

Frame of Reference for specialist and end-user interaction

Building with Nature Guideline

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Frame of Reference for specialist and end-user interaction

Type: Method

Project Phase: Initiation

Purpose: Matching research/ specialist knowledge with end-users needs

Requirements: none

Relevant Software: none

*5 Basic steps towards
Building with Nature*

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About

The Frame of Reference method aims to structure the interaction between end-users and specialists in application-oriented knowledge development. Key is to use the end-user's information requirements as an explicit starting point for knowledge development, and to continually match specialist research with the information need of end-users. A core element of the method is the definition of fit-for-purpose quantifiable performance indicators. The tool is potentially useful in any situation where miscommunication may arise in interaction between interdependent actors, with different states of knowledge, working on different parts of the same overall problem. Applying this method increases the probability that specialist research produces results that are applicable in policy development or practical application (van Koningsveld, 2003). The method relies on logic and structure and may thus be used by anyone.

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Related Projects

[Adaptive monitoring of sand extraction areas - Maasvlakte 2 extension, NL](#)

[Salt Marsh development, Marconi, Delfzijl \(in preparation\)](#)

[Sand nourishment - Sand Engine Delfland, North Sea, NL](#)

Related Tools

[Identification of ecological and socio-economic components - EcoMindmap](#)

[Including natural value in decision-making - Nature Index](#)

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[Visual thinking for creative designing](#)

Even though an incredible amount of literature can be found on coastal management, coastal research, communication, knowledge transfer and transferring findings from science to practice, a simple fact remains: end users (e.g. coastal managers) and specialists (e.g. coastal scientist) still feel that there are problems in their communication. Researchers, on the one hand, are often of the opinion that their knowledge is not effectively implemented in practice. End users of specialist knowledge, on the other hand, often claim that research findings can not, or not easily, be put to practical use. The problem is not a lack of literature, but rather we face the challenge of getting two groups to communicate better.

Basic Frame of Reference template



Van Koningsveld & Mulder (2004) suggested that end-user-specialist communication could be guided effectively by making the essential components of d

1. a strategic management objective;
2. an operational management objective; and
3. a decision recipe containing a foursome of elements:
 - a. a quantitative state concept;
 - b. a benchmarking procedure;
 - c. an intervention procedure; and
 - d. an evaluation procedure confronting the operational as well as the strategic objective

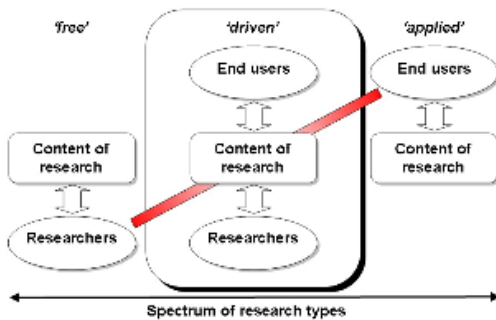
Building with Nature interest

Any Building with Nature project inherently involves complicated interactions between decision makers and specialists. One example is the development of conceptual and detailed designs that are technically sound, while at the same time they meet the original project objectives. Another example is the setup of a fit-for-purpose monitoring programme. In some shape or form these interactions are found in each of the project phases distinguished in this Guideline. In most cases, the Frame of Reference method can help to clearly define the problem at hand and structure the communication about it.

Besides the fact that the Frame of Reference tool is useful for any Building with Nature project, it is also useful for the Building with Nature innovation programme as a whole. The Building with Nature innovation programme is a proto-typical example of a 'driven' research project, just like programmes such as CoastView, Conscience and Micore. This means that the pre-mentioned potential for miscommunication between actors, with different states of knowledge, working on different parts of the same overall problem, is present throughout the programme.

How to Use

The Frame of Reference approach can be applied in every situation where miscommunication can arise in interaction between interdependent actors, with different states of knowledge, working on different parts of the same overall problem. In a research setting, proper handling of the interaction between researchers and end-users requires three basic skills, which are brought together with the Frame of Reference approach.



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Basic Skills:

1. The (will and) ability of researchers and end-users to interact effectively in a process of joint problem definition.
2. The (will and) ability to focus on-going research on this jointly defined problem (effort mainly required from the scientist).
3. The (will and) ability to adapt existing procedures and processes in practice to state-of-the-art knowledge (effort mainly required from the end-user).

Requirements

Working with the 'basic' Frame of Reference promotes a greater involvement of the end-users during research projects and facilitates a regular confrontation of research results with developing end-user needs. A successful application of the suggested approach, however, requires an open and constructive attitude of both end-users and specialists. Willingness to co-operate, an open atmosphere and a flexible attitude are also required to provide a favourable context. Individual personalities, research management and finance regimes can either stimulate or impede the development of such a context.

Phased plan process

A key element in matching science with end-user needs, is to use the end-user's information requirements as an explicit starting point for knowledge development and to continually confront research results with those needs. In practice, this may turn out to be unfeasible without further confinement. As a guideline, it is suggested to make at least some essential components of the *decision-making* process and the associated information requirements explicit, thus creating a shared 'frame of reference'.

Analysis of practical cases, by Van Koningsveld and Mulder (2004), indicated that successful end-user-specialist interaction is associated with a 'basic' Frame of Reference comprising explicit definitions of:

1. a strategic management objective;

2. an operational management objective; and
3. a decision recipe containing a foursome of elements, viz.:
 - a. a quantitative state concept;
 - b. a benchmarking procedure;
 - c. an intervention procedure; and
 - d. an evaluation procedure confronting the operational as well as the strategic objective.

End-user-specialist discussions may now be guided by trying to fill the blank fields on a template. Van Koningsveld et al (2005) suggested the iterative Game, Set & Match approach for this process.

Iterative method of application: Game, Set & Match

Developing a 'basic' Frame of Reference that can be used for coastal management, and is based on the best insights in coastal system behaviour, obviously requires many iterations and discussions. To prevent discussions that are too abstract, it is suggested to strive for a fully developed 'basic' Frame of Reference, using the "Game, Set & Match"-principle.

During the 'Game'-phase, some item of the Frame of Reference is discussed; preferably starting from the strategic objective and working one's way 'down'. After some discussion, the actor responsible for defining the coastal management issue (or a mediator), 'sets' the problem at hand, summarising the previous discussion and making the crucial elements as explicit as possible (state what you do know). The result is an explicit target for the participants to 'match' their knowledge to. The 'set' Frame of Reference may now be altered, broadened or detailed by all participants. With the resulting Frame of Reference, a new 'Game'-phase may be initiated.

In the initiation phase, several iterations may be possible during one meeting or workshop. Once an initial coarse Frame of Reference has emerged, more time may be needed to actually match new specialist knowledge, as new technologies and algorithms may need to be developed and applied. If the interval between a 'matching'-phase and a new 'game' of discussion becomes too large, it may be useful to apply the concept of pilot applications or prototyping to allow discussions to progress beyond the mere abstract.

As an example, the Frame of Reference method has been applied for the Dutch coastal sediment management policy of [Dynamic Preservation](#) is presented below: The main objective for Dynamic Preservation is to guarantee sustainable preservation of safety and of values and functions in the dune area. Dynamic Preservation implies the goal to make optimal use of natural processes. Consequently, the principal intervention procedure is sand nourishment.

Practical Applications

1. Detailing Building with Nature designs
2. Developing adaptive management strategies
3. Lessons learned

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Detailing Building with Nature designs

One of the main challenges in BwN is developing effective adaptive management strategies that successfully achieve a number of predetermined objectives. The BwN Adaptive Management Guideline provides methodologies to structure this cycle and to get the process started. The approach proposed is structured around the principles of the Frame of Reference method. Once one or more conceptual Eco-dynamic designs have been generated, they need to be further detailed to assess their practical feasibility and economic viability. From the conceptual design one or more building solutions are selected for further detailing. Once objectives have been established, analysis of the natural setting should reveal boundary conditions and functional requirements for the design. Application of those requirements in the natural setting yields the dimensions of a final design. Comparison of the final design with the original objectives and the overall conceptual design will indicate whether further iteration is needed.

Developing adaptive management strategies

Monitoring the ecosystem response to engineering works has become an important part of any large-scale development. It enables an adaptive approach, optimizing monitoring efforts and operational management at the same time: the execution of engineering work or the operation of the resulting infrastructure can be adjusted 'on the fly' in order to reach environmental goals. Since adjustments should be based on effect monitoring, adaptive management involves a cycle of planning, monitoring and evaluation of results (cf. Deming's (1986) cycle of Plan, Act, Evaluate & Adjust).

For more information please refer to the document [Adaptive execution guidelines for low-impact dredging](#).

Lessons learned

The Frame of Reference was applied in various projects (CoastView, Kustlijn zorg, ConScience, MICORE, Building with Nature) by a large number of people from varying backgrounds (PhD candidates, Post-docs, Senior Researchers, Project Managers, Programme Directors, End Users of various kinds etc.). Based on practical experience gained providing guidance, a number of tips and tricks have been collected that are useful as a guideline for checking the quality of a Frame of Reference:

- Check that each element is filled with the kind of information prescribed in the 'basic' Frame of Reference.
 - Try to prevent formulating objectives as actions. You can formulate objectives actively, but be careful not to mix objectives with interventions.
 - Check whether the operational objective is connected logically to the strategic objective and provides sufficient handles to detail the steps of the decision recipe.
 - A quantitative state concept (QSC) should not be formulated as an action, try to link it with model output or data from measurement/monitoring. Remember it should be the building solution for the benchmarking and intervention procedures.
 - Think ahead who the actor is that could/should own these objectives (it will give you an idea on what kind of intervention is feasible).
- Check the logical coherence of objectives, indicators and interventions.
 - For each step think about the interlinks with previous and following steps.
 - Approach the Frame of Reference from different starting points, it may give you new insights with respect to overall coherence.
 - Check whether the proposed intervention method in fact results in elimination of the problem in the benchmarking step. As trivial as it sounds, this is an aspect that is often overlooked.
 - Consider whether the intervention you suggest matches with the actor you supposed could/should 'own' the objectives.
- Take your time to define the reference state in the benchmarking step.
 - See if you can support benchmarks with scientific data. Often literature is available to assert e.g. what kind of flow velocities are hazardous when dealing with swimmer safety or what kind of dike overtopping discharges have the potential to cause damage.
 - Try to avoid subjective benchmarks. Reference states like 'sufficient naturalness', for a dune area, or 'historic atmosphere', for a beach front, can not (or hardly) be objectively assessed. This will present difficulties in making any policy based on this Frame of Reference operational.
- Take care in the evaluation step to reflect on the operational objective AND the strategic objective.
 - This step provides the main triggers to modify the scheme.

Besides above tips and tricks for checking the quality of a Frame of Reference, another important lesson learned could be extracted from the practical Frame of Reference applications. Generalising over a large number of Frames of Reference it may be observed that once a practical problem context has been defined a logical next step is to proceed with further detailing of the method. To prevent this quantification step to become a huge bottleneck in the end-user specialist interaction, the threshold to integrate data, models and tools into a given Frame of Reference should be kept as low as possible. The OpenEarth approach offers a radical new approach to handling data, models and tools (Van Koningsveld et al., 2010). It was developed partly as an extension of the Frame of Reference work. For more information please refer to the [Geographical data and knowledge management - OpenEarth](#) tool description.

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Projects

Examples of projects where Frame of Reference approach has been used:

- **ConScience** - <http://www.conscience-eu.net>
- **MICORE** - <http://www.micore.eu>
- **Building with Nature** - <http://www.ecoshape.nl>
 - [Adaptive execution guidelines for low-impact dredging](#)

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