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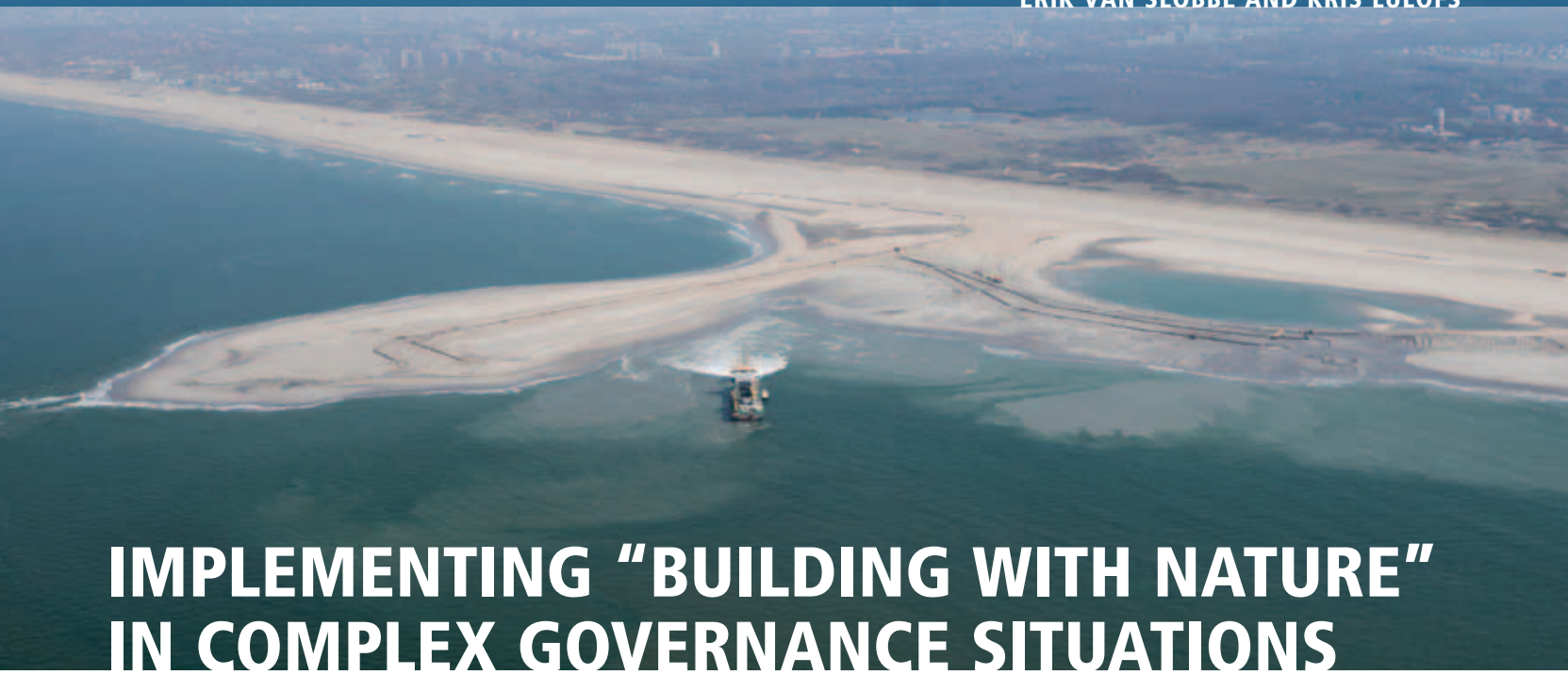

IMPLEMENTING "BUILDING WITH NATURE" IN COMPLEX GOVERNANCE SITUATIONS

ABSTRACT

Two governance aspects of modern coastal engineering which seem to be of importance to many coastal projects all over the world are considered here. Reflections on these two aspects are related to the context in which projects take place. The first is the fragmentation of decision-making and funding.

These types of projects usually involve many actors who need to collaborate in one way or another. In order to understand how these collaborations are constructed, the way in which the formation of coalitions of governments, NGOs and stakeholders at multiple scales must be examined. The question is: what are the characteristics of such coalitions?

To do justice to this context, two cases of the Building with Nature (BwN) innovation programme are presented. First, a number of governance-relevant characteristics of the BwN programme are introduced. The two cases are then described, and in the last section some general lessons learnt from them are formulated. The cases do not form a representative basis for the conclusions, but the narratives serve as illustrations of governance aspects in the BwN programme as a whole.

The second aspect is the growing sense of uncertainty actors experience as a result of the longer time horizons of projects and as a consequence of the integration of a growing number of functions to be served by the projects (including ecological ones). The question is: how to deal with this uncertainty?

The cases presented in this paper were studied in the innovation programme Building with Nature, which runs from 2008 till the end of 2012. It is funded from different sources, amongst which the Subsidieregeling Innovatieketen Water (SIW), sponsored by the Netherlands Ministry of Infrastructure and Environment, and contributions of the participants in the EcoShape consortium. The programme receives co-funding from the European Fund for Regional Development and the Municipality of Dordrecht.
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Above: The Sand Engine pilot project (seen here in April 2011) is part of the Building with Nature programme. It is located on the North Sea coast of the Netherlands and will form a 21.5 million m^3 artificial sandy peninsula connected to the shore and rising above high water.

INTRODUCTION

The place is Hindeloopen, a small town on the IJsselmeer coast in the North of the Netherlands. It is April 2011. There is a tense atmosphere in the room. Inhabitants reiterate their objections to the sand nourishment. Their spokesperson presents a formal protest letter. They have seen too many failing interventions to improve the coast. They do not want to gamble on the risk of another failure. They depend for their livelihood on recreation and new sand may destroy swimming and surfing conditions. They call upon the authorities not to issue the required permits for the sand nourishment.

The representative of the Building with Nature consortium emphasises that measures are needed because the coast must be prepared for water level rises in the future. That doing nothing is not an option for the long term. He assures them that nothing will be done against the wishes of the community. He invites the audience to join him in designing feasible strategies and to this end he puts maps of the coastal zone on the table.

Hesitantly the first participants begin to indicate where earlier interventions took place and what has gone wrong. One tells of old

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sand shoals and failed nourishments and breakwaters that have disappeared in the waves. The local kite surf teacher and the harbourmaster prove to possess a wealth of experiential knowledge on prevailing wave and wind regimes and on sediment transports. These are compared to model results.

By doing this the conversation develops into a more and more enthusiastic exchange about the coast. Both the professional and the local experts enjoy sharing their knowledge and learn from each other. After two hours the atmosphere has improved so much that appointments can be made. The BwN representatives promise to make a plan for a coastal experiment, based on the outcome of the meeting, which will be discussed with the local community again.

This brief real-life history illustrates the importance of governance in the planning and design of coastal projects in modern societies. Citizens want to have a say in interventions that influence their personal environment. They often have relevant knowledge and experiences and planning processes dominated by professional experts are not automatically trusted any longer. Also civilians do have resources (for example, political lobby, use of media and the conduct of legal proceedings) to slow down projects or even block implementation. And, last but not least, the absence of unequivocal political control on projects has become a general governance characteristic, as a result of the involvement of multiple authorities and the fragmentation of decision-making, regulations and financing arrangements.

Planning and design processes of infra-structural works are therefore often messy, with unexpected turns and changes. Project initiators need to involve themselves in local networks and to give due attention to sound communications and interactions. The Hindeloopen project, for instance, involves many governmental parties and NGOs and is financed by five contributors.

TWO GOVERNANCE ASPECTS OF MODERN COASTAL ENGINEERING

This article considers two governance aspects of modern coastal engineering which seem to be of importance to many coastal projects all over the world. The first is the fragmentation of decision-making and funding. These types of projects usually involve many actors, who need to collaborate in one way or another. In order to understand how these collaborations are constructed, how coalitions of governments, NGOs and stakeholders at multiple scales are formed must be examined. The question is: What are the characteristics of such coalitions?

The second aspect is the growing sense of uncertainty actors experience as a result of the longer time horizons of projects and as a consequence of the integration of a growing number of functions to be served by the projects (including ecological ones). The question is: How to deal with this uncertainty?

Reflections on these two questions are related to the context in which projects take place. Decision-making depends on local culture and the political situation and uncertainties are related to the complexity of a project.
To do justice to this context, the experiences of two cases of the Building with Nature (BwN) innovation programme are presented. First a number of governance-relevant characteristics of the BwN programme are introduced. Then two cases are described and, in the last section, some general lessons learnt from them are formulated. The cases do not form a representative basis for the conclusions, but the narratives serve as illustrations of governance aspects in the BwN programme as a whole.

GOVERNANCE ASPECTS OF THE BUILDING WITH NATURE INNOVATION PROGRAMME

Current coastal engineering practice is dominated by a paradigm which is characterised by separation of ecological and socio-economic functions and by choices for hard infrastructures like dams, dikes, harbour fronts and dredged canals in ecosystems under pressure. This often leads to sub-optimal solutions which fit poorly with the dynamics of the natural system. Nature itself plays a secondary role in the design process, at the expense of long delays during project initiation and preparation.

A shift of this paradigm is needed.
The challenge is to find cost-effective and sustainable (green) development strategies. Approaches which work with nature – rather than against it. The urgency of this quest is being recognised in many countries and much experimentation and innovation is going on.

The Dutch €30 million Building with Nature Innovation Programme (www.ecoshape.nl) aims to take advantage of the opportunities offered by nature and is grounded in modern scientific insights as, for instance, eco-engineering. BwN promotes solutions that reconcile the needs of society with the concerns for the environment. An integrated ecosystem-based approach and stakeholder involvement from the early stages of project development onwards are essential features.

This ecosystem-based approach boils down to:
1. understand system functioning ("read" the ecosystem, the socio-economic system and the governance system),
2. plan a project or activity taking the system's present and envisaged functions into account (combining functional and ecological specifications),

3. determine how natural processes can be used and stimulated to achieve the project goals and others (using the power of nature),
4. determine how governance processes can be used and stimulated to achieve the project goals (using the power structures in place),
5. monitor the environment during execution, analyse the results statistically, make risk-assessments and – if necessary – adapt the monitoring programme and/or the project execution (monitoring and adaptive management), and
6. monitor the environment after completion, so as to assess the project's performance, to learn for the future (experience harvesting, knowledge development) and, if necessary, to adjust the project design.

The Building with Nature Programme aims to deliver:

(i) hands-on experience from pilot experiments,
(ii) knowledge on governance, ecological, engineering and monitoring aspects of building with nature and
(iii) practice-oriented guidelines on "Eco-dynamic Development and Design" (EDD).

Figure 1 provides an overview of typical Building with Nature solutions for a variety of marine and riverine environments.

Part of the research activities of the Building with Nature programme concerns decision-making and dealing with uncertainty. One objective is to monitor the progress of the adoption of Building with Nature ideas amongst authorities and experts in the Netherlands. This is done via analysis of documents (reports, media, interviews, etc.) and by means of interviews. Also, use is made of logs of people involved in the Building with Nature programme, itself. The presentations and analyses of the following case descriptions are based on preliminary results of this monitoring.

The two cases

The two cases (see locations on Figure 2) are selected because they both implement sand nourishments on the shore face. The sand is moved to the coasts using natural processes, i.e., wind, waves, currents and trapping by vegetation. The objectives of both experimental approaches are: flood safety, maintenance of an eroding coast, development of ecological values and recreation. Because of the multifunctional and experimental nature, complex decision-making and legal procedures are part of the experiments and project managers have to deal with uncertainties about how the experiments evolve in time.

Although both cases share the same objectives, there are big differences between the two. The most important is the difference in scale. The Sand Engine Delfland in the Province of South Holland is one very large intervention whilst the sand engine experiment in the northern Province of Friesland consists of three very small pilots. Table I presents a number of characteristics.

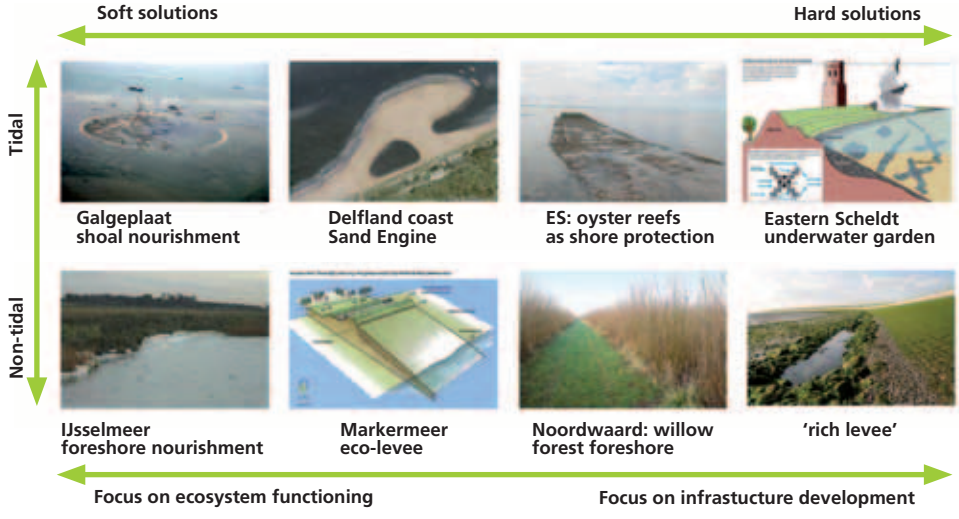

Figure 1. Examples and positioning of Building with Nature in tidal and non-tidal environments and on a scale of human versus ecosystem dominance.

FRISIAN COAST PILOT STUDY

Context

The IJsselmeer Lake receives water from a delta branch of the River Rhine and discharges this under free flow into the Wadden Sea. In 1932, this freshwater lake was created by the construction of an artificial dam (see the separation of the North Sea and IJsselmeer Lake in Figure 2) that separated the – then saline – tidal embayment from the sea. The objectives then were threefold: to create new land for food production, to increase safety against flooding by shortening the coastline by a factor of 10 and to create a freshwater reservoir.

As a result of the reports of the Intergovernmental Panel on Climate Change (IPCC) on climate change, the Netherlands Government commissioned a study into the question of whether the current national water and flood protection systems are sufficiently robust for the next 100 years (Delta Commission 2008). This study concluded that one must prepare for a maximum sea-level rise of 1.30 metres in the next century. And as fresh water needs are expected to increase in the future, the reservoir function of IJssemer Lake must be reinforced. All in all the commission advised to prepare for a lake level rise of 1.50 m by the year 2100. This conclusion was accepted by the Netherlands Government as a sustainable, forward-looking strategy. But it led to strong criticism from the authorities and inhabitants of communities along the lake.

The coast of the Frisian IJsselmeer Lake has adapted a relatively constant level since its closure in 1932. If the lake level were to rise at once to the proposed height, valuable historic cities bordering the lake would face flooding threats. Industrial sites, recreational facilities and valuable natural areas that have developed since the closure would disappear. Moreover, such a rise of water level would affect the groundwater flows and drainage of the surrounding polders. And finally, people felt a sense of injustice, as the costs of water-level rises would bear on the regions of Frisian coastline whilst the benefits of more freshwater would go to other parts of the country.

Table I. A Comparisom of Some Characteristics of the Two Cases.

	Sand Engine in South Holland	Sand Engine in Friesland
Location	On the North Sea coast of the Province of South Holland.	In the Province of Friesland, on coast of the IJsselmeer Lake (a former embayment turned into a lake by a closure dam built in 1932) in the north of the Netherlands.
Context	To compensate for the on-going erosion of the North Sea coast, as an alternative to smaller, more frequent nourishments. The sand engine will act as a sand source for several decades.	The water level in the lake is expected to rise as a result of sea-level rise and may undergo larger variations resulting from its function as a freshwater reserve. This may affect the coastal wetlands and the economic functions vested in them.
Dynamics	North-going tidal and wave-driven residual currents and predominantly south-westerly winds and waves.	Predominantly south-westerly wind and waves.
Intervention	21.5 million m^3 shore face nourishment in the form of a peninsula that extends about 1 km into the sea (Figure 5).	Three pilots, each including a nourishment of 20,000 m^3 sand 200 m from the shore. In pilot 1, a semi- permeable row of piles is built to promote sedimentation (Figure 3).
Features	• Is an alternative to smaller, more frequent nourishments • Avoids repeated ecological disturbance and enhances ecological quality • Creates new recreational opportunities	Maintains the shallow foreshore with the purposes of: • augmenting the natural dynamics • avoiding dike strengthening • creating new recreational opportunities
Planning	First ideas before 2000; construction 2011; functioning: several decades	Initiation and initial negotiations 2009; implementation 2011-2012; functioning: 3-4 years

Clearly, what was considered a sustainable strategy at a national level conflicted with images of sustainable futures at provincial and municipal levels.

Coalition formation

Faced with this context of conflict, the Building with Nature (BwN) programme was asked by the national Government to initiate a pilot study along the Frisian coast. The Ministry wanted to send a positive signal to the region and at the same time wanted to investigate whether indeed an adaptation of the coasts to a slowly rising lake water level would be possible.

With this request, representatives of BwN approached the Frisian governments to seek collaboration. During talks it became clear that the interest to participate amongst regional parties diametrically opposed those of the national Government. Local actors saw the urgent need to join the policy processes and political deliberations about the lake, but the goal was to stop plans to raise the lake level. Frisian parties realised that they had neglected the management of the lake and consequently did not know what the actual management issues were.

Participation in the BwN pilots was considered important, partly to enhance knowledge and experience and partly to demonstrate a constructive attitude to the national Government, even though the underlying goals were opposite. A paradoxical situation emerged: The BwN pilot study was supported by the national Government with the aim of facilitating raising the lake level, whereas the regional authorities participated in the study with the goal of stopping the rise.

Initially the BwN representatives sought support among Frisian officials and local experts. The civil servants were interested in participation, but without a regional coalition of authorities and decision-makers in favour of the idea they hesitated to become an active advocate for BwN. As civil servants they perceived their role as that of executing existing policies and priorities and not introducing new ways of thinking. On top of that there was always the looming conflict with national authorities. This made the initiator of the BwN pilots reconsider his strategies and seek a coalition that would signal the need for change at a convincingly influential level.

He contacted a group of authorities that now can be considered "champions" for building with nature: The deputy of the Province of Friesland, the chair of the Water Board (*Wetterskip Fryslan*) and the director of the NGO *It Fryske Gea*. *Wetterskip Fryslan* covers the entire area of the Province of Friesland; *It Fryske Gea* manages designated nature protection areas and culture heritage of the province. Driven by the wish to be innovative and to push innovation and regional economies, these three supra-local authorities formed a coalition with BwN. Influenced by the thinking about climate adaptation, they understood that complex planning issues might arise in the coming decades, which would call for new approaches.

Usually such a long time horizon is not part of an authority's considerations. One of the strategies applied was to let them philosophise about the potential role of BwN in a video that was put on YouTube. This video turned out to be an important motivating factor during encounters and meetings. It showed the political superiors in favour of the BwN experiment and experts and policy-makers saw this as a legitimisation for their own support. The video prepared the ground for BwN to connect to other relevant actors and resources and it can be considered the entrance ticket to the deliberation process with stakeholders to specify the exact location and details of the pilot and the formal procedures in order to meet regulations.

In addition, the interests of a local entities needed to be served. *It Fryske Gea* wanted to revitalise its natural coasts by initiating the dynamics of sedimentation and new ecological successions. The coasts were paralysed after the damming of 1933 stopped the tidal motion. The recreational entrepreneurs of Hindeloopen saw possibilities to improve conditions for swimmers and surfers. And the Water Board was interested because the creation of a shallow foreshore could become a less costly alternative to dike reinforcement.

A coalition of regional Frisian parties was formed on the basis of these various motives and this group decided to support the implementation of a BwN pilot project. Financing (2 million euros) was arranged through contributions from all parties with additional grants from national funds.
A condition for support was that the pilots be set up as experiments. In the press and in information meetings emphasis was put on the experimental nature of the pilot projects. By doing so the political importance of new interventions on the coasts was downplayed. Because of this, the experiments were set up on a relatively small scale.

Dealing with uncertainty

The pilot projects along the Frisian coast require knowledge from different sides, because they are relatively unknown territory: The creation of foreshores using natural processes. The coast is morphologically in balance and there is no tide, just waves. It was therefore decided to nourish sand just off the coast and to use the energy of the waves to transport the sand to the coast (Figure 3).

An important role is played by the growth of vegetation, such as reeds and water plants, that can fix the sand that comes onshore. But how and when the sand will deposit and how and when vegetation will develop is to a large extent unknown.

In the planning process, morphological and ecological processes were studied. Also, the impact on nature values was predicted and a carefully designed monitoring plan was made.

For implementing and monitoring the pilot, knowledge from morphologists, ecologists, monitoring experts, policy makers, governance experts, dredging contractors and others was needed. Because of the importance of the pilots to the development of strategies for the IJsselmeer in light of climate change, climate scientists and strategists from other government agencies (provinces, munipalities, water boards) showed intense interest.

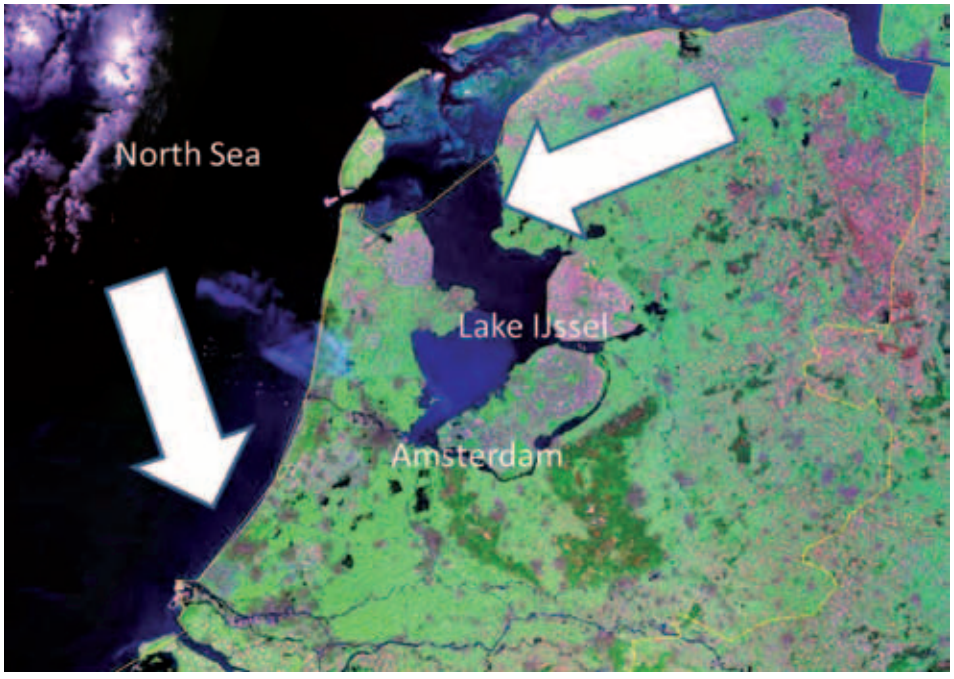

Figure 2. Satellite image of the Netherlands with locations of the two case sites.

The exchange of knowledge between these experts was facilitated by a so-called Community of Practice (CoP). The purpose of forming this group was to enhance the professionalism of the participants through discussion about professional practices. Participants represent a great diversity of knowledge fields, but they share the same practice, namely the development of new coastal management strategies.

The CoP consists of twenty people from governments, NGOs and the private sector. It meets once every three months for a whole day. The first pilot on the Frisian coast has been subject of a CoP meeting. The result of critical reflection was that more attention had to be spent to communication with people in the area.

THE DELFLAND SAND ENGINE, PROVINCE OF SOUTH HOLLAND

Context

The Delfland Sand Engine is the most well-known and largest experiment in the Netherlands that has been developed and designed in line with the Building with Nature principles. The EcoShape–Building with Nature consortium has played an expert advisory role in the partnership.

The Province of South-Holland, in cooperation with the Ministry of Infrastructure and Environment, took the initiative of preparing and implementing a pilot mega-nourishment on the Delfland coast, in order to gain experience in coastal development using building with nature. The Delfland coast between Hoek van Holland and Scheveningen is an eroding coast for which frequent nourishments are needed to maintain the shoreline.

The Sand Engine is a 21.5 million m^3 artificial sandy hook connected to the shore and rising above high water (Figure 5). Waves, wind and currents will gradually distribute the sand along the coast and over the shoreface.

The primary objective of the pilot project "Sand Engine" is to combine longer-term safety with more room for nature and recreation. It was long known and recognised on the political agenda that the residents of the southern part of the Randstad, a conurbation that includes Rotterdam and the Hague and is the most

Figure 3. As part of the pilot study on the Frisian IJsselmeer coast, a semi-permeable row of poles was constructed. This row must mitigate wave energy so that sand can deposit at the location of the Sand Engine. Insert, close-up of the poles being placed.

densely populated area of the Netherlands, experienced a considerable shortage of these amenities. A secondary aim was to innovate and to develop knowledge (Van Dalfsen and Aarninkhof, 2009).

In the initial phase, 13 different variations were considered. These were reduced to 4 in the exploratory phase, each with a construction volume of 20 million cubic metres:

(1) an elongated underwater nourishment along the Delfland coast with three variations off Ter Heijde, each with a height of about 3 m above mean sea level;
(2) a delta-shaped peninsula;
(3) a streamlined sandy hook and
(4) a small island (Mulder and Stive 2011, p 3).

The main aspects considered in the assessment were coastal safety, nature, recreation, other functions and innovations and feasibility. Modelling the dynamic character of the Sand Engine and its continuously changing form involved significant uncertainties. Yet, a choice could be made between the alternatives. A sandy hook to the north of Ter Heijde, off the Solleveld dune reserve, was the alternative that had the best scores in the Environmental Impact Assessment.

When, finally, on 17 January 2011, the new vice-minister Mr. Atsma officially signaled the start of the construction, several years had passed and the project had become quite high profile.

Coalition formation

The discussion regarding coastal expansion between Hoek van Holland and Scheveningen, the Delfland coast, was initiated 30 years ago by Dr Ronald Waterman, a coastal expert and Member of the Parliament of the Province of South-Holland. Dr Waterman developed over the years into a passionate Building with Nature advocate, who managed to get this idea on the political agenda.

In 2003, a resolution was passed in the national parliament that demanded an exploration of the potential of a multi-functional expansion of the coast. At that time the Province already had an explicit policy; seeking to push nature and recreation in this area. Several actors then accepted the idea of a seawards coastal strategy. In 2006 an advisory committee presented its report on these issues to Mrs. Lenie Dwarshuis, a member of the governing board of the Province of South Holland. The embryonic idea for the Sand Engine was outlined in this report.

Meanwhile a Member of Parliament of the national Government, Mrs. Tineke Huizinga, also became an advocate of this innovative coastal management strategy. When appointed in 2007 as Vice-Minister of Public Works and Water Management, she became responsible for coastal safety. This enhanced the momentum for the Sand Engine. An essential and powerful coalition was smoothly formed between the Cabinet and the Province, thanks to the personal engagement of Ms. Dwarshuis. This laid the foundations for the further exploration and planning activities described above.

From this moment on the Sand Engine was a rollercoaster that was relatively unstoppable. A coalition was formed between the State, the Province, the Hoogheemraadschap van Delfland water board, the drinking water company Dunea, the World Wildlife Fund, the Association of Life and Coast Guards (Reddingsbrigade), the relevant municipalities and EcoShape–Building with Nature. Thus the EcoShape Foundation became a member of the project partnership.

The general attitude was that almost certainly the Sand Engine would go through, although details would be discussed with stakeholders. The formal and public procedures with regard to the Environmental Impact Assessment (EIA) were executed quickly and smoothly. Still some concerns and also some comments emerged in public and consultation meetings. In the end no real procedural obstacles emerged, although some of the issues continued to be discussed in political and societal arenas.

Amongst these issues, swimming and recreation safety during construction and afterwards came to the fore. Municipal councils pushed the discussion towards the safety measures required to guarantee swimming and recreational safety. In response to this, an Integral Safety Plan was issued in 2010 and discussed with municipal councils in 2011. During construction and after construction the effects will be monitored and modelled frequently and safety measures will be updated continuously. The decision to allocate and train additional lifeguards for this area is also a result of this discussion.

Moreover, a protocol has been formulated and published that makes explicit which actor is responsible for which issue.

Figure 4. The Community of Practice (CoP) on a field visit to the coast in the rain.

Of course, there were minor contextual issues to settle. For instance, with the recreation, hotel and catering sector. One of the issues was that the beach width should not become too large. If the sea is too far away, that would be bad for business. A somewhat tougher issue was introduced by a group of kite surfers, who perceived a regulatory threat: If the Sand Engine indeed creates additional nature, the area may be designated as a nature conservation area and then be closed for other activities. This issue also caused concern amongst others, because the dynamic nature of the Sand Engine totally misfits static conservation requirements. After careful consideration a decision was taken that the Sand Engine area would be explicitly separated from a nearby Natura 2000 area.

Meanwhile, the principal government actors involved, the State and the Province, reached an agreement with regard to the allocation of costs. The bill was allocated: €58 million to be paid by the State, €12 million by the Province. One element in these financial deliberations was the question of who was going to pay for the maintenance and management of the new 100 ha of nature expected to develop from the dynamic nature of the Sand Engine.

The decision was made that the Province will delegate the task, as customary, to the association Stichting Zuid-Hollands Landschap. Some efforts were also made to raise co-funding from other parties that were believed to benefit from the Sand Engine.

Yet even today an action group promoting stoppage of the project is busy. This group continues to recycle old issues and sometimes add new ones in order to get the public's attention and to mobilise support. The swimming and recreational safety issue is one of arguments put forward. The action group also started a discussion on the presence and risks of explosives that were dumped nearby.

Although sonar soundings did not prove the presence of such material, this did not stop the discussion. The local action group keeps trying to reverse the decisions through organising passionate actions that raise media attention and, indeed, sometimes their arguments are discussed in provincial and national parliaments.

Uncertainties

The issue of uncertainties inherent to "building with nature" is of special interest to BwN projects and of relevance to governance. Discussions with regard to regulatory technicalities concerning decision-making on the Sand Engine highlight the fact that building with nature comes with less well-defined borders in space and time.

A number of uncertainties played a role during exploration, planning and execution of this pilot project. Using numerical simulation models, estimates were made of how the mega-nourishment is going to behave. However, a model is a schematic representation of reality and weather is unpredictable, especially the number and intensity of storms. Here the limitations of modeling became evident.

The expected dynamics with regard to shape and beach development remain uncertain. Hence it remains uncertain how effective the Sand Engine will be for coastal defense, though of course the State was keen to know what the savings on (also uncertain) regular coastal defense efforts would be.

Also the development of the ecosystem quality proved hard to predict. One of the factors of uncertainty concerned mud accumulation in the expected lagoon. The mud content in the deposited sand will also affect its susceptibility to wind blown transport. The speed at which this wind-blown sand will spread over the shore and stimulate dune and nature formation proved hard to predict. Also the issue arose of an old offshore mud deposit, where 40 years ago contaminated mud from Rotterdam harbour was dumped. In combination with the Sand Engine this might affect groundwater and drinking water quality.

In the Netherlands, the public-at-large is invited to give official comments on plans that are subject to an environmental impact assessment (EIA). Careful examination of these comments on the Sand Engine indicates that a large part (50%) of the general public (18 out of 36 reactions) is very concerned with the effects on the current recreational conditions (e.g., swimmer safety; loss of current surfing conditions).

Only 2 reactions were more or less positive about new opportunities. Hence one can conclude that the public is not quite interested in new recreational opportunities or new nature. Safeguarding vested interests and existing opportunities is more important to them.

Furthermore, the outcomes indicate that people demand the same level of certainty as without the project (Van den Hoek 2011). The Dutch EIA system includes a committee (Committee EIA) that judges EIA reports. Not surprisingly, the Committee EIA for the Sand Engine concluded in 2010 that the level of uncertainty of the project was extremely high and judged that there was a tendency amongst the proponents to take a too optimistic position.

DISCUSSION AND PRELIMINARY GUIDANCE

From the pilot projects in the IJsselmeer and on the Dutch coast one of the lessons learnt is that it is not that easy to translate innovative

Figure 5. Delfland Sand Engine on June 14, 2011 showing the progress of construction of the peninsula which will extend about 1 km into the North Sea.

ideas into policy. The mindsets of people are not focused on what can be achieved by an innovation. For most people – except perhaps some visionaries – what is seems to be more prominent in their mindsets than what *can be*. The simple governance lesson is of course that "building with nature" solutions should be connected to existing problems as they are perceived in the area. Only then can the actors' perceptions be influenced and stakeholders may be willing to connect their stakes and resources to such an initiative.

Linking an innovation to various arenas and contexts is an activity that should start as soon as possible. A good start is of course an analysis of actors and their positions and an assessment of what kind of coalition in favour of "building with nature" could be assembled. This also makes clear who the potential opponents are.

With regard to contexts, relevant information concerns at least the actors, their resources and their "comfort zones" with regard to applied approaches of development and design. In addition, the idea of a one-time actor analysis is too simple. Actors' preferences, knowledge and resources change over time and so do contexts. So monitoring governance systems in order to assemble coalitions and map out opposition needs to be done on a continuous basis.

Furthermore, potential benefits that have been overlooked so far may be of interest. BwN can be considered as an ongoing process of seeking solutions to newly emerging problems and ambitions, as has been illustrated by our pilots. If this is done carefully, political salience may be achieved.

Another lesson learnt is that the development of regional plans in most cases includes multiple scales of governance, hence multiple playing fields to act upon. One may be tempted to connect to the smallest scale necessary for implementing the project. Such a strategy, however, normally includes multiple interests and often stakeholders that are influential in local arenas and local decision-making. The threat of getting trapped in short-term interests and local political dealing is significant.

Often a combination of top-down and bottom-up assembling efforts is needed, certainly in situations in which BwN and its characteristics have played no role so far. Often a top-down coalition enables communicating urgency and salience, thus providing an entrance ticket for the BwN manager to the bottom-up integration process. At least for the pilot cases presented above, these guidance lessons for "building with nature" in complex governance contexts and processes seem to apply.

An important issue proved to be the imprecise spatial and temporal scales of BwN designs, thus the necessity to deal with uncertainty. This requires governors, NGOs, stakeholders to step out of their "comfort zones". Not only in the case of the Sand Engine, but also in the IJsselmeer pilots uncertainty was an issue. Although "traditional" designs are perceived to offer more certainty, it has to be made clear that BwN uncertainties are within a defined spectrum.

CONCLUSIONS

General guidance for implementing innovative ideas like BwN should include strategies to cope with uncertainties, e.g., by involving experts for the application and interpretation of models. In communication with stakeholders and public these experts can be cited. Moreover, the Sand Engine case demonstrates that one has to keep in mind that fear and uncertainty are sometimes content and knowledge related – more information will lead to better understanding – whereas on other occasions fears are just imagined and used by stakeholders to induce opposition.

Finally, the IJsselmeer pilot study makes clear that actors often need to be reassured that "Building with Nature" not only means inherent uncertainties, but also that the possibility of re-adjustment and a course-correction, steering things in another direction, is possible if things develop which are considered to be undesirable.

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