

Report

International conference on the Water-Energy-Food nexus in cities



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Conference overview

Set-up of the conference

On May 12, 2022, Closer Cities organised a one-day international conference on the Water-Energy-Food nexus in cities. The conference was organised in close collaboration with a large number of partners and experts. The conference was fully aligned with the philosophy of the Netherlands: Solving Global Challenges Together. The predominant focus of this conference was on how improved urban knowledge sharing regarding the WEF-nexus contributes to realisation of the UN Sustainable Development Goals. Partners and experts who contributed to the organisation of this conference come from various organisations including TNO, Deltares, TU Delft, Wageningen University & Research, Erasmus University Rotterdam, IHS Institute for Housing and Urban Development, Global Compact Network Netherlands, Aeres Hogeschool, RVO (Netherlands Enterprise Agency), Province of Flevoland, RUAF and several others.

The Water Energy Food (WEF) Nexus | Many of the global challenges relate to the scarcity of raw materials, including water. Challenges in the water system are closely intertwined with, among other things, challenges in the energy and food supply. We therefore speak of a water-energy-food (WEF) nexus in which the interactions between these sectors are central. Due to the universality of the problems in the WEF-nexus, good practices and effective approaches in one place can inspire solutions in other places around the world. Urbanisation and human factors make WEF-nexus related challenges particularly pressing in urban areas. The WEF-nexus conference therefore focuses specifically on knowledge exchange between urban areas so that urban professionals worldwide (policy makers who work for and in cities, but also researchers, NGOs and the private sector) can either learn from each other's experiences or develop new knowledge together.

The Water-Energy-Food nexus is full of complicated interdependencies and cities deal with them in different ways. The WEF-nexus conference reflects the importance of sustainability, and its challenges and opportunities were therefore related to the framework of the Sustainable Development Goals. According to the United Nations:

“The water-food-energy nexus is central to sustainable development. Demand for all three is increasing, driven by a rising global population, rapid urbanization, changing diets and economic growth. The inextricable linkages between these critical domains require a suitably integrated approach to ensuring water and food security, and sustainable agriculture and energy production worldwide”.

During the conference, experts and participants exchanged effective local approaches and discussed questions like: how can we scale up good practices? What role do context variables play in the exchangeability of effective approaches? What can stimulate the co-creation of effective approaches?



Expert meeting with round tables | The conference was in fact an expert meeting by invitation only without keynote speeches. The latter stems from the organisers' idea that everyone is an expert in some way. The conference took on an interactive format of roundtable sessions. There were three rounds of small group discussions of approximately 45 minutes with 4-7 experts. The roundtable sessions allowed experts to engage in in-depth and fruitful discussions. There were 21 tables representing different kinds of topics related to water management, energy supply, food production, and the interplay between them.

The three rounds were inspired by the activities of the Closer Cities approach: map, monitor and magnify. Round 1 identified knowledge to share that helps achieve sustainable cities (map). Round 2 focused on how knowledge is being shared and which boosts and barriers play a role in these processes (monitor). Round 3 discussed the factors for making a city comparable enough to share with and actions to make sure that other cities can benefit from those experiences (magnify). A detailed report of each round can be found in the next section of this report.

Location

Between April and October 2022, the world horticulture exposition Floriade was organised in the city of Almere, the Netherlands. The Floriade Expo takes place in the Netherlands only once a decade. The theme of Floriade 2022 was ‘Growing Green Cities’, presenting the creative, green and sustainable solutions required to make ‘growing green cities’ happen. The Water-Energy-Food nexus in cities conference had a good fit with the Floriade 2022 theme. After the conference, participants had the possibility to visit the Floriade Expo.



Participants

Closer Cities welcomed over 150 participants coming from different backgrounds and sectors to the conference. The participants represented the public sector, the private sector, knowledge institutes, NGOs, and civil society. We had a special visit from Bangladesh and Egypt, with delegation members participating in the conference. The experts who hosted a table presented their WEF-nexus projects:

1. Adaptive greenhouse technology, use case Middle East. Optimising Water and Energy use and Food production (Egon Janssen - TNO)
2. Towards zero hunger (SDG2) by means of setting up a new viable rural-urban fish food system between Nyeri and Kibera, Nairobi (Kenya) (Katrine Soma and Charles Mbauni Kanyuguto - WUR & FOSPA)
3. Boosting the horticulture sector in Ghana – concrete tools and strategies to achieve a sustainable impact for the next generation (Lindsey Schwidder - TU Delft)

4. City Region Food Systems – Reinforcing Rural-Urban Linkages for Resilient Food Systems (Henk Renting and René van Veenhuizen - Aeres & RUAF)
5. Farm of the Future: regenerative, productive and resilient (Wijnand Sukkel - WUR)
6. Large scale use of subsurface solutions for a robust freshwater supply and water management in the coastal zone (Gualbert Oude Essink - Deltares)
7. The challenge of spatialising food systems: bridging the nexus (Bertram de Rooij - WUR)
8. Social inclusion in the WEF-nexus – an example of Southwest Bangladesh (Melvin van der Veen - Both ENDS)
9. Benefits and challenges in long-term collaboration and knowledge sharing (Piebe Hoeksma - Unie van Waterschappen)
10. Discover the Greenport cluster approach for a healthy and sustainable future for the horticulture (Jolanda Heistek and Koen Smeekens - Greenport West Holland)
11. Supermarket of the future (Lenno Munnikes and Gaby van der Wens - Flevo Campus)
12. An Antique Green Desert in the Udhruh Region (Southern Jordan) (Mark Driessen - Leiden University)
13. Together under one roof that's future-proof: How to create a sustainable and viable polder ecosystem? (Dirk Deichmann - RSM)
14. Circular concepts and approaches for refugee camps and other marginal/informal settlements in Uganda (and other parts of (East) Africa) (Guus Paardekooper, Peter Scheer and Maike Bennema - Skilled & SeMiLLA Sanitation & Deltares)
15. Accelerating a public-private partnership in a high urban area at the intersection between energy transition and climate adaptation. How to do it? (Ian Minnes - Arcadis)
16. WEF-nexus challenges for food resilient cities (Thera Rohling - Priva)
17. Transdisciplinary decision-making in Brainport Smart District (BSD) (Maryam Ghodsvali - Eindhoven University of Technology)
18. Land and water resource management: Upscaling food production on irrigation lands (Ore Fika - IHS Erasmus University)
19. Vertical Farming (Bas van Gerwen and Luuk Graamans - Municipality Lansingerland & Wageningen University)
20. The African Farmers Stories, Connecting the Nigerian and Dutch Horticulture Ecosystem (Coen Hubers - Leiden-Delft-Erasmus, Greenport Hub)
21. Living with risks – Urban flood resilience in Beira, Mozambique (Wendeline van der Feltz and Ellen de Bruijn - The Netherlands Red Cross)

other countries and cities. The exchange of insights can lead to improved, co-created solutions, that will always need some fine tuning for local context. Gillian raised the question about what it takes for knowledge to be shared successfully:

“It depends on the goals. We can use knowledge sharing opportunities as a motivation for, and a trigger to, reflect on our work. After events like this one, there are opportunities to take time to create your stories and share them. When it comes to other people’s goals – these might be to replicate what you have done, or scale it, or to learn from your mistakes. Ask questions – great questions challenge you to learn more about your experience. Once you know what people want to learn from you, you might share a different story, or different perspective on your story. You might move from a presentation format to more of a dialogue, which can serve both your own goals and those of your learning exchange partners”.



With an eye on uncovering what knowledge there is within the experts’ projects and table topics, the first discussion round of the day officially started and participants actively began to exchange and discuss insights and knowledge. The importance of cross-sectoral collaboration was underlined. Partnerships, in any form, can enable and stimulate effective exchange of knowledge. In solving complicated challenges, collaboration with all kinds of stakeholders can be beneficial in finding solutions. Joint collaborative efforts can take place in the short and long term as long as mutual agreements are made, including negotiating, sharing similar interests, equal distribution of benefits among stakeholders, and establishing trust. **Dirk Deichmann** and his table concluded that energy and water sectors are slowly transitioning into public-private collaborative efforts. Similarly, **Wijnand Sukkel** from Farm of the Future and his table experts spoke about this public-private collaboration as a way to create more legal frameworks

(policies, subsidies) that both promote innovation, keep food affordable, and reduce the risks for farmers. Within such collaborative efforts, leadership and skilled people make up an important part of successful knowledge sharing. To start off a collaboration, you need an inspirational leader. One can be inspired and learn from organisations with experience. Starting small is always essential. First do assessments, use local resources, and then scale up. In scaling up, it is about integrating and understanding different domains in a project that enables sustainable solutions, such as social, technical, and ecological.

The transfer of knowledge should always be done in an easy and understandable way for all stakeholders involved. This includes transforming specialised data and language to comprehensible information and creating a common language. Storytelling through visualisation platforms can help, for example in presenting knowledge to the government, and is easily accessible and understood by different stakeholders.

When it comes to integrating a nexus approach, the task is never easy. Experts therefore discussed the value of implementing tools as reflection and to let process design be part of the project design. Reflection is a long-term process and the experts learn by doing. Ongoing training and capacity building are important aspects of the nexus approach as well. **Ore Fika**, from land and water resource management, demands farmers to learn new technology that helps improve their productivity and knowledge to upscale food production on irrigation lands. Some experts put emphasis on increasing and continuing the dialogue on the WEF-nexus. For **Katrina Soma**, working towards zero hunger between Nyeri and Kibera in Nairobi means focusing on dialogue and inclusion of the youth and women.



Student scribes of the EUR, IHS, and TU Delft.

Round 2: boosts and barriers to knowledge sharing



The second round concentrated on conditions that facilitate or hinder knowledge sharing. **Dr. Peter Scholten** (IHS Institute for Housing and Urban Development Studies) and **Dr. Ellen Minkman** (TU Delft) gave a sneak preview of the results of a recent study by the Closer Cities team. They first introduced the research initiative Closer Cities and explained that it was established to stimulate the circulation of existing knowledge rather than inventing the wheel in every city. The Closer Cities urban research project (2021-2030) aims to optimise urban knowledge sharing via three key activities: Map, Monitor and Magnify. The first step is to map the knowledge that is out and make it visible. The conference plays an important role in revealing the knowledge that already exists and participants were cordially invited to share their projects and experiences on the Closer Cities interactive web platform. Second, the team intends to monitor boosts and barriers to knowledge sharing in order to understand better how to lift the barriers and stimulate the boosts. The final ambition is to magnify upscaling and transplantation of ideas to make (new) knowledge visible, usable, and shareable.

A team led by **Jet Bakker** dove into the question: which conditions play a role in urban knowledge sharing? When doing an image search on Google, 'urban knowledge sharing' returns images of brains, cogwheels and people writing on sticky notes or handing over things to each other. Although not very substantial, these images do reflect the key components of knowledge sharing: actors that engage in the exchange, the relationship between them and their knowledge.

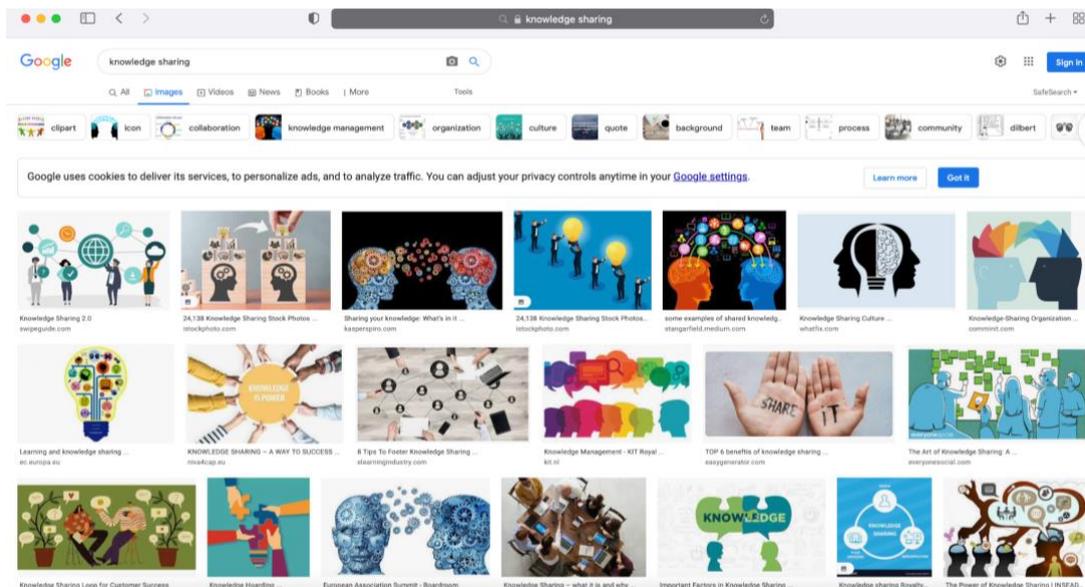


Figure 1. Knowledge sharing according to Google image search

The team decided to dive instead into the scientific literature on urban knowledge sharing. They identified 54 research articles in 48 academic journals. This resulted in a set of conditions (boosts and barriers) for knowledge sharing, but also in a **typology of knowledge sharing**. Three main types can be distinguished: transfer, exchange, and co-creation. Scholten and Minkman explained the main differences between the three types. For example, in a transfer process, one of the actors (the sender) has certain relevant knowledge that is shared with another actor (the receiver), while in exchange and co-creation the involved actors are more equal. In addition, while transfer and exchange circulate existing knowledge, co-creation is aimed at generating *new* knowledge. Although the same conditions were identified for all three types of sharing, it differs which ones are considered key factors. To give an example, a direct relationship between sender and receiver was often named as a key condition for knowledge transfer, while process management is more prominent in studies on knowledge exchange and knowledge co-creation.

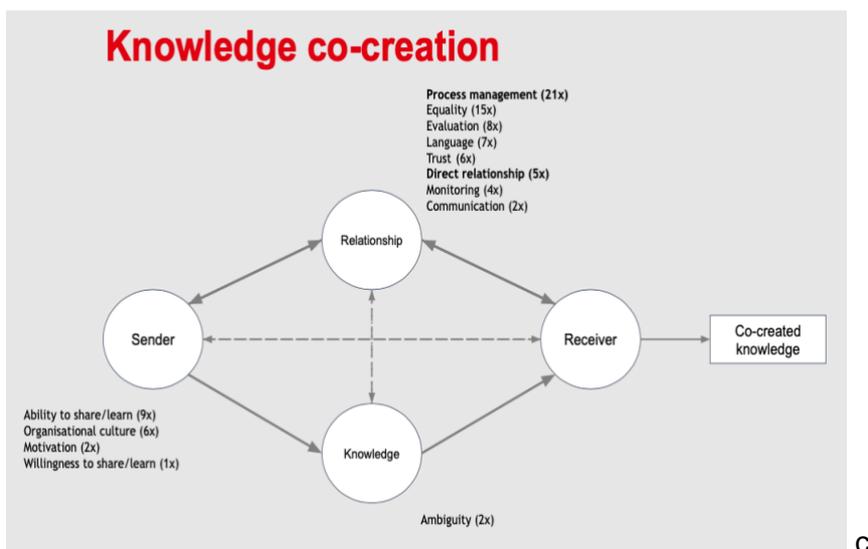
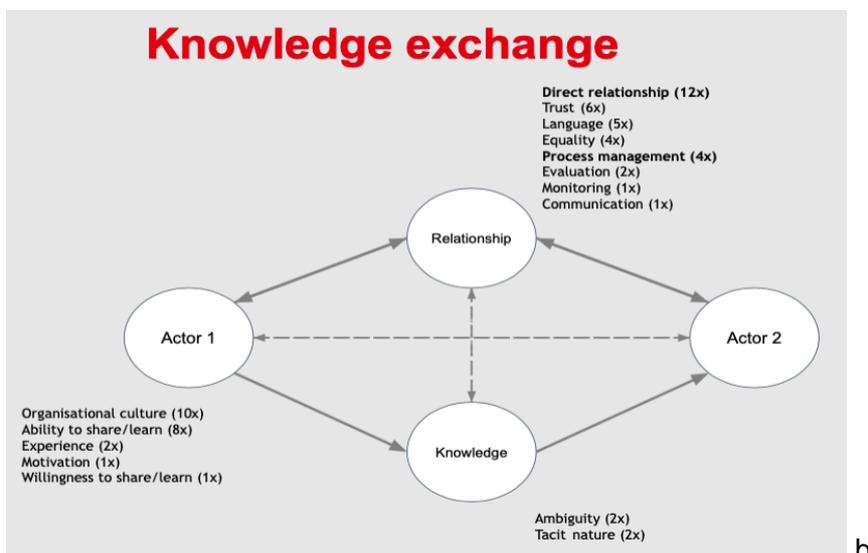
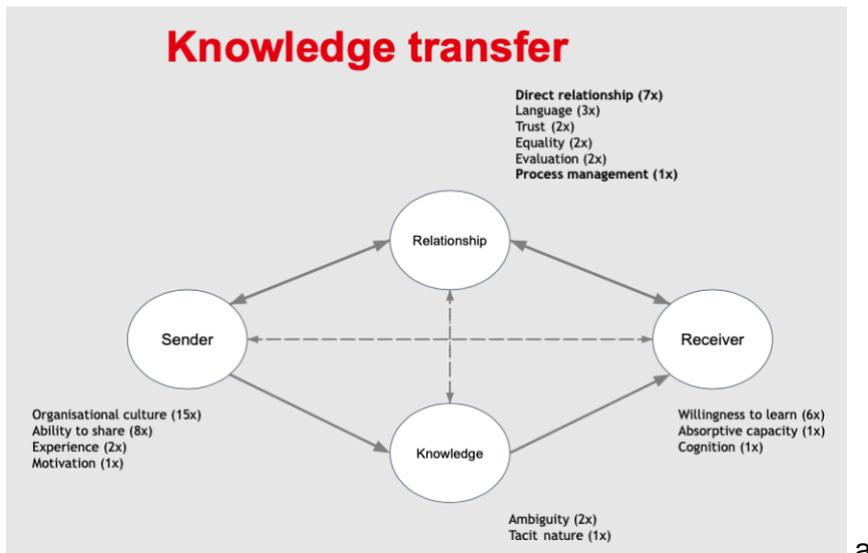


Figure 2. Conceptualisation of the processes of knowledge transfer (a), knowledge exchange (b) and knowledge co-creation (c), based on a systematic literature review. The numbers indicate how often the respective conditions were mentioned in the scientific literature.

Participants shared their key boosts and barriers in the plenary wrap up through MentiMeter. Over 60 different boosts were mentioned. Among them, having a Common goal or interest (6x) and Networking (6x) were frequently highlighted. The most prominent boost was – undoubtedly – Trust, as this was mentioned no less than 20 times. The big question then of course becomes: how to realise this much-needed trust between the knowledge sharing partners? Barriers that were frequently mentioned include Language barriers (5x), Legislation (6x) and Power dynamics (7x). Peter Scholten, Ellen Minkman, Robbert Nesselaar and Gilian Martin Mehers then invited participants to share some stories behind the boosts & barriers that they brought into the discussion.

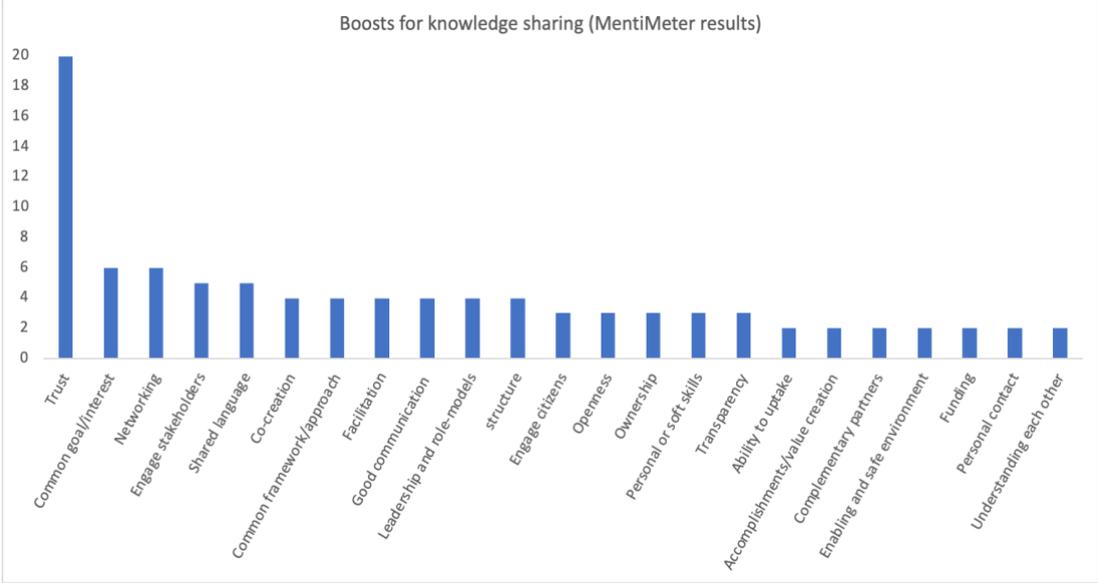


Figure 3. Key boosts for knowledge sharing, as mentioned by participants of the conference.

A scientific follow-up | Next to the MentiMeter inputs, the Closer Cities team will analyse the notes that were taken at each discussion table by volunteers. We will look beyond the theory, by integrating boosts and barriers from practice with our conceptual study. The discussions of round 2 of this conference will be used to gather practical experiences. At the time this report is published, the analysis is still ongoing. Preliminary results show the added value of adding this practical perspective. On the one hand, the round table discussions confirmed the importance of some of the conditions identified in the theory. We see that participants in the table discussions particularly point out the importance of the relationships between the various parties involved in a knowledge sharing project. Equality in these relationships is mentioned most. Other examples are trust and communication. Particularly, a language barrier has been named oftentimes. This can entail a barrier of actual spoken language but sometimes also in terms of different jargon and terminology. On the other hand, the conceptual overview of boosts and barriers received additional input from the more practical angle and, as such new,

additional conditions have been identified. These include the role that power dynamics play in the exchange process; the challenge to identify and engage the right stakeholders; and the importance of sustained resources so that the project remains financially viable after the initial project period.

Another valuable contribution that we identified in the discussions are the insights shared from practice on how to overcome some of the barriers that we have been discussing. Main takeaways here are the identifying and nourishing of champions, the building of an inclusive network of stakeholders and systematic knowledge building. This once more reinforces the supposition of this conference: everybody is an expert and has valuable knowledge to share! Based on your inputs we at Closer Cities will be continuing to analyse these preliminary findings and we aim to, in close collaboration with you, provide more insights in the boosts and barriers as well as the ways to deal with them in a successful manner to improve the sharing of knowledge and projects toward achieving the SDGs.



Round 3: expanding urban knowledge sharing



Round three focused on discussing the next steps: what do we need to expand urban knowledge sharing? During the plenary introduction, **Negar Noori** (Erasmus University Rotterdam) and **Robbert Nesselaar** (Co-founder Closer Cities) went into potential practical strategies of knowledge sharing and bringing these ideas into practice. They introduced the metaphor of knowledge “transplantation” and provided the experts with two questions: what makes a city comparable enough to share with? What needs to be done to make sure that other cities can benefit from those experiences?

Knowing the wicked barriers and promising boosts of urban knowledge sharing based on Round 1 and 2, experts in Round 3 looked into necessities, such as guidelines, platforms, city visits and peer-to-peer, for making cuttings of projects or duplicating them so that other cities can benefit from the knowledge. Experts discussed what steps they must take to achieve that.

The third round of table discussions concluded that having comparable challenges or a comparable context helps in ensuring cities can benefit from each other’s knowledge. It is useful to have a context-specific starting point and define its criteria and definitions; determine the typologies and the different entry points and understand at what level cities’ characteristics are going to be compared at, such as governance, social, or technological. To make cities comparable to share with, different actors must speak the same language. The SDGs are a great example of a universal, common language. Speaking the language of the SDGs enhances the ability of these actors to tap into each other’s knowledge and to co-create solutions together around the SDGs. Citizen science can also be part of the sharing process between two cities as a sense of ownership can be gained from that. Citizen science also adds

the value of implementation. Cities can learn from each other how a project is set up and show how other cities can implement it in their local context.

To enhance the sharing of urban knowledge among actors, easy access to information, long-term commitment, and trust are key. Learning instruments and digital platforms also lead to improvement in that it allows for the exchange of knowledge, indicate problems, make matches, share lessons learned and discuss what went wrong. Towards the end of round 3, there was an interesting discussion going on with the entire room about establishing a new role within organisations for the improvement of sharing knowledge, namely the CSO (Chief Sharing Officer).

The third wrap-up was slightly longer as it transitioned into the plenary closing. We asked people to open MentiMeter once more. Most participants agreed with the statement “Improved sharing and co-creation of urban knowledge can have a huge positive boost to the SDGs”. In the discussion that followed, a remark by **Sandra de Vries** (PulsAqua) received a spontaneous applause. She stated that we do not need to improve knowledge transfer but that we need to improve listening to the needs and interests of our counterparts. With this valuable contribution we ended the day with drinks, snacks and the opportunity to visit the Floriade terrain.

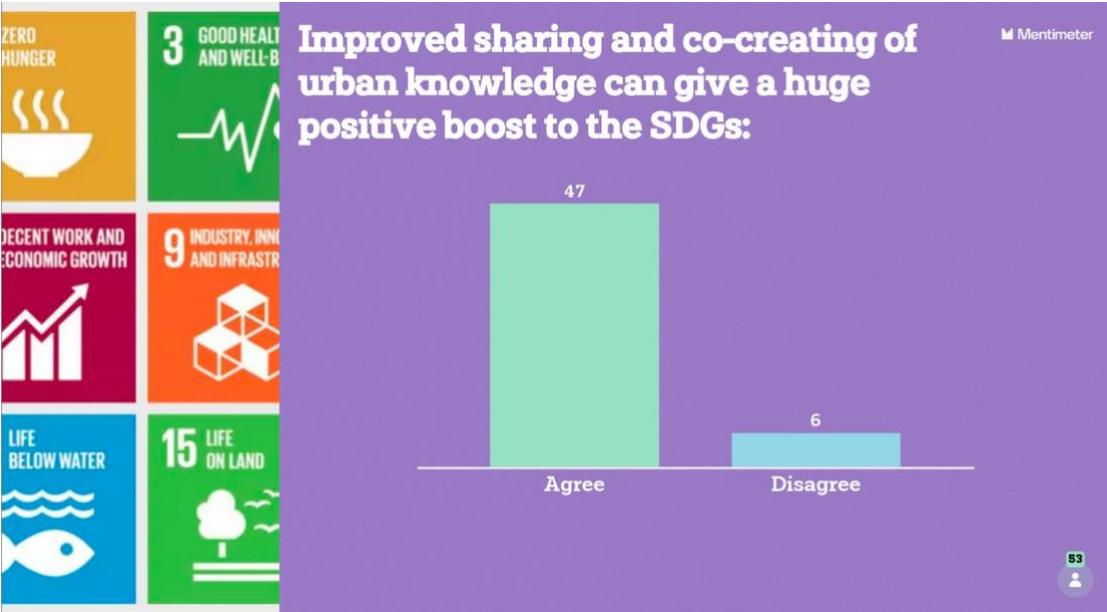


Figure 4. MentiMeter results

6 Large scale use of subsurface solutions for a robust freshwater supply and water management in the coastal zone

Round 3

What makes a city comparable enough to share with?

- Related to similar problems
 - ↳ locals experience similar problems.

What is necessary to improve urban knowledge sharing?

- Platform to share knowledge.
 - Make matches
 - platform to indicate problem
- People for Spotting Opportunities
 - Lessons learned: What went wrong?

NL Netherlands

Poster with main takeaways of table 6

Conclusion

Main takeaways

The predominant focus of the conference was on how improved urban knowledge sharing with regards to the WEF-nexus contributes to the realisation of the UN Sustainable Development Goals. Central to this theme are the interactions between different sectors and urban professionals, in particular how they can learn from each other's experiences. Closer Cities aims to facilitate this by virtue of a three-phase process, which involves mapping, monitoring, and magnifying. A summary of the key takeaways in light of these phases can be found below.

Map | Round 1 revolved around the first phase of the process, namely mapping or in other words, identifying shareable knowledge to ultimately contribute to sustainable cities. The conference in itself played a preliminary yet important role in revealing the knowledge that already exists. Sandra and Gillian shared their knowledge with the participants and discussed sustainable solutions. The different tables in particular enabled the sharing of knowledge and making connections with other experts. From these table discussions emerged a common belief that collaboration between sectors, and in particular partnerships, are needed for knowledge exchange and finding solutions to problems. Specifically, joint collaborative efforts with mutual agreements including negotiating, sharing similar interests, and equal distribution of benefits among stakeholders are of high importance. For instance, energy and water sectors transforming into public-private collaborative efforts as well as establishing legal frameworks will boost innovation, affordable food, and reduce risks for farmers. In addition, managerial and leadership skills are necessary for successful knowledge sharing and collaboration. The table discussions further emphasise that it is important to start small and scale up as you go. This means that one should first understand a different area of a project to be able to create social, technical, and ecological sustainable solutions. Furthermore, knowledge transfer should be comprehensible for stakeholders, which can be done by creating a common language or through storytelling. Finally, a Nexus approach should be characterised by several important elements. These include implementing tools such as reflections and process design, ongoing training and capacity building, adopting new technological innovations for higher productivity of food production on irrigation lands, a continuous dialogue on the WEF-nexus, and an increasing inclusion of youth and women.

Monitor | Round 2 dealt with monitoring the conditions that facilitate and hinder knowledge sharing. Peter and Ellen explained the aim of Closer Cities and presented results of a recent study. Jet's team investigated the conditions that play a role in urban knowledge sharing. They explained that Google images embody the key components of knowledge sharing, namely

actors who engage in the knowledge exchange and their relationships. A more in-depth examination through scientific literature revealed the conditions for urban knowledge sharing and resulted in the development of a knowledge sharing typology. This typology consists of three main types of knowledge sharing, namely transfer, exchange, co-creation. The first two deal with existing knowledge, whilst the latter seeks to generate new knowledge. The literature review also uncovered different key conditions for each type:

- Dominant in transfer: direct relationship, willingness to learn from the receiver, ambiguity of knowledge, organisational culture by the sender
- Dominant in exchange: direct relationship, ambiguity of knowledge, organisational culture by the sender
- Dominant in co-creation: process management for relationship, co-created knowledge by the receiver, ambiguity of knowledge, ability to share and learn by the partners

In the plenary wrap up of Round 2, participants shared their key boosts and barriers. The main boosts that were mentioned include trust, a common goal or interest, and networking. This leaves us with an essential question: How to achieve trust between knowledge sharing partners? The barriers that were most frequently mentioned by the participants include language barriers, legislation, and power dynamics.

Magnify | Round 3 was all about the final ambition, namely, to magnify upscaling and transplantation of ideas to make (new) knowledge visible, usable and shareable. Negar and Robbert discussed potential practical strategies for knowledge sharing. They put forward a discussion upon the comparisons between cities that ensure knowledge sharing and how cities benefit from other cities' experiences – the so-called metaphor of knowledge transplantation. Comparable challenges or contexts encourage cities to benefit from each other and in turn allows for the determination of typologies, entry points, and at what level cities will be compared at. Additionally, speaking the SDG language and citizen science make up an important part of the sharing process between cities. Furthermore, easy access to information, long-term commitment and trust are key in urban knowledge sharing, as well as learning instruments and digital platforms. Finally, the discussion also led to the idea of establishing a new role within organisations and municipalities for the improvement of sharing knowledge: the Chief Sharing Officer (CSO: who supports and stimulates colleagues to improve their sharing abilities), in addition to existing CEO, CFO, CTO and so forth. The plenary closing touched upon the improved sharing and co-creation of urban knowledge that can have a huge positive boost on the SDGs. Sandra de Vries closed the round by stating that we don't need to improve transfer of knowledge, but we need to better listen to the needs and interests of our counterparts.

Next steps

The results of the conference are of much value to the Closer Cities approach, on urban knowledge sharing optimisation. The outcome of the WEF-nexus conference provides an important basis for continued research of questions like: which WEF-nexus approach works where and why, and how can improved cross-border exchange of insights and projects make sure that we make optimal use of this and reduce knowledge to remain untapped? Via www.closercities.org/wef-nexus, examples will be collected and analysed. Urban professionals working in this field are invited to share projects and experiences and continue to work on this topic together. Closer Cities will continue to work on the WEF-nexus for the coming years, as well as on various other urban topics.

How to stay involved

To stay involved with Closer Cities and the WEF-nexus:

- [LinkedIn](#)
- [Closer Cities platform](#)
- [WEF-nexus page and forum](#)
- Closer Cities newsletter: subscribe on our [homepage](#)

If you have any questions, suggestions, requests: please reach us at info@closercities.org.