Delta Challenges and Nature-based Solutions in Dialogue

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The delta areas had been significant for human development.The environmental degradation and the climate change are one of the multiple pressures experienced by urban deltas such as groundwater extractions, land subsidence affecting the provision of ecosystem services that pose extra risk in the livelihoods of the local as well on the global populations living in these areas. Nature-based solutions have proved their potential to counteract some of these pressures. The following talk brings to the fore an interdisciplinary take on the potential, the value as well as the challenges encompassed in designing, planning and governing nature-based solutions for urban deltas.

This dialogue is the transcription of a series of interviews from the guest editors, Veronica Zagare and Diego Sepulveda with the authors, held during October/November 2022.

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Kim van Nieuwaal is a specialist in science-policy interactions, particularly in the field of adaptation to climate change. Currently, Kim is strategic advisor at Climate Adaptation Services foundation. He is director of Delta Alliance International. Kim is also chairman of the board at the Dutch Wadden Sea Society. Kim was one of the lead authors of the National Adaptation Strategy of the Netherlands which was published in 2016. Also, Kim has been involved in climate adaptation strategies for Rotterdam, The Hague, Mainport Schiphol Airport, the South-west Delta, the Wadden Sea and the major rivers in the Netherlands.

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PART I — KIM VAN NIEUWAAL

Editor: *Considering your overall and broad vision of different deltas around the world, which are the challenges and opportunities you identify concerning climate adaptation in deltas?*

Kim van Nieuwaal: Let me start with the opportunities. This is actually the 'fun part' for me, as I find this the appealing aspect of climate adaptation. Climate change and the need to adapt to that urges us to reconsider our delta from an integrative perspective. It is a trigger to critically rethink the complex system that our delta has become. We now know and acknowledge that climate change is happening. It is here and we should do something about the causes, which is the mitigation aspect. But we now also know that climate adaptation is unavoidable, regardless of our mitigation efforts.

I see it in the Netherlands, but also other deltas are realising this. The changing climate puts pressure on your system and urges you to look for solutions amidst other major societal challenges that also put pressure on the deltaic system, such as the transition of energy and food supply. The bigger picture needs to be taken into account and only integrated approaches will suffice. And that is what I find a real fascinating puzzle, in the light of what we all want to achieve in the end: a healthy and attractive environment to work and live in. Eventually, our world will be greener in the future, as I really believe that this is the only way forward for us as human species. It will be an adaptive world, particularly in the deltas of the world, which I consider the pressure cookers of our time and the time to come. People have always been attracted to deltas because of their ecological dynamics. Deltas are like magnets in that sense. This entails certain threats, like that of effects of climate change that hit harder and earlier than anywhere else, but it also entails certain opportunities, which is the potential of the beauty of living in a delta as a green-blue environment. That is something we need to invest in. And that is what I like about climate adaptation: it is essentially an investment issue of how to make the world a better environment to live in.

And then you ask for challenges. There are plenty of them of course. The first thing that comes to mind is the integrative approach that I just touched upon. I mean, sometimes I wonder what is more challenging than solving problems in the Delta, because it has so many aspects, involving so many disciplines, under such big pressure. Another challenge I think is capacity: to have the right people in the right place to work on that giant complex puzzle, as a whole, but also in all its details. And then there is of course the issue of funding. We are talking big money when it comes to the challenges in the delta. But to unlock those funds bankable proposals are needed. Well, and then the mentioned complexity and capacity comes in. Another challenge is the science policy interface. Things are moving at a rapid pace in the deltaic pressure cookers and it is very difficult to keep up with all the knowledge that is being produced and all the policy frameworks, rules and regulations that are at stake. So, the science policy interface, which translates the knowledge to policy makers is, I think, crucial, but also very difficult because you would expect that policy is always underpinned by science, but that is not always the case, unfortunately. Another challenge that I could think of is the one that we are currently also working on very hard - and one that I think will be one of the 'next big chapters' in adaptation - is the monitoring aspect. I think we have acquired a lot of knowledge and expertise. We do have plans. We are implementing things. But soon you will have to question: taking all of this into account, are we on track? Also, in terms of the money: we are investing a lot in this, in the capacity, the science, the policy and the plans and implementation, and somebody eventually will ask: are we doing the right thing? For mitigation it is relatively easy to measure your progress by using Co2 as an indicator. Climate adaptation does not have such an indicator, yet. I personally think that the climate risks could be an indicator. We are working on a system now in the Netherlands for a national monitor based on that notion. Can you 'freeze' our current climate risks in the future by taking the right measures, and perhaps even diminishing those risks, but at least not see them increasing in the future. And here also the financing comes in. Investors will be very interested to see their properties safeguarded from increasing climate risks.

Editor: *Could you identify, in general terms, some responses and trends being developed in deltas towards climate adaptation?*

Kim van Nieuwaal: In general terms, we recognize two dominant ways of reacting to climate change. One is risk avoidance and the other is going for the opportunities. The avoidance approach is reductionist. It's very much technical and engineering-driven, bringing the issue back to its bare essentials as a problem. It is very much about quantification of risks and uncertainties, in answer to questions such as: are the measures cost effective? So, what you actually want to do with the risk avoidance approach is to minimise risks. We've done that in the Netherlands actually after the 1953 flood, when we decided that we don't want this to happen again, so we are going to minimise the risk of another flood. Notwithstanding those efforts we had some recent floods in 1993 and 1995, which cannot be compared to the one of 1953, but they were a wake-up call to a certain extent. It was the time when climate change got on our radar. We started to realise that the forces of nature are not something only to be fought against, as we had primarily done with the Delta Works. A next chapter would become the Room for the River approach, which literally does what it says. We have learnt that measures as part of that approach also improve the quality of the spatial environment. So you could say we have gone through a paradigm shift, from the avoidance approach to minimising risks towards a more opportunity-based framework. And when you think in terms of opportunities, you look at things in a more integrative and holistic way. What you would want to do is create support for that, for instance by using design and visualisation. You want to actually seduce people, rather than scaring them or forcing them in certain directions. So, in contrast to risk avoidance, where

you want to minimise the risks, when you think in terms of opportunities, you actually want to maximise the opportunities and value creation. I see this in the Netherlands but also elsewhere. And I think this is the way to go. Nature-based solutions are a logical component of the opportunities approach I think.

Editor: *Which is the role that nature-based solutions may have towards a sustainable transition in deltas?*

Kim van Nieuwaal: The relevance of nature-based solutions goes beyond that of the specific measures and projects I believe. As I argued earlier, our built environment will have to be more and more green in the future. So, we will need to know more about ecosystems and how to live with them. Putting nature-based solutions into practice will teach us and inspire us in that respect. What I really believe in is that when you get to know and understand something, you will start to appreciate it, or even love it, and when that is the case you will make an effort to take care of it. And this applies I hope to our future deltas. We want to know more about the financial world or about travelling to other planets. But I think one of the real resources in the future is our knowledge of ecosystems and our role in relation to them. And the people who have the knowledge and capacity to do so. But also, I think, we have a competitive advantage in creating a world which is more attractive to live in, also for investors. This is something we all want to see happening in the future.

Allow me to refrain from details on nature-based solutions, as I am not an expert myself. But, I just came back from Indonesia and walked through the mangrove forests again, thinking to myself: this is the future for deltas, coastal areas and small islands. You find the local community being involved in those joint endeavours, taking care of their shared environment. I honestly hope that future generations push the boundaries in that respect, coming from a time and place of urban jungles and worrying about materialistic things and returning to situation in which we better understand that our natural environment is something that we should treasure as a necessary condition for our existence. The recent pandemic was and is overall a tragedy of course, but I think we have also witnessed an increased appreciation of our living environment as we were restricted in our travelling. So, they started to look for places where there is water and trees, like lakes and parks. So, eventually, nature-based solutions are perhaps more part of our human nature than we often realise.
This is why I remain positive about the future.

PART II — NIKI FRANTZESKAKI

Editor: *Which is the role that nature-based solutions may have towards a sustainable transition in deltas?*

Nikki Frantzeskaki: What I can offer in this dialogue on the potential of nature-based solutions for urban deltas is taking a sustainability transitions perspective on what needs to be done for climate adaptation in cities and in delta cities, but also for the governance of and with nature-based solutions. Let me start by saying it is really recognized across many of the global reports that in order to deal with the combined crises of climate change and biodiversity loss, we need to make systemic transformations at pace and at scale. In this case, we have seen that cities, especially well-equipped cities in terms of staff, capacity, in terms of planning, in terms of climate adaptation knowledge, are taking very daring steps. However, we need to think about what happens with all the other cities that do not have these capacities. Would a way forward be to invite them or actively engage them into the discussion on transformative change into the issues and accelerate their capacities to take up action?

Have people tried and acquired knowledge of the systemic solutions that are economically, ecologically, socially, and technically ready for dealing with climate adaptation and climate mitigation in cities? So, when we talk about capacity, we need to think beyond financial capacity. We need to think beyond 'the right people' because 'the right people' does not often refer to experts. And what we see from looking at effective initiatives in cities from a transition's perspective, is that it is about multiple actors that synergize, that work in a coordinated way, that device or find innovative ways to change existing ways of organisation. Such activation of collective agency we see to progress climate adaptation. So, we need to think about multiple expertise, multiple knowledge coming into play.

In my view, when I talk about systemic solutions like nature-based solutions, we have stressed the need to be underpinned and guided by a systems approach for the design, implementation, management and the stewardship of these solutions. And this is not about being reductionistic. This is about having an organising framework of taking complexity seriously, analysing and understanding complexity - taking it to heart. It is about recognizing the feedback loops, the interconnectedness between the social, ecological, and technological components that need to be well-designed and prepared in nature-based solutions.

At the same time, we need to, and again, I say we, in terms of everybody who is involved in adaptation efforts, we need to take the context seriously. A solution is not effective if it is not tailored to the context nor if it does not connect and is embedded in the context. We have seen a lot of examples, and from my earlier work in Jakarta, for example, with the flood protection works there and all the challenges (including the failures faced), it was because a lot of these large infrastructure projects were not well connected to the socio-cultural context drivers. You might make a rain gar-

den, you might even make drainage canals, but if people litter or block them, that will result in their destruction and malfunction.

I think we have a lot of examples, including the ones in the Netherlands, that we saw this shift from an approach that was more about engineering, managing, and confining nature, versus living with nature. This big shift in the Netherlands was pioneered with the Living with Water program, the sand machine, and the sand dunes, the deculvering of riverbank areas as well. I think these are all measures that show how we can implement nature-based solutions without compromising the urban lifestyle. Finding space for and giving it back to nature in urban deltas, comes with a lot of conflict for space, and for how public space will be designed and used. Hence, we need to really take into account that this is a spatial planning aspect.

We need to start to think of nature-based solutions in urban deltas as part of the puzzle of urban infrastructure; how they can connect and be integrated and hybridised better. So, for me, the most important future step for the science and practice of nature-based solutions is to think about how they can connect, how they can interface with other urban infrastructures. There are some examples to consider such as using rain gardens for passive irrigation of urban trees, and linear parks with trees creating canopy cover (and shading) to bicycle lanes and pedestrian pathways.

The last statement is about how to ensure that nature-based solutions when employed for urban regeneration create equal distribution of benefits and are not employed as means of displacement/gentrification. This connects with the point on the values and challenges of Green Infrastructure posed by Kim. I want to stress the aspect of the context in which N.B.S are being introduced or thought of being introduced, needs to be taken very seriously into consideration, not as a barrier. When designing and planning nature-based solutions, we need to take this kind of understanding of the social cultural practices that are in place and engage with citizens in a way that fits their socio-cultural practice. Such co-creation processes require different skills and capacities from planners and researchers alike. It is often the case that we cannot do it with a technical language of illustrating benefits or efficacy of nature-based solutions, different approaches for co-creation and engagement are needed. I'm not saying technical analysis isn't important; it's very important, and expert knowledge is very important. At the same time, we need to recognize that we also need some other types of knowledge and expertise in order to engage with citizens. And this expertise exists. To summarise it is really important to take inter- and trans-disciplinarity as a principle, for designing, implementing, and managing nature-based solutions for climate adaptation in urban deltas.

PART III — EMMANUELLE COHEN SHACHAM

Editor: *What is the role that the Global Standard for NbS play towards the implementation of NbS for climate adaptation in deltas, and what are some reflections on the two previous opinions regarding Deltas, Sustainable transitions and NbS?*

Emmanuelle Cohen Shacham: The perspective I can provide to this dialogue is based on the work on Nature-based Solutions (NbS) I have been part of, within IUCN's Commission on Ecosystem Management. One first point to mention is that the IUCN work on NbS - both the conceptual and operational frameworks - should be relevant and was intentionally done to be used and adaptable to a diversity of contexts: whether the geographic context, for a use in all the regions around the globe, the ecological context (for the various types of ecosystems), or aiming at addressing a whole range of societal challenges (like climate change adaptation and mitigation, addressing biodiversity loss and ecosystem degradation, ensuring food security and water security, disaster risk reduction, ensuring human health, and social and economic development), with different NbS interventions. In other words, the NbS framework is not designed to be used in just one particular context, like deltas. In addition, NbS shouldn't only be implemented for or looked into just for one particular challenge (such as addressing climate change through ecosystem-based adaptation). Indeed, although it may be challenging, and as mentioned above, NbS are about addressing several types of societal challenges in an integrative manner, through collaboration and the coordination of multiple stakeholders, and through synergies across sectors, while benefiting nature and society.

The NbS conceptual framework consisted of a definition and a set of 8 principles for NbS, to set a common basis of understanding of what NbS are and aren't. Based on it, the Global Standard for NbS was developed, with a set of eight criteria and 28 indicators, to firstly ensure that anyone that is talking about NbS, planning to develop or implement one, is actually doing so. In addition, the Global Standard has a self-assessment tool to provide different types of users with a robust operational framework to help them design, implement, assess, improve and scale their interventions. It is aimed at being used by a variety of stakeholders, whether they are project managers, planners, donors, the finance sector, citizens, practitioners on the ground, policymakers, or researchers that are actually using this as a research framework. The eight criteria and 28 indicators, helps to underline specific aspects or activities that need to be considered or taken into account at different phases of an NbS intervention - during the planning, implementation or ongoing management phase. And then, the more all these aspects are considered, the more the intervention is adapted to meet all of these criteria and indicators, the more adapted and improved NbS these interventions become, and the better the targeted societal challenges are addressed.

The NbS Global Standard's eight criteria focus on NbS addressing societal challenges; NbS designed at scale; NbS resulting in a net gain to biodiversity and ecosystem integ-

rity; NbS as economically viable; NbS being based on inclusive, transparent and empowering governance processes; on equitably balancing trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits; NbS being managed adaptively; and NbS being sustainable and mainstreamed within an appropriate jurisdictional context.

As it was mentioned above, the monitoring aspect is important and can help follow the intervention's progress, and verifying if the targets that were set during the planning phase are being reached. Such results may be used for different purposes, among them convincing policymakers or planners to choose NbS over more conventional type of intervention, and donors to fund similar initiatives. And of course, monitoring is important to keep track of the progress and identify good practice to be replicated.

I agree with what was mentioned on the importance and need for a system approach to help guide the design, implementation, and management of the of NbS interventions. The NbS Global Standard can help organising and listing all the most important aspects that need to be taken into account during the planning, implementation or the ongoing management phase of the NbS intervention.
Also regarding the importance of tailoring NbS to the context, I agree and as I mentioned above, NbS interventions are being planned and implemented in very different contexts, and they are context dependent. In certain regions, certain norms are in place and are already being implemented and used. Relevant legislation and policy at the local, regional, national or even international context can help to support the success of the intervention. NbS may also very much vary, depending on other, more physical types of contexts, such as the place, the ecological context (which vary from instance, from dry land, coastal wetlands, mountain, urban area, a lake, a delta, or a marine type of ecosystem) the climate and regional contexts and what kind of stakeholders are involved in the intervention's development. How many people are aware of their initiative and involved from the start? How many people know about what is at stake and care about what is being done? How many organisations would be willing to develop NbS in the short run, accurately and take into account, the different criteria and indicators, of the Global Standard?

I also agree that it is very important to involve the local community, indigenous people's community if present, local stakeholders, because of their knowledge of the place, the different tools that could be used, and the different types of knowledge that they could bring to the table. Ensuring that all relevant stakeholders, including the local community, are present and involved in the full NbS process, is the focus of Criterion 5 (on inclusive, transparent and empowering governance processes), of the NbS Global Standard. In addition, according to Criterion 2 (on NbS design informed by scale and synergies) of the Global Standard, it is important to look for complementary interventions that can help support the success of the NbS. One relevant example was in our 2016 publication, focusing on Green Infrastructure in Barcelona. Education and awareness raising to the local community was an essential source of success for that intervention. First, on the importance of nature and the ecosystem services that are being provided thanks to the intervention. Second, on the role of nature as a source; as a basis for the solutions, and on how important it is to make sure that the ecosystem are kept healthy in order for the NbS to continue to be sustainable in the long run.

It is important not to isolate NbS only for climate adaptation, but to use this framework and the tools available to address a variety of societal challenges, in an integrated way. There are examples of NbS for climate adaptation, while implementing ecosystem based management and adaptation, and also addressing food security, water security, and economic development, in dryland ecosystems in Jordan. Another one is NbS for adaptation while also implementing ecosystem restoration, ecosystem-based management, integrated natural resources management, and agroecological approaches, to address water and food security, biodiversity loss and ecosystem degradation, and socio-economic development, in the highlands of Ecuador. Although some examples can be framed as adaptation, the intervention can also increase carbon storage in parallel, and increase climate mitigation, while addressing other societal challenges. So, I wouldn't single out adaptation when planning or referring to an NbS intervention, and try to look more in a more integrative way, on how to contribute to other issues, such as biodiversity loss or ecosystem degradation, food or water security, or other societal challenges.

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