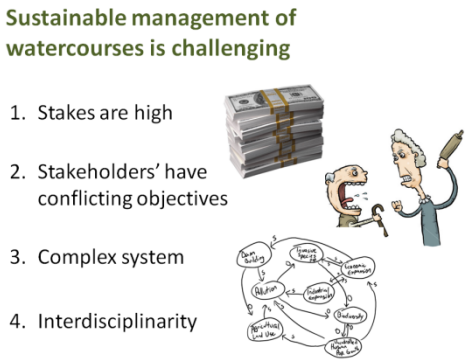
In this lecture I will first explain the terms of the title: **interactive, multi-criteria decision analysis, collaborative and management of watercourses**. After that I will summarize my major findings.



Let's start from the projects which form the material of this thesis. There are five cases, four of them are watercourse regulation projects and one is a flood prevention project. In these projects

more than one hundred meetings and workshops were arranged and a wide spectrum of methods were applied. The central material comes from one hundred and thirty three computer aided personal decision analysis interviews.

Water course regulation projects have significantly altered the status of water courses in Finland. Almost all largest lakes and rivers are regulated. Most of the projects were launched after the Second World War. In the course of time, the use of the watercourses and the values of the society have dramatically changed. As a result, there has been a high political pressure to modify existing regulation practices to better meet the current needs. Tens of development projects have been started and realized during the last twenty years, which is also the period of this work. These projects aimed at balancing economic, ecological and social objectives. However, this has been a challenging task in every case. There are several reasons for that. Next I will present four of them.



First, stakes in the projects are high. The water levels and flows affect tens of thousands peoples' everyday life and recreational use. They have an impact on source of livelihoods, floods and hydro power generation. Thus, the decisions concerning regulation practices really matters in the local, regional and even in national level.

Second, water user groups have different and even conflicting interests and objectives. Finding regulation practices which reconcile them in the different sections of the water course in the different water conditions can be impossible merely because of hydrological reasons.

Third, water course regulation projects and their causal relationships on aquatic ecosystem are ver complex.

and lastly, in order to find technically and economically feasible, ecologically sustainable and socially acceptable solutions co-operation and dialogue between engineers, limnologists, biologists and sociologists is needed. Incorporation of the knowledge of local residents and user groups into the process is also very important.

In finding sustainable management practices mathematical models are invaluable in developing and analyzing alternatives. However, finding an agreement is definitely not a mathematical optimization task but a collective learning and negotiation process. A crucial question is **how to create stakeholder processes which are fair, open, meaningful and efficient?**

Major changes in environmental planning culture and practices have occurred over 20 years period of this work. Today, dialogue between authorities, stakeholders and experts is considered very important and is also one indicator of a high quality planning process. Three of the regulation projects, Päijänne, Pirkanmaa and Koitere were collaborative ones. In these projects stakeholders worked together to identify problems, define objectives, share information, and find opportunities to collectively acceptable regulation policies. The most important forums for stakeholder involvement were steering groups which comprised representatives of several authorities, hydropower companies, non-governmental organizations, fishermen, and recreational users. In the long lasting projects, sustaining participants' interest and activity is a challenging task.

Based on my experiences four general recommendations regarding the design and realization of participatory planning processes can be presented:

How to design fair, open, meaningful and efficient processes?

1. Involve stakeholders early and actively
2. Build trust
3. Focus on values
4. Create a structured learning process

Many decisions guiding the planning and impact assessment are made in the beginning of the process. For instance, what is the problem which has to be solved, who are key stakeholders, how the process should be realized and what kind of alternatives and impacts will be considered? In the case projects the early and active involvement of the stakeholders has had a positive systemic impact on the whole planning process.

I have seen that distrust can feed the conflict and make it very difficult to focus on right issues. Dialogue and social learning become possible only after trust has been built between participants. My experiences suggest that in truly participatory and transparent process, trust between participants will develop in the course of time. Trust towards the project improves if the participants experience that their opinions are appreciated and that they can really affect the process and its outcomes. (8 min)

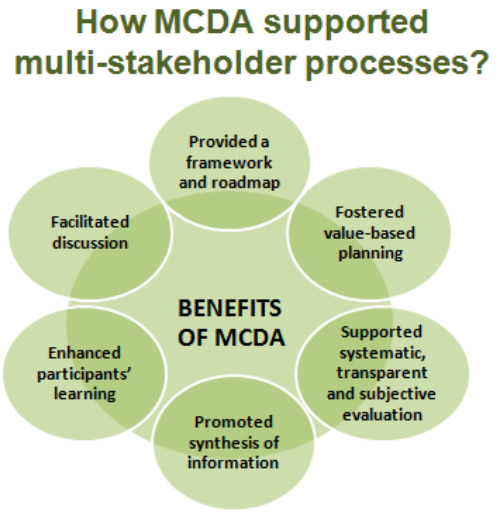
Planning processes often miss out discussion of the participants' objectives and proceed too quickly to evaluation of the alternatives. This easily leads to a deadlock situation where participants try to convince others why the alternative they prefer is the best one. However, alternatives are relevant only because they are means to reach objectives. Therefore, in the beginning of the projects it is important to discuss objectives which each party consider important in the decision situation.

Decisions should not be based on unconsidered opinions but on informed judgments. Mutual learning is critical because no single party, agency, organization, or discipline has alone adequate knowledge and understanding of a particular situation. In the case projects structured and systematic processes improved understanding of the alternatives' impacts and uncertainties related to them.

Designing and realizing multi-stakeholder processes in a participatory, structured, value-focused and educative way is a delicate task in which new approaches, practices and tools are needed. Next I describe **how Multi-Criteria Decision Analysis has helped in this**?

Multi-Criteria Decision Analysis, MCDA, is a formal approach which helps to bring structure and transparency to the planning situations in which there are multiple objectives and conflicting values. One of the pioneers in the MCDA field, Ralph Keeney, defines it as "*a formalization of common sense for decision problems which are too complex for informal use of common sense*". MCDA applications in environmental planning are numerous and diverse. Applications cover for instance water resources, fisheries and forestry management, agriculture and energy and climate policies.

In the three latest cases, the design of the planning process was based on MCDA. In addition, MCDA tools were applied in the development and comparison of alternatives. Major benefits of MCDA in these projects were following:



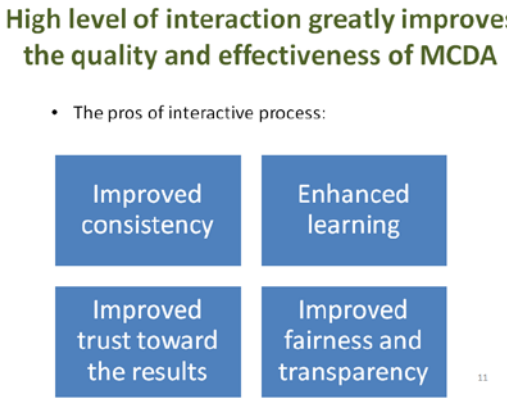
- MCDA systemized and structured the planning process and provided a framework and roadmap for the whole planning process.
- MCDA fostered value-based planning. Identifying each stakeholder's objectives and compiling a common objective's hierarchy proved to be a substantial step in building shared understanding. Becoming aware of the other stakeholders' objectives helped to look at the problem from broader view. This improved conditions for joint-solution finding.
- MCDA supported systematic and transparent evaluation of alternatives from different perspectives. Capabilities to include non-monetary impacts and subjective preferences into the evaluation of alternatives are unquestionable strengths of MCDA, and largely explain why the use of MCDA is rapidly increasing at the moment.
- MCDA promoted collecting, combining and summarizing information from several sources and creating common language in the steering groups. This was a very valuable characteristic in multidisciplinary projects.
- MCDA and mathematical models enhanced learning of participants in many ways. When eliciting weights to the criteria people were encouraged to consider their own values and trade-offs more deeply than normally. In computer aided interviews people had also an opportunity to see how their preferences affected the desirability of alternatives.

One of the major results of this thesis is the decision analysis interview approach. It refers to an MCDA process which is based on personal interviews with a multi-criteria model. The process can be divided into three major phases. In the projects studied, the first phase: framing, impact

assessment, and compilation of workbook material took most of the time. In the interviews, the decision analyst used the MCDA software, asked the elicitation questions, and took care to ensure that the answers reflected the participant's views as well as possible.

One of the main claims and conclusions of this thesis is that the levels of integration and interaction have a crucial impact on the quality and effectiveness of the MCDA process and its outcomes. Integration refers to how MCDA is linked to the planning and how it supports various phases of the process. A high level of interaction means that key stakeholders are actively involved in the various phases of the process and that weight elicitation and analysis of the results are interactive and computer-aided.

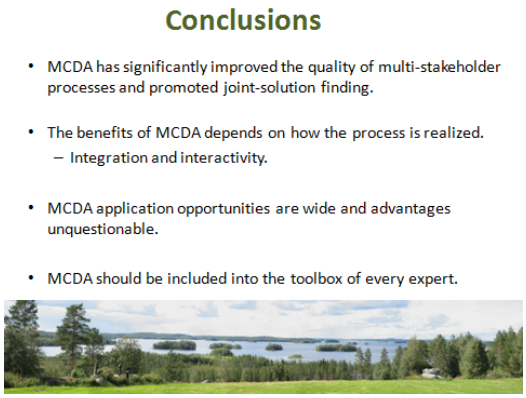
Major advantages of interactive use of MCDA are presented in this slide: (improved consistency, enhanced learning, improved trust toward the results and improved fairness and transparency).



Personal decision analysis interviews provided an excellent opportunity to observe participants' behaviour when they elicited weights, and to identify problems in the process. My findings are in line with earlier studies showing that people have difficulties in assigning consistent and unbiased weights. Therefore, close interaction between the analyst and the participant in the weight elicitation is needed.

Applied MCDA models provided a 'learning by analysing' opportunity for the participants. The interactive use of the models supported the systematic analysis of the stakeholders' preferences and helped to analyse how their preferences affected the ranking of the alternatives. Participants considered the possibility to immediate feedback very useful. By using MCDA methods interactively, people could see how their answers were used as input values for the analysis and also how they affected the outcome. As a consequence, stakeholders' trust in the model, the results, and even the whole planning process increased.

The personal decision analysis interview was a good way to give each participant an opportunity to express his or her opinions and get those opinions documented equally to others'. One can even say that in this respect the decision analysis interviews had a positive effect on the perceived fairness of the planning processes. They signalled that each participant's opinion was appreciated and taken into account.



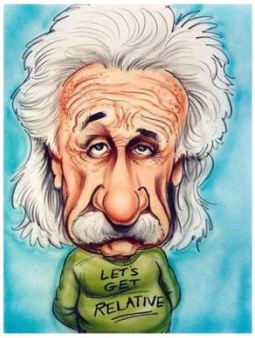
And finally the conclusions. In all four regulation development projects, agreement on the recommendations was achieved. However, this was not an easy task in any of the projects and required considerable work and intensive discussions in the projects' steering groups. In all cases, the outcome was a compromise and not all stakeholders were entirely happy with it. Some stakeholders were disappointed because their hopes regarding the magnitude of changes in water levels were greater than what was finally included in the policy recommendations.

Evaluation of the role of MCDA in reaching agreement is very difficult: we cannot have two projects that are identical except that MCDA is used in one but not the other. It is also very hard to separate the use of MCDA from the whole planning process, because MCDA was an integral part of it. Therefore, I cannot claim that finding acceptable compromises was a consequence of the use of MCDA. However, MCDA has several characteristics that directly improved the quality of the decision-making process and which supported joint problem-solving. I see many of them as resulting from the systematic, interactive, transparent, and value-based approach.

Ladies and gentleman, today's environmental problems are complex, large, multidisciplinary, and ill-structured. Finding sustainable solutions requires that there is a good dialogue between policy-makers, scientists and stakeholders. There is also a great need for approaches which support systematic evaluation of alternatives from different points of views. In this thesis I have shown that MCDA fulfills well these criteria when it is properly integrated into the participatory planning process and when it is used in an interactive manner. I see that MCDA has so many advantages that it should be included into the toolbox of every expert working in environmental planning and impact assessment.

One of the greatest scientists, Albert Einstein, made his life work long before MCDA was evolved. In addition to famous mathematical equations, he left many insightful quotations. One of them is *"Not everything that can be counted counts, and not everything that counts can be counted."* I totally agree with Albert. However, I see that with the help of MCDA it is possible to include into the decision-making process also such impacts which in fact can not be counted accurately.

"Not everything that can be counted counts,
and not everything that counts can be counted."



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