

**DIRECTOR
OF ECOSHAPE
AND ADAELTA
HENK NIEBOER**

—
**‘WE HAVE TO PUT
MORE EFFORT INTO
THE DEMAND SIDE,
FIND WAYS TO BRIDGE
THE VALLEY OF DEATH.’**

Engineering and entrepreneurship, preferably in an international setting, have determined the course of Henk Nieboer's path. As a director of Witteveen+Bos, he showed how to conquer new markets in the field of hydraulic engineering across borders. With the innovation programme Building with Nature, he proved that sustainability and engineering can go hand-in-hand providing added value for society. Self-employed in Adaelta, he now focuses on the next challenge: to convince decision makers that nature-based solutions are the answer.

Interview by Astrid Kramer

You started working for Witteveen+Bos right after your graduation in 1987. In 2017, you stepped down as director and in July of this year, you left the company completely. How does it feel to say goodbye to the company where you worked over 30 years?

Well, it feels quite good. It has been great working for Witteveen+Bos for such a long time and it has been great until the end. But although it was a really great time, a good experience to work there and I look back with pride and much pleasure, it is also good that I left.

When you became a director of Witteveen+Bos, you defined three goals: internationalisation, increasing entrepreneurship and putting Witteveen+Bos on the map in the field of delta technology. Did you leave Witteveen+Bos because you accomplished your goals?

Well, with these goals, there is of course always more work to be done. So, I wouldn't say 'mission accomplished'. My main reason for leaving was that it was time for a new challenge. I had worked in many different positions, first as a specialist engineer, then as a project leader, group leader followed by business unit leader. In 2006, I became a member of the board of directors and in 2017, I was advisor to the board. When you have been in charge of a whole company, it is a very special experience to step down and remain in the company. In the end, I felt that my career within the company was complete.

Which project during your Witteveen+Bos career are you most proud of?

Actually, there are quite a few. When I travel from the east of The Netherlands to the northwest, I am always very proud when I



pass the aqueduct Hardersluis between Harderwijk and Flevoland and the naviduct, a special class of navigable aqueduct, at Enkhuizen. In the early nineties, I was the project leader of the team that came up with the concepts of these objects and they were actually built.

I am also very proud of the Kapuk project on Java, Indonesia. This involved a reclamation area of 1100 hectares which was designed into a residential area. A construction of five polders, areas with managed ground water tables which we made using the old-fashioned Dutch art of constructing ring dykes, building pumping stations, pumping the water out, letting the soil ripen and bring in a drainage layer. If you go there now, it is mainly middle-class housing areas. I am proud to walk around there and see all the families living happily in their houses.

In August 2015, you became director of EcoShape. When did you become aware of Building with Nature?

In the early 2000s there was a platform in The Netherlands called Waterfront where a group of people informally discussed the organisation and improvement of the knowledge infrastructure in our sector. We already spoke about Building with Nature because at that time, the need for nature-

based solutions was apparent. Especially the dredging industry was having trouble with environmental regulation and legislation. So, already at that time we were thinking about what to do about that. But in the end, we didn't proceed with starting EcoShape because we didn't have the means and concluded that the level we were talking at was too low.

And then the dredging industry stepped in?

Building with Nature escaped from my view for a few years until we, from the hydraulic engineering sector, were called to the office of Van Oord in Rotterdam in 2006. Frank Verhoeven of Boskalis – and IADC's current president – and John van Herwijnen of Van Oord told us they wanted to initiate an innovation programme focusing on the environmental aspects of our work. We had brainstormed and tendered for subsidy from Economic Affairs. We lost, resubmitted and lost again. But then in the coalition agreement of the cabinet Balkenende-Bos, innovation money was reserved from which we received a contribution starting in 2008. The programme at that time was financed 50-50% by the public and private sector.

I always thought it was an important initiative of the dredging sector, not only because the theme is important, but also

You have to think about which factors are driving the system.

Meet Henk Nieboer

In the run-up to becoming a director of Witteveen+Bos in 2005, Henk Nieboer defined his ambition to bring internationalisation, entrepreneurship and a top position in the field of delta engineering to the company. Over the span of a decade, he successfully taught employees worldwide how to start something new from scratch.

In 2019, he decided it was time to set a new goal and start something new himself. Guided by his entrepreneurial spirit and passion for hydraulic engineering, he left Witteveen+Bos and founded his own company Adaelta. He is now dedicated to enabling the showcasing of nature-based solutions worldwide in the field of climate adaptation projects.

Additionally, he currently holds the appointed position of Honorary Consul of the Republic of Kazakhstan in The Netherlands and director of EcoShape, the foundation based in Dordrecht, The Netherlands, which runs the innovation programme Building with Nature.

because it was a good opportunity for knowledge institutes and public and private parties to work together. I had a lot of experience with the innovation programmes of the 1990s which were financed by our government from natural gas revenues. I was always very disappointed in them because these programmes were always managed by either knowledge institutes or public parties, and the private sector could only learn from the results in reports or courses. In my opinion, this was not very efficient. It was my ambition to create opportunities where private and public parties could work together with knowledge institutes on innovation questions or challenges. I saw the innovation programme Building with Nature as a good opportunity to prove that this would work.

So in 2008, the Building with Nature movement really started up?

Yes, I put a lot of effort in the initial brainstorming and formation of ideas. Later on, in the programming of the topics, I became a member of the scientific advisory board – the only one who didn't

have his PhD. After completion of the first programme, I was a member of the international usability review board who assessed whether the results were useful or not. When it was decided to start the second phase in 2012, I thought my time was up. I asked another representative of Witteveen+Bos to follow up and decided to concentrate on being a director of Witteveen+Bos. But three years later, EcoShape came back and asked if I wanted to fulfil the position of director. My primary reaction was: 'this is not possible because I am a director of Witteveen+Bos' but while saying it, I realised I was going to do it anyway because I wanted it.

What do you like about working at EcoShape?

First of all, it is a great topic to be working on. A completely new way of looking at solutions and products in our sector and trying to get a grip on that. How does it work? What do we need to know? We now have developed quite a lot of knowledge. Of course, we are nowhere as far as we are with the so-called 'grey infrastructure' so there is still a lot to

learn. A lot of progress is possible. What I also like is the challenge that it is still quite difficult to get nature-based solutions accepted by clients. We need to overcome that.

The content, the challenge is interesting, but the way of working is also really interesting. To work with a small group of focused people, driving a much larger group of people, creating the context so that they can do their research. It is a wonderful job.

Despite the positive results of the Building with Nature pilots and the effort made by the EcoShape partners to promote the concept, full-scale applications seem rare.

If you look in the *Engineering with Nature Atlas* by the US Army Corps of Engineers, you see dozens of project examples that have been realised. Some of them do not meet our criteria of Building with Nature solutions but many of them do. Application of the concept does exist.

However, one of the problems is: everybody wants it, but nobody buys it. There is still the perception among infrastructure managers that Building with Nature solutions are relatively unpredictable. So, if I buy it, what am I buying? What will it be in five- or ten-years' time? Because it is a natural system, it is difficult to predict how it will behave and what the management efforts are to maintain it. In our global society, there is a lot of willingness to invest a lot of money up front in a project but there is no willingness to compete for cash flow to do long-term maintenance. Capital expenditure is okay but operational expenditure should be as low as possible.

At the EcoShape conference last year, there was a presentation by Cees Brandsen, one of the directors of Rijkswaterstaat. He said he *wants* nature-based solutions, but he *needs* to know the predictability. That is something we cannot give him yet; not with the same reliability as with grey infrastructure. We do not know what the mangrove will look like after five years. Therefore, we should work with asset managers and convince them, show them or experiment together with adaptive management so that they learn to cope with and appreciate the unexpected developments that nature-based solutions will demonstrate.

Are there other issues with Building with Nature?

Well, one thing is: what am I buying? The other thing is, defining the term. There is no common perception on what a Building with Nature solution is. People have different ideas about it. Sometimes you are talking to people and when you get down to the details, you understand that you have been talking about different things. We need to have some kind of common language and visualise it. We need to create showcases – exactly what EcoShape did – to prove to people that it works. You can show it, take people there so you can make them experience it.

There is no transactional language for nature-based solutions. With a monofunctional design you can determine, calculate or show the dimensions and determine if the desired function will be fulfilled for an acceptable amount of money. But nature-based solutions are always multi-purpose, they bring different benefits, but it is very hard to quantify these benefits and very often these benefits are not a benefit for the client that you are working for. Because they produce multiple benefits; they also influence more stakeholders compared with a traditional solution. This also means that in a planning process you need to involve more stakeholders which is complicated in the planning process.

One of the arguments used for lack of upscaling is that money is available, but that it cannot be reached. Do you agree with this?

Yes, and this is exactly what I want to dedicate my further career to. We need to go to these people, the financiers. We need to go out and talk to them, find out what is keeping them from investing in it and try to remove these barriers for them. To connect them to other parties and show that nature-based solutions will work.

Is there a good tool or method to calculate how much is lost and how much is earned?

A societal cost benefit analysis is such a tool. You have to make a cost benefit analysis across the whole spectrum, not only monetary aspects but also other aspects. However, this is far from settled science. People are still investigating a lot but there is not yet consensus on how to measure all

Brundtland Report's Definition of Sustainability

In 1983, the then Secretary General of the United Nations approached Gro Harlem Brundtland to assume an enormous undertaking: forming and chairing the World Commission on Environment and Development (WCED). The independent commission was tasked with conceiving 'a global agenda for change', addressing topics of long-term environmental strategies for the upcoming millennium, ways to encourage collaboration between countries at diverse stages of economic and social development, and ways to deal with environmental concerns among others. This would require defining perceptions of the issues at hand.

The ensuing 1987 publication of *Our Common Future*, widely known as the Brundtland Report, defined sustainable development as: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This definition laid the fundamental groundwork for future initiatives. After the Brundtland Report's publication, the commission was dissolved and replaced with an organisation named after the report, Center for Our Common Future, to address the findings of the report. Although this organisation ceased activity in 2002, other initiatives culminated with the United Nations Sustainable Development Goals (UN SDGs) in 2015.

SUSTAINABLE DEVELOPMENT GOALS



these positive aspects. As long as we do not have consensus on the method, we cannot compare projects. You cannot say this project has more value than that. Like in tendering, you cannot say this contractor is better than that one.

Sustainability has become an important concept in engineering over the last two decades. What is the key to sustainability for you?

I am always very much impressed by the original Brundtland definition stating that we should provide the needs of the present generation without compromising the opportunities for future generations to meet their needs. At the moment, we are not there yet. Therefore, we have to take a look at all our processes, all our activities to see where we can optimise these in such a way that we can be convinced that in the future, people also meet their needs. That is, for me, the key aspect of sustainability.

Both the book *Dredging for Sustainable Infrastructure* and the *Building with Nature* concept talk about placing a project in a bigger picture. How big should this picture be?

This fully depends on the assignment or question you are working on. Nature-based solutions can exist at relatively small scales but also on enormous scales. With nature-based solutions, your ambition is to make use of the natural system as much as possible, so you have to understand the system very well.

Therefore, you have to start each project with a good system analysis. For instance, where is the sediment coming from? What is driving the sediment? Where does it silt up? What is keeping the sediment in place? What does the accumulation lead to? You have to think about which factors are driving the system. The area that you want to study may be small, but the sediment source may be a river 20 kilometres away.

If the functioning of your nature-based solution depends on the supply of sediment, you also have to take a good look at where the river gets its sediment from. How will that be in the future? If you see that there is quite a lot of sediment runoff from an area that will be urbanised in the coming ten

If we understand how to build with nature, then creating new nature through infrastructural development is the next step.

years, then it could be quite dangerous to rely on a nature-based solution. The system analysis determines the scale you have to look at.

What do you think is the relevance of *Building with Nature* for the industry and society in general?

I see Building with Nature as an opportunity for our sector not only to innovate or to get a better image but also to reach out to new potential clients and stakeholders. It brings us new products with which we can solve societies' challenges. If you work in a limited segment of society, for instance the oil and gas industry or infrastructure, and you tailor or optimise your product for that segment, it will be very difficult to reach out to new clients.

For society as a whole, I see that willingness to work with nature means that our projects are going to contribute to the conservation of nature. As soon as human functions become dependent on the conservation of nature, the natural processes, humans will do their best to conserve this nature and to keep the processes ongoing. It is an opportunity for conservation but also for restoration. If we understand how to build with nature, then creating new nature through infrastructural development is the next step. This is needed because so much has already been lost. If we learn how to work with nature in the future, then we may be able to see every infrastructure project as an opportunity to revive something that has been lost instead of creating even more loss.

Is there a role for EcoShape to train people in *Building with Nature*?

We contribute to several courses, for instance to the Building with Nature curriculum at the TU Delft and TU Twente. I also spoke at the IHC summer school this year. We do contribute but it is a relatively modest role.

Good news is that we now have a professor in ecological engineering, Peter Herman. He knows exactly what Building with Nature is and he is training a new generation of engineers. Stefan Aarninkhof and Mark van Koningsveld have also become professors. They both worked at EcoShape for several years and are among the founding fathers of this concept in The Netherlands.

What about the training of decision makers and clients outside The Netherlands?

One of the results of this phase of the EcoShape programme will be a book of concepts. This is not a technical book or a book with guidelines but a book showing people what can be achieved with Building with Nature solutions. We want to present it in such a way that decision makers get passionate and inspired. They do not have to live it through first-hand, but they have to facilitate it. We want to touch them with inspiration.

Then again, this book will not be enough. You have to go out there yourself and talk to people, and I think that is mainly a task for the consortium members of EcoShape. After all, EcoShape is not a goal in itself, it is a supporting vehicle for the ambitions of our partners.

What is EcoShape?

Founded in 2008, EcoShape is the foundation that manages the public-private innovation programme known as Building with Nature (BwN). After four years of consultations, BwN was launched in 2012 to shift the direction of engineering solutions toward concepts that encourage building with natural materials as well as utilising the forces and interactions present within the natural system.

EcoShape brings together diverse parties including contractors, engineering companies, research institutions, government and NGOs to develop and spread knowledge about BwN. These parties cooperate under a common goal: to provide durable solutions in the water, by letting nature to do its work. Through collaboration with ecologists and economists, innovative hydraulic infrastructure solutions can be conceived which serve the environment, society, and economy.

The foundation is dedicated to creating awareness of BwN solutions, developing tools to support the implementation and assessment of BwN solutions through field experiments, and expanding its knowledge base. Through pilot projects, EcoShape acquires knowledge which can be applied in other locations around the world, supporting its belief that knowing the system is key to designing a sustainable solution.

One BwN solution is the project along the Norfolk coast in the UK, known as Sandscaping which is based on the Sand Engine concept developed along the Delfland coast in The Netherlands. Photo Chris Taylor



How do you keep expanding your vision on sustainability in your personal life?

By reading an enormous amount of information. Ten years ago, we were frontrunners on this topic but currently there are so many related initiatives worldwide. I am following these through social media and try to keep track of the publications, absorbing as much as possible.

It is incredible how much information is out there. In Europe, you have Think Nature, OPLA, Enable and Horizon 2020 programmes. The World Bank is publishing guidelines. The ADB is doing it. IUCN is making a standard.

But the thing is, everybody is using their own terms and slightly different definitions. This adds to the confusion at the clients and recipient's side. That needs to be solved in the future. There are several attempts to make a central platform, some more alive than others.

Has there been a project in your career which you would like to redo according to the Building with Nature philosophy?

In 1989 I worked on the Kapuk project in Indonesia and one day I stood in a strip of mangroves, perhaps some 25 metres wide. I realised this relatively quiet area would soon be

a city and the monkeys in the trees would move away. Behind the mangrove was open water, perhaps 20 or 25 metres, followed by the levy, protecting the houses behind it. We decided to keep a strip of mangrove intact as the first wall of sea protection. What is very interesting now is that over the years, the strip of mangrove expanded to over 100 metres deep. And the monkeys came back.

If I could go back to the beginning of my career with the knowledge I now have, I would make a masterplan for the Bay of Jakarta using the concept of mangrove formation. Create an enormous city inside a mangrove, make real

parks, green areas for people to walk in and create conditions for this coast to accrete so there will be a very large band of mangrove in front of it.

One of the big issues of the bay of Jakarta is that there are still 10.000 people earning their money as traditional fishermen. Maybe we could then create living areas for these people on this spontaneously accreting land.

How do you see the future for nature-based solutions outside of The Netherlands?

I see it as very bright. Everybody wants them. Everybody thinks they need them. One way or another they will be used and created. There is a lot of research being done. The only thing is that – but you see this in many sectors – there is a period between the supply and demand called the ‘valley of death’. We saw demand and we reacted with a new proposition. Now we have a proposition which has become much more than we originally wanted but we do not see large scale demand for this proposition yet. We have to put more effort into the demand side. That is what we still have to cope with. We have to find ways to bridge the valley of death.

It is very often the case that the science and policy world want it. What we need to do – besides upscaling – is to connect this world. We have to connect knowledge institutes, governmental bodies and public parties to the private sector.

Why is this connection important?

What I see is that they are mainly talking among themselves. It was the same in The Netherlands. The large knowledge development

programmes executed with the revenues from natural gas were done without any involvement of the private sector. How was the private sector able to learn what was done? By attending courses and reading the publications. That does not work. You have to *experience* the whole process together and *live* it in order to be able to *apply* it.

Does large-scale application of Building with Nature fit in with competitive commercial hydraulic engineering?

I see no reason why not. I think the good thing about the commercial world is that if a client wants to work with a commercial party, he is forced to clearly express what he needs in order to make a contract. If you want to realise a solution, be it nature based or not, you have to know what you need, what you expect from it. Because, otherwise, the other party cannot design what you need or cannot make what you asked for.

What about sharing knowledge in a competitive industry?

Well you have pre-competitive and competitive knowledge. Pre-competitive knowledge, for instance, is the impact of a group of worms on

soil ripening. If you know this, you can use the worms and the silts as construction material by making use of the worms. But what you do with the construction material, what you design and how you use it to create added value, that is the creative part. That you cannot share. Here you can prove your added value.

The current Building with Nature programme ends in 2020. Is there a future for EcoShape?

EcoShape manages the innovation programme Building with Nature. If the programme stops, then EcoShape in its present form has no use anymore. Therefore, the real question is: Will there be a third programme?

I see potential for that. Along with many people, I am convinced that it would be great if we could come up with a new programme. However, experience with previous four-year innovation programmes showed that it is important that follow up programmes are better shaped in a different formula, because otherwise the programme may lose its charm and energy. Therefore, we need to look for a different formula and maybe also for different people. With new ambitions, new insights. This is currently being discussed.

If I could go back to the beginning of my career with the knowledge I now have, I would make a masterplan for the Bay of Jakarta using the concept of mangrove formation.

Resumé

2015–Present

Director of EcoShape

www.ecoshape.org

2015–Present

Member of Supervisory Board of Deltares

www.deltares.nl

2012–Present

Chairman of the Kazakhstan Chamber of Netherlands Council for Trade Promotion

www.internationaalondernemen.nl

2009–Present

Board Member of Witteveen+Bos Pension Fund

2010–2016

Vice President of KIVI

www.kivi.nl

2017–2019

Engineer of Witteveen+Bos

2006–2017

Director of Witteveen+Bos

1987–2006

Various positions at Witteveen+Bos

www.witteveenbos.com