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Mid-term report on learning mechanisms under the 1st call

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Summary

This report describes the results and outcomes of the activities planned for the first call for innovative knowledge of planning and managing UF-NBS for urban ecosystem restoration and rehabilitation. Unfortunately, due to the Covid-19 pandemic, the 1st call and related activities were postponed to a later stage of the project

Approval

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2021-04-23 15:46:36	Dr. Rik DE VREESE (EFI)
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Mid-term report on learning mechanisms under the 1st call (D3.4)

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EXECUTIVE SUMMARY

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KEYWORDS

Sustainable urban development, trees, forests, biodiversity, urban regeneration, green infrastructure, capacity building,

ABBREVIATIONS

UF-NBS: Urban forests as nature-based solutions

NbS: Nature-based solutions

KEY DEFINITIONS

Urban forests as nature-based solutions (urban forests): UF-NBS are a subset of nature-based solutions, that build on tree-based urban ecosystems to address societal challenges, simultaneously providing ecosystem services for human well-being and biodiversity benefits. UF-NBS include peri-urban and urban forests, forested parks, small woods in urban areas, and trees in public and private spaces. UF-NBS comprise every measure a city can take to address urban development challenges by deploying tree-based ecosystems. (European Forest Institute, 2018)

Urban forestry: the practice of planning and management of urban forests to ensure their health, longevity and ability to provide ecosystem services now and in the future.

Nature-based Solutions (NbS): Nature-based Solutions (NbS) are defined as "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions." (European Commission 2016, Faivre et al. 2017)

Urban tree(s): usually long living woody organism including woody shrubs, usually single stemmed, with the potential to grow at a site in a urban or peri-urban area. This includes roadside trees, trees in squares, parking areas, or in parks and private gardens. Urban trees appear as individual trees, or as groups of trees.

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1 Note on the 1st call for learning mechanism

The circumstances brought by the Covid-19 pandemic had a profound impact on the activities of Working Package nº3 and especially on the task 3.2 "Setting up and running the CLEARING HOUSE learning architecture" in which the call for learning mechanism was supposed to be organized.

The coordinator of the CLEARING HOUSE project, EFI, in agreement with the funding authority and the task leader (Metropolis), decided to postpone the 1st call for cities scheduled in months 8-10. As the cities were concerned about fighting the effects of the pandemic and project partners decided it was better to wait to have a clearer perspective on the whole organization of the learning mechanism (call, learning city tandems & task forces, international seminar), while giving the cities better conditions to apply to the call in an more appropriate time.

2 Learning City tandems & Task Forces

As mentioned in point 1), the learning city tandems & task forces were cancelled and postponed to a further stage of the project.

3 International Thematic Workshop

The International Thematic Workshop was organized online and during the 2021 Urban Forestry Days co-organised with the European Forest Institute (EFI), the European Forum on Urban Forestry (EFUF) and the Horizon 2020 CLEARING HOUSE project

The event targeted at advanced practitioners, researchers, sector leading policymakers and those interested inf the latest developments in Europe and beyond. The conference was run in English with Mandarin interpretation.

3.1 Data on Registration/Participation

The following numbers reflects the registration and participation at the International Thematic Workshop. The numbers were provided by EFI, through the registration process.

Total Registration: 1076

Civil Society and NGOs	149
General Public	83
Industry (Urban planners, arborists, people working in landscape construction,Forest/park/nature or conservation Managers ...)	267
Media	21
Policy Makers	48
Scientific Community (Higher Education, Research)	508

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Audience participation: 750 unique participants from 68 countries in total.
NB: This is a combined participant list for the two days, some doubles might exist

Speakers Participation: 23 women & 23 men

3.2 Day 1 : Tuesday March 23rd 2021

Day one was themed on **integrated urban forest management** with a focus on the '*sustainable transition of cities*' and '*urban forestry and the pillars of sustainability*'.

- Keynote session 1: The urban area and sustainability transition (9.20-10.20 CET time)

Participants:

- Harriet Bulkeley (Durham University) "Cities and Sustainable Transitions: making space for nature-based solutions"
- Jerylee Wilkes-Allemann (Bern University of Applied Sciences) & Giuseppe Scarascia-Mugnozza (University of Tuscia) "Bio-cities for a resilient future: research gaps and action"

- Keynote session 2: Urban forestry and the pillars of sustainability (10.40-11.40 CET time)

Participants:

- Cecil Konijnendijk van den Bosch (NBS Institute) & Tahia Devisscher (University of British Columbia) "Brave New World – on the pathways for global urban forestry";
- Dagmar Haase (HU Berlin) "Where do urban forests go? Aspects of Climate change and its impacts on shape, diversity and usage of urban forests in Europe;
- Rik De Vreese (European Forest Institute) & Dennis Roitsch (European Forest Institute) "Urban forests for societies" ;
- Michael Ramage (University of Cambridge) "Growing the Future: Wood in Buildings"

Wrap Up of the Keynote sessions – Written by Vera Franziska Knill (EFI), adapted from Knill, V. (2021)

Opening the first keynote session on 'The urban area and sustainability transition´, Harriet Bulkeley, Professor in the Department of Geography at **Durham University** and project coordinator for the H2020 Smart Cities and Communities programme **NATURVATION** project, raised the importance of **making space for nature-based solutions**. In a changing climate and with increasing demand for housing and electricity, alternative ways for keeping our cities cool are urgently needed. Prof Bulkeley referred to the **World Energy Outlook (IEA 2018)**, stating that energy demand for air conditioning and electric fans is set to triple by 2050, which equals the current electricity capacity of the United States, the EU, and Japan combined. This development contributes to the increasingly important role of healthy urban forests and their cooling effect.

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"Since the early 1990s, local governments began to position cities as central to the international effort to address climate change", says Prof Bulkeley. But what is needed to enable nature-based solutions to step into place? Rethinking governance schemes, fostering financing and establishing innovative business models are a few of the solutions she mentioned. Prof Bulkeley further highlighted the importance of ensuring social and environmental justice: In order to enable nature-based solutions, it is critical to engage all stakeholder across different sectors and countries.

Why do we need a **paradigm shift to transform our cities into bio-cities**? Jerylee Wilkes-Allemann, **Bern University of Applied Sciences** and Giuseppe Scarascia-Mugnozza, **University of Tuscia** presented ongoing research that aims to define narratives, actions and research gaps. Furthermore, an architect's insight, presented by Vicente Guallart, **IAAC**, stressed the need for shifting towards **circular bio-cities** by merging 'urbanity' and nature. Sustainable urban development, as well as architecture, are closely linked to nature and its resources. This group of speakers followed one theme: Cities need to learn from nature to organize themselves and follow the principles of natural systems to promote life.

The second keynote session about 'Urban forestry and the pillars of sustainability' started right on the **pathways for global urban forestry**. Tahia Devisscher, **University of British Columbia**, emphasized the value of urban forests for promoting health and wellbeing. To put this into practice, she presented the 3-30-300 rule (**Cecil Konijnendijk van den Bosch, 2021**):

- Each resident is able to see at least 3 trees from their residence.
- Each neighborhood has at least 30% canopy cover (or other vegetation in e.g. arid zones).
- Accessible public green space (0.5-1.0 ha at least) less than 300m from each residence.

According to Dr Devisscher and Prof Konijnendijk, adopting nature-based thinking is needed to reimagine future cities based on the connection between nature and people. Building social and ecological resilience as well as synergies between Sustainable Development Goals through nature-based solutions requires a transformative urban landscape.

And where do urban forests go? Dagmar Haase, **HU Berlin**, showed Leipzig city trees' examples to depict the aspects of climate change and its impacts on shape, diversity, and usage of urban forests in Europe. Looking at the wide range of essential benefits that urban forests provide, protecting and improving the ecological status of urban green in the long-term plays an increasingly important role, especially regarding heat and drought stress. This takes into account not only individual tree species or forests but also an essential factor for a healthy ecosystem: the soil. Prof Haase further provided perspectives about essential research questions to be asked when assessing the future of urban forests. Among others, focusing on the governance of urban forests: What are the synergies and tradeoffs in classical planning, the role of civil society, and new forms of stewardship?

Besides the many benefits that urban trees provide for climate regulation, urban green spaces are also vital for strengthening social relations. Rik De Vreese and Dennis Roitsch, researchers at **EFI**, highlighted the **societal values of urban forests**.

The final presentation of the session, by Michael H. Ramage, **University of Cambridge**, took attendees and panelists on a tour to learn about **growing the future sustainably by using wood in buildings**. Large-scale building in timber requires ensuring stewardship for the people and the environment that helped create high-value forest products. Prof Ramage argues that builders, developers and countries should be credited for the CO2 stored in buildings. Rethinking urban

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building material and putting timber as a primary resource requires appropriate policies and incentives.

- Panel : "The importance of urban forests for sustainable cities" (12.00-13.00 CET time)

Participants:

- Sami Lakkonen, Strategy Manager, City of Joensuu
- Antoni Farrero, Technical Management Office, Metropolitan Area of Barcelona
- Guirong Tong, director of Fuzhou Forestry Administration
- Mr. Rodrigo Ravena, Chief of Staff of the Green and Environment Secretariat, Sao Paulo City government
- Pierfrancesco Maran, Councillor for Urban Planning, Green and Agriculture, City of Milan
- Oscar Chamat, Research and Policy Officer, The World Association of Major Metropolises – Metropolis

Wrap Up of the Panel – Written by Guillaume Berret (Metropolis), adapted from Berret, G. (2021)

Recent trends show that more and more cities and metropolitan territories are turning to Nature-Based Solutions (NBS) to help develop more sustainable, resilient and healthy urban spaces. Urban Forests (UF) are a subset of Nature-Based Solutions that build on tree-based urban ecosystems to address societal challenges, simultaneously providing ecosystem services for human well-being and biodiversity benefits

The discussions, which were moderated by Oscar Chamat, Research and Policy Officer at the Metropolis Secretariat General, revolved around the benefits of urban and peri-urban forests. The debates also pointed to some challenging issues related to their development, the strong link between urban forests and the perceived attractiveness of a metropolitan area, and the importance of people's engagement in building metropolitan green spaces.

Vision and approaches to urban forests

To kick off the session, Chamat asked participants to share how their respective administrations approach urban forests.

Sami Laakkonen, Strategy Director for Joensuu's local government, explained that UF has strong links with the economy of **Joensuu**. Located in Eastern Finland, the city hosts the headquarters of the European Forest Institute, and is sometimes known as the "European Forest Capital", as the forestry sector represents a turnover of almost two billion euros in the local economy.

Several participants spoke of UF as a sustainability driver. Guirong Tong, Director of the Fuzhou Forestry Administration, stated that UF is "a pillar for **Fuzhou**'s administration in planning and developing a sustainable city, as without it, the whole ecosystem surrounding Fuzhou would be lost."

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"Trees and forests are life", continued Rodrigo Ravena, Chief of Staff of the Secretary of Green and Environment of **São Paulo**: "Developing urban forests is about providing a better urban environment and enhancing the quality of life of our citizens."

For the **Barcelona** Metropolitan Area (AMB), "the vision is to blur the boundaries between urban and nature, providing the metropolis with a wide range of ecological, social, cultural, and financial eco-services", stated Antoni Farrero, Technical Management Office Coordinator at the AMB. The representative from **Milan**, Pierfrancesco Maran, Deputy Mayor for Urban Planning, Green Areas and Agriculture, shared Milan's approach in planning UF, treating it "not only as a green policy, but more like an industrial one." His comments echoed one of the findings of the new Metropolis Issue Paper "Bringing nature back to the metropolis for all", where authors stressed the importance of recognising urban greening as an action that is not isolated from other urban planning interventions.

Community engagement in a greener urban environment

All the panellists mentioned that community engagement is crucial in efforts to build and maintain a greener urban environment. In Milan, the recent Green Plan drawn up by the local government to build 20 new parks in the city by 2030 received strong support from the population, not only politically but also economically: the city opened up donations for individuals to finance the Green Plan and received more than €500,000 in donations from civil society. This money will be used to help fund planting trees—the city wants to plant 3 million by 2030. "People have to look at urban forests as something that is important in their own lives", mentioned Ravera, whose department is surveying the opinions of São Paulo citizens living in the areas to be 'regreened' and inviting them to take part in the planting process. "Greening cities is more than just planting trees. Planning and citizen engagement in this process is fundamental for Urban Forests to truly be an asset—not only for cities, but also for the people living in them", added Ravera.

Urban practitioners are increasingly optimistic, as people's awareness on the need for UF keeps rising. "As our metropolitan areas keep growing, every day more and more citizens are realising the importance of having more green spaces accessible to them in these areas", mentioned Farrero from the Barcelona Metropolitan Area. "Citizens want to see something green when they open their window, or be able to walk to a park near their home", Tong continued, mentioning recreational activities as one of the benefits that UF offer citizens, highlighting the importance of community engagement with these spaces.

Urban Forests and the economy

As demonstrated by the Joensuu example, UF can also serve as a force for enhancing the attractiveness and competitiveness of a metropolitan area. "UF is like a business card" for Fuzhou, said Tong, "it helps us create a better business environment and attract business, as people are more enthusiastic living in a greener city." Echoing his colleague from Fuzhou, Ravera commented on the increasing property value in the areas of São Paulo that have seen recent green interventions.

Using the work carried out in the Barcelona Metropolitan Area as an example, Farrero highlighted the need to find a balance between UF and natural forests surrounding urban areas, calling attention

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to the term 'smart forest' proposed by Chamat: "Some solutions can be costly if they are not carried out from the right approach".

The insights of the speakers show how Urban Forests can be a valuable tool in managing recent urbanisation trends, echoing research from the EU Horizon 2020 CLEARING HOUSE project. Nevertheless, it is also important to keep in mind that a green urban development has to be looked at from the perspective of environmental justice. Approaches should be adopted that go beyond direct impacts, such as improved air quality, and look also at providing equitable access to environmental resources for everyone, regardless of race, ethnicity, income, age or gender, so that a greener metropolis is greener for all its inhabitants.

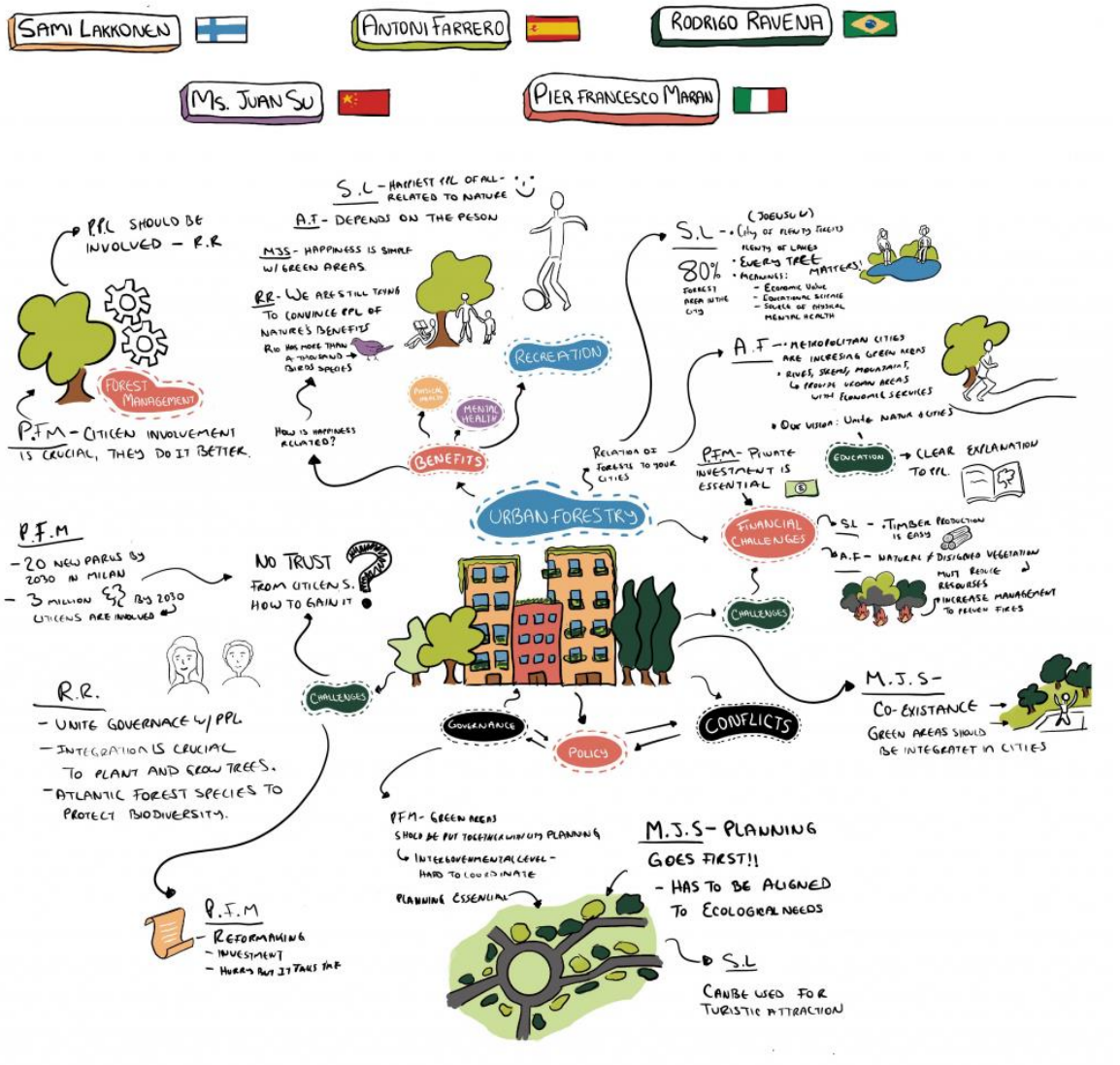

Figure 1 : Graphical recording of the session (Rueda, G. 2021)

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- Virtual fieldtrip "Forests as critical infrastructure? Integrated Forest Management and recreation for forests and people" (14.00-15.30 CET time)

Participants:

- Maria Schloßmacher (EFI) "The effect of forest environment on human health in Changbai Mountain"
- Heike Hückesfeld (House of Nature, Bonn)
- Andreas Schuck (EFI)
- Uwe Schölmerich,(Arbeitsgemeinschaft Naturgemäße Waldwirtschaft North-Rhine Westphalia (ANW))
- Renate Späth (Ministry for the Environment, Agriculture, Nature Conservation and Consumer Protection (MULNV) NRW)

Wrap Up of the Virtual fieldtrip – Written by Knill, V.

After a day packed with the latest urban forestry developments, insights on integrated forest management and lively discussions about the role of urban forests for co-creating more sustainable cities, a virtual excursion brought the participants right into Kottenforst. Located in the southwest of Bonn in North Rhine-Westphalia, the 4.000 hectares peri-urban forest area serves as a stage to enjoy nature, recreate, meet people and engage in discussions. A group of urban forestry experts, interviewed by Maria Schloßmacher (EFI), accompanied the visual experience and shed light on environmental education, microhabitats, Marteloscopes and the importance of enabling and enhancing dialogue about forests.

Public Urban Forests – environmental education for all
Starting off the virtual excursion, Heike Hückesfeld (House of Nature, Bonn) invited the participants to learn about the environmental education facility located in the middle of the Kottenforst forest. Here, the peri-urban forest area welcomes people to exercise, unwind and develop environmental awareness. The forest comes as a habitat with many different facets – participating in a wide range of workshops, nature activities and tours around the forests, visitors can experience the forest with all their senses. Be it exploring the living soil with all its crawling diversity, learning about the importance of dead wood for life in the forest, or discovering the significant role of the (500-700!) fungi species in the Kottenforst.
Besides the many outdoor adventures, the permanent exhibition on urban forests allows a unique indoor forest learning experience.

Marteloscopes, Microhabitats and Integrated Forest Management
The next stop during the virtual excursion started right in between the trees. Andreas Schuck (EFI) led the participants to a Marteloscope in the Kottenforst and explained the idea behind the concept. A so-called Marteloscope serves as a demonstration site within the forest, allowing education and training activities to better understand forest management decisions and individual tree selection. Comprising a 1-hectare rectangular forest site, where each tree is numbered, mapped and recorded, a Marteloscope also invites visitors to get to know the site during guided field exercises to grasp the diverse facets of ecosystem services and their management challenges. Besides looking at species types, forest mensuration data and timber quality, Marteloscopes focus on tree microhabitats. Why are large dead branches, cracks, loose bark, or tree cavities crucial for biodiversity?

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These microhabitats are home to specialized and often endangered forest species of both flora and fauna. Therefore, they represent a paramount aspect when assessing the ecological value of individual tree and the whole forest area. But how can the economic value of a forest in terms of micro-habitats be estimated? Andreas Schuck suggests looking at key aspects, such as how long it takes for a natural structure to develop and how many species are dependent on this structure.

Uwe Schölmerich, former head of the State Forest Enterprise Rhein-Sieg-Erft from the regional forest service "Wald und Holz NRW" and chair of the 'Arbeitsgemeinschaft Naturgemäße Waldwirtschaft North-Rhine Westphalia (ANW)' in Germany (Pro Silva Germany, North-Rhine Westphalia) took on the virtual tour. He led the participants through the Kottenforst, explaining what it needs to operate nature-oriented integrated forest management in an urban environment: Well-qualified staff is indispensable.

As of the early forest managers to join the Integrate Network from Germany and to build up the Marteloscope in the Kottenforst, the 'Jägerhäuschen', Uwe Schölmerich worked at the interface of forestry and society for many years. During this time, he brought a significant number of foresters, nature conservationists, students and all those eager to learn about integrated forest management into the forest.

ZEITENWENDE – Turn of an era
Renate Späth (Ministry for the Environment, Agriculture, Nature Conservation and Consumer Protection (MULNV) NRW) guided the participants to a special place in the middle of the forest to round off the virtual excursion with a central message. The white letters located in the middle of a former forest area, which was destroyed by bark beetle damage and drought, seek to raise awareness about the severe consequences of climate change.

Facing the turn of an area, the ZEITENWENDE project in the Kottenforst does not only point out the challenges we are facing, but also turns the forest into a multifaceted place to meet, experience art, cultural activities and open discourse.

3.3 Day 2 : Wednesday March 24th 2021

Day two was themed on **urban forests and health infrastructure**. Keynote speakers outlined what medical science is telling us about forests as health infrastructure followed by a thematic workshop on 'forests and urban greenspaces in pandemic times'.

<u>- Session 1: What does the Public Health Science tell us on forests as health infrastructure (9.00-10.15 CET time)</u>

<u>Participants:</u>

- Dr. Peige Du (Beihua University) "The effect of forest environment on human health in Changbai Mountain"
- Matthias Braubach (Wolrd Health Organization) "Urban nature and its health relevance".
- Matilda van den Bosch (IS Global) "Nature and Public Health: mechanisms and scientific evidence."
- Dr. Rik de Vreese (EFI)

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Wrap Up of the session – Written by Christiane Düring (EFI), adapted from Düring, C. (2021)

First up was Prof Peige Du from the Beihua University. Her presentation on "*The effect of forest environment on human health in Changbai Mountain*" introduced a forest-based intervention with 12 participants in the Changbai Mountain, which, with its great diversity of species, had been rated as one of the top 10 most beautiful forests in China in 2005. After scrutinising the forest's set up in terms of types of plants, different altitudes and the forest volatiles, the researchers had identified 39 species of volatiles (e.g. alcohols, ketones and aldehydes) and compared their density at different times of the day and in different areas. Ketones were for instance at their highest in the evenings in the yoga area. Using a quantifiable method, the study found that after a 3-day trip to the forest, the participants' blood compositions showed significant improvements. Moreover, participants' anxiety levels and sleep quality had also improved – but what about patients with an existing illness?

Prof Du and her team notably conducted a second study, this time with diabetic patients who had been sent on a 3-day study trip into the forest. Like the healthy group, these participants also showed a remarkable reduction in stress hormones. Even more so, it was found that the forest-based intervention had been a significant help in regulating the glucose level in their blood. These auspicious results give reason enough for the team to already be planning to extend the research into other areas in the country as well as different seasons to amplify the results and make forest-based health care available and accessible to the broader public. Combining all findings with the knowledge of the impact specific volatiles have on our health will facilitate forest-based health care planning in the future.

"If nature were a pill, it would be reimbursed by health care insurance"

Following the presentation from China, Matthias Braubach from the WHO presented his team's insights on "*Urban nature and its health relevance*". Setting the stage, Mr Braubach visualised population growth and the resulting increase in energy and water consumption as well as a rise in water shortage, ocean acidification and loss of tropical forests. At the same time, the graph related to biodiversity showed a steep decrease. These developments are both alarming and ironic as research has proven that humans need nature for its many health benefits. In particular, he mentioned environmental benefits, nature benefits, as well as social and mental benefits for humans. Moreover, he also pointed out that the WHO had not only published outputs on health benefits but had also compiled a guide on how to avoid some of the risks and challenges that come along with an increase in green spaces, such as exposure to pollen, and gentrification and replacement of residents. Thus, he remarked, it is essential to maximise the benefits of being out in nature whilst acknowledging and minimising the risks. With the help of the newly developed GIS-based tool "GreenUr", one can measure green space availability, quantify green space impacts on health, raise awareness to promote local research and assessments and support training activities related to environment and health. A similar tool has been created for blue infrastructure (the BlueHealth Toolbox). These tools will be particularly useful for urban planning.

Before closing, Mr Braubach brought the COVID-19-pandemic into the equation. He particularly highlighted the inequality of benefits from and access to nature in our society. Scrutinising access

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and availability to nature, research suggests that in highest social economic groups, almost every person has access to a private or communal garden or the like. In contrast, the number of those without access goes up by nearly factor 3 to the lowest social economic group where almost 1 out of 5 people does not have access to a private or communal garden, yard, patio or at least balcony. These will be the people most affected by negative mental health impacts. He closed by saying:

"If nature were a pill, it would be reimbursed by health care insurance … but we need to ensure that it is available locally and for all! Otherwise, we would be adding yet another dimension to the health equity discussion." (Matthias Braubach, WHO European Centre for Environment and Health)

Healthy lives through greener cities – could more trees relieve our health systems?

Last but not least, Matilda van den Bosch from IS Global presented: "*Nature and Public Health: mechanisms and scientific evidence."* On a global scale, human illnesses have shifted away from communicable (infectious) diseases to non-communicable illnesses such as depression, cardiovascular diseases, strokes, chronic respiratory diseases, diabetes, and cancer. Ironically, around 80% of these could be prevented through lifestyle or environmental-related actions by reducing stress levels, being more physically active, combating loneliness by increasing social contacts, and protecting our biodiversity, which would bring along regulating ecosystem services. These preventive measures would already have a considerable impact on the population.

Looking deeper into the biodiversity pathway, Dr van den Bosch presented a comparative study from Finland, which compared a group of children exposed to biodiversity on their skin to a standard group without intervention. The results showed that the increased exposure to biodiversity on skin changes the microbiome and meant a better immune function in the children. Another study provided proof that nature delays biological ageing because being exposed to nature slows down the ageing process (measure based on telomere length through blood sampling). Concluding, Dr van den Bosch confirmed that there is significant scientific evidence of the benefits of exposure to nature for both human mental and physical health.

What exactly determines the impact and how can we upscale it – lively discussions on the evidence and its manifestation

Following the three presentations, Prof Rik De Vreese facilitated a discussion round with questions from the audience. The first question was directed at Prof Du asking if the forest-based health care study considered that the positive impact of the intervention could also result from the group interaction rather than the experience of the forest. Prof Du explained that a Japanese study suggests that the positive impact is rooted in the forest surrounding; yet that her team is already planning to do a follow-up comparative study looking at a group in an urban and in a forest environment whilst also comparing their earlier results with those collected in a different season with a different vegetation.

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A second question asked Matilda van den Bosch if there was a difference between planting single trees or a group of trees for human health. She replied that it depends on the illness that is being addressed. Looking out of the window, the view of just a single tree could already ease people's stress levels, whereas to encourage physical activity, a group of trees would be necessary. Asked about his opinion, Matthias Braubach said that in general, any type of nature in any setting was useful, particularly in the mental health dimension. His opinion: "Having one tree is better than having no tree!"

Embracing these insights and scientific proofs of health benefits of urban forests and green spaces and designing cities accordingly calls for one question: What are the obstacles or challenges that prevent a broader and faster greening of our cities? Mr Braubach answered that the perception might not do justice to what is already being done as many cities are trying to get greener as becoming more sustainable and more resilient has been on many cities' agendas for a while. He explained that it simply takes time to restructure and rebuild already established urban infrastructures, and of course, the cost thereof is certainly an issue that needs addressing. He further mentioned that he would like to see more natural experiments where cities investing in green spaces should partner up with universities to find out where what sort of green space would be most beneficial and needed. Lastly, he underlined the importance of local authorities and their work in greening our cities for the benefit of citizens and nature alike.

Session 2: Forests and urban green spaces in pandemic times (10:30-11.45 CET time)

Participants:

- Liisa Tyrvainen (Natural Resources Institute Finland) "Managing our forests to strengthen their public health outcomes"
- Nic da Schio (Vrije Universiteit Brussel) and Jakob Derks (European Forest Institute) "Changes in urban forest use and attitudes towards urban forest during the COVID-19 lockdown"
- Wendy Chen (University of Hong Kong) "Urban parks amidst COVID pandemic"

Wrap Up of the session – Written by Verónica Ruiz Garcia (IUCN), adapted from Ruiz Garcia, V. (2021)

Forests and urban green spaces are essential elements in the urban environment, providing multiple ecosystem services as well as beneficial effects on physical and mental health. The unprecedented COVID-19 pandemic along with other major environmental challenges such as climate change have made stakeholders ponder on how to deal with complex health crises in urban settings.

In a world with an increasing population and urbanisation, forests and urban green spaces are critical elements for making cities more sustainable, greener and healthier places to live. During this one-hour session we learnt about citizens perceptions and usage patterns of forests and urban green spaces through different geographical contexts.

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"Pandemic has raised the role of nature for Fins. Citizens have raised their voices to policy makers and now it is on them to make the change and re-evaluate urban planning!" – said Liisa Tyrvainen (Natural Resources Institute Finland). In a survey conducted recently in Finland, 96% people state that they participate in outdoor recreation whether in neighbouring areas, green open spaces or urban spaces. The lockdown impeded people to reach nature; and pandemic has talked back to people to look into the urban planning policies and re-evaluate them since the current urban forests and green spaces won't be enough for an increasing number of users. The knowledge on urban forest-based solutions is there outside but it has to be better mainstreamed and used in urban planning and decision making to find new solutions.

Following the same optic, Nic da Schio (Vrije Universiteit Brussel) and Jakob Derks (European Forest Institute) presented the outputs of their study on how urban nature helped people cope with the COVID-19 lockdown in Belgium and Germany. The studies showed an increase of 40% on the use of green spaces and over 80% of respondents mentioned that urban forests should be prioritised by governments. "These studies have been an opportunity to raise awareness and give the voices to people that are not frequent users of these spaces!" – said Jakob Derks.

This is happening in Europe but the situation is not particularly different in China. In the spring of 2020, the COVID-19 global pandemic forced many governments to impose a set of restrictions including the closure of businesses, social distancing and limitations of the use of public green spaces. That is why community gardens in China played an important role in mitigating the negative impacts of the pandemic and reducing the level of stress. However, not everybody has access to these semi-public spaces; therefore, positioning urban parks in the policy agenda and giving more funding will contribute to implement transformative actions towards achieving societal challenges. "Combined efforts will help building back better in a post pandemic situation" – said Wendy Chen (University of Hong Kong).

<u>- Session 3: Launch of the European Forum on Urban Forestry semester (12.00-13.00 CET time)</u>

<u>Participants:</u>

- Clemence Dirac-Ramohavelo (Federal Office for the Environment, Switzerland) "Introducing EFUF.app"
- Bianca Wyss-Baerlocher (Urban Green Polylogue) "Insight of things ahead and Call for additional events and activities"
- Pete Stringer (Manchester City of Trees) "Introducing the "Urban Forestry for a resilient future" webinars"

This session presented highlights of the next European Forum on Urban Forestry semester #EFUF2021, organized from March to May 2021:

- The myEFUF app, an app that facilitate knowledge exchange and meetings in a virtual setting and available in 5 languages: English, German, French, Italian and Spanish.

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- The Urban Forestry for a Resilient Future webinars, a series of 3 webinars on the 4th, 5th and 6th of May targeted at practitioners, researchers, policymakers and people eager to learn about the manifold opportunities urban forestry provides to make urban areas more resilient, and covering the following themes:
    - **Theme 1**: 'Keeping cities cool and reducing flood risk' – How our urban forests help to provide resilience, and what we can do to make them more adaptable to climate change and urban expansion
    - **Theme 2**: 'The air we breathe and the way we feel' – The role of the urban forest in meeting our basic life needs and addressing the challenges of physical and mental health
    - **Theme 3**: 'Trees and urban design' – How trees and GI are integral to the development of our towns and cities in creating places where people want to live, work and play and how forest products can help to reduce our carbon footprint.

<u>- Glimpsing through the trees - round of introductions to projects on urban green space, trees, human health and well-being? (13:30-14.00 CET time)</u>

<u>Participants:</u>

- Annebel Soer (EFI)
- Tadhg MacIntyre (Maynooth University)
- Erik Andersson (Stockholm University Resilience Centre)
- Michael Scherer-Lorenzen (Freiburg University)
- Katriina Kilpi (Nature Minded)
- Bettina Wilk (ICLEI)

<u>Wrap Up of the session – Written by Knill, V., adapted from Knill, V. (2021, 2)</u>

Starting off the session, Annebel Soer (EFI) presented Green4C (GreenForCare), a project looking at nature activities that promote physical and mental well-being, health and social inclusion. The three-year project, co-funded by the Erasmus+ Programme of the European Union, aims to contribute to the development of Green Care entrepreneurial opportunities and to facilitate capacity and skills for students, researchers, professionals and practitioners. New learning approaches and platforms step into place that help develop and enhance knowledge exchange in the field of Green Care.

Walking further down the green path, Tadhg MacIntyre (Maynooth University) took participants on a tour to learn about natural ways to foster urban mental health and well-being: GoGreenRoutes. The project pursues to grow nature-connectedness across Europe, Latin America, and China. Restoring our natural surroundings and ensuring accessibility to urban green spaces are essential steps to promote increased usage of green corridors, increased ways of active mobility, and contributing to society's health and well-being. A multidisciplinary consortium of 40 organisations teams up to link participatory approaches and citizen science with digital innovation, co-creating so-called "Urban Well-being Labs" in six "Cultivating Cities", developing a set of environmental quality indicators and exchanging lessons-learnt among different "Seed Cities" and a "Cross-Pollination Network". Let's start sowing!

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How to ENABLE green and blue infrastructure (GBI) potential in complex social-ecological regions? A systematic approach for assessing local solutions was presented by Erik Andersson (Stockholm University Resilience Centre). For society to thrive in urban areas, cities need to provide social and environmental benefits. This can be achieved through well-designed GBI, which come with significant potential to deliver multifunctional opportunities for social inclusion, health and human well-being, stormwater retention and habitat functions. Focusing on five case study sites, ENABLE examines how and under what conditions people favour those benefits the most. The project further looks into the distribution of GBI benefits among urban residents and their accessibility and how to ensure a GBI benefit-flow in the long run.

So how should a forest look like to make us feel well and to contribute to our health? And can this be aligned with site-specific biodiversity conservation and forest ecosystem management? A group of researchers united within the scope of the Dr. FOREST research project to answer these questions and quantify the impacts of forest diversity on human health and well-being. Michael Scherer-Lorenzen (Freiburg University) gave insights into the effects and underlying mechanisms with which tree diversity in temperate forests influence human health and well-being.

Time to dive into the forests of Belgium. Katriina Kilpi (Nature Minded) introduced the benefits of strategically designed forest bathing trails to enhance resilience, health and well-being and highlighted the need for nearby and accessible nature spaces. Furthermore, Katriina Kilpi presented the International Forest Therapy Days (IFTDays), which provide a meeting place for international forest therapy practitioners, scientists, and people eager to apply nature's healing effects in their work. Throughout a range of events in nature, participants are invited to learn about different practices, share their knowledge and experience, and expand their tools regarding forest-based health practices.

It is in our nature to network - Bettina Wilk (ICLEI) introduced NetworkNature, a resource for the nature-based solutions (NBS) community, which aims to spread the word about NBS and to create opportunities to maximise their impact on a local, regional and international scale. Funded by the European Commission under the Horizon 2020 programme and guided by strategical impact pathways, NetworkNature seeks to synthesise and strengthen the NBS evidence base and engage existing stakeholders and expand related communities. Further activities aim to ensure a mutual informing between NBS science and the policy agenda and accelerate the uptake of NBS across different sectors.

The session packed with manifold insights on how urban green spaces provide a window to connect with nature, recreate, interact with others and enhance the way we feel was brought to an end with a short discussion.

- Video Poster Session. "Research and Practice and Perspectives on Integrated Forest Management and Urban Forestry Contributions by young researchers and practitioners (14:00-15.00 CET time)

Participants:

- Clive Davies (EFI)

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- Amelie Claessens (IUCN Urban Alliance; University of Antwerp, Belgium)
- Annie Yuan (University of Toronto, Canada)
- Becky Duncan (Open Aye C.I.C, Scotland)
- Dean Bell (Centre for Sustainable Planning and Environments, University of the West of England)
- Karolina Zięba-Kulawik (University of Agriculture in Krakow, Poland)
- Patrycja Przewoźna (Adam Mickiewicz University, Poland)
- Paolo Viskanic (R3GIS Ltd)
- Ramona-Elena Scriban (University Ștefan cel Mare of Suceava, Romania)
- Sally Torres Mallma (Universidad Ricardo Palma, Peru)

Wrap Up of the Video Poster Session – Written by Knill, V., adapted from Knill, V. (2021, 3)

Clive Davies, Chair EFUF International Steering group, moderated the virtual session and highlighted the relevance of giving young scientists a voice.

Amelie Claessens (IUCN Urban Alliance; University of Antwerp, Belgium) examines the cooling effect of trees in street canyons with the help of the EUREC-air laboratory of the University of Antwerp and local citizen scientists. To do so, she measures temperature from April 2020 until April 2021 on 37 points throughout three adjacent street canyons with a similar orientation but with different numbers of trees. As a result, a high-resolution map of intrastreet variations will be created. With this map's help, it will be feasible to carry out comparisons on a spatial and temporal scale, examining heat stress severity to humans.

The benefits urban green infrastructure (GI) provides can be harnessed best when involving all stakeholders that benefit directly and indirectly from those. Public awareness is crucial for GI development to be perceived, understood and appreciated widely. However, GI knowledge is mostly shared among professionals. But what about the knowledge of urban residents and their interest in green infrastructure development in residential landscapes? Annie Yuan (University of Toronto, Canada) importantly explored this topic focusing on living green infrastructure (GI) as an emerging concept referring to trees and other vegetated spaces that provide a range of ecosystem services and therefore benefits to citizens. Annie surveyed residents living in the City of Philadelphia, PA, to find out more about what residents already know about the concept of GI and what environmental concerns exist to identify barriers and opportunities to GI development and its management in the long run. Results indicate that most people are interested in recreational aspects and aesthetic values of GI.

Speaking of recreation, there are many different ways that well-being and mental health can be enhanced through activities in woodlands. Becky Duncan and the team of Open Aye C.I.C, Scotland, use creativity in woodlands to enhance mental health amongst diverse groups in their project 'Wellbeing Of The Woods'. Through a participatory approach and arts therapy practice, this project, supported and funded by Scottish Forestry, engages people from different countries and backgrounds in nature. The setting: Woodlands in Scotland. The equipment: A camera and a backpack packed with all you need for a one-day excursion.

Given the increasing recognition of tree-based ecosystem services, different politically-driven planting targets have stepped into place in cities worldwide. However, many initiatives neglect

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crucial topics such as available planting space and growing requirements. Hard landscapes and impermeable soil surfaces do not make tree planting an easy task. High mortality rates of young trees is therefore a common phenomenon. What can be done from an engineer's perspective to counteract this trend? How can we increase tree growth and long-term survival to help trees reach their species potential and optimise ecosystem services delivery? Dean Bell (Centre for Sustainable Planning and Environments, University of the West of England) invites us to learn about his research on the role of multidisciplinary integration in achieving resilient tree pits in hard landscapes, reporting key concepts of engineered solutions through a literature-informed typology. This research's key message is that multidisciplinary integration is fundamental in achieving climate-ready, resilient and multifunctional tree pit infrastructure in hard landscapes.

To adequately monitor and ultimately enhance and protect the ecosystem services provided by urban trees, it is paramount to put these services into the equation. Let's take a look at the example of Poland: How did the relaxed legislation on tree cutting in 2017 impact urban trees and their provision of ecosystem services? Contributions by two young reseachers from Poland importantly assessed this development. Karolina Zięba-Kulawik (University of Agriculture in Krakow, Poland) used a methodology for combining remotely sensed data with field measurements to assess selected tree parameters to estimate ecosystem services (ES) provided by urban trees. The study team determined values of ES provided by trees in 2017 in Racibórz (Poland) and estimated the loss of ES in a period of changing legislation that temporarily allowed removal of trees on private property without permission from city authorities. A main conclusion drawn is that tree inventories require application of a combination of multi-source data analyses.

Trees growing on private property have become an essential part of urban green policies. In many places, restrictions are imposed on tree removal on private property. Monitoring compliance of these regulations often results difficult due to a lack of reference data and public administration capacity. Using a method based on LiDAR allows for monitoring green areas, including private properties, despite these limitations. Patrycja Przewoźna (Adam Mickiewicz University, Poland) applied this method for the impact assessment of the temporary suspension of mandatory permits on tree removal, which was in force in 2017 in Poland. Explore the results about the use of bi-temporal ALS point clouds for tree removal detection on private property, highlighting the importance of regular monitoring of UTC for effective urban tree management.

A new approach to urban green area management was presented by Paolo Viskanic (R3GIS Ltd). The EU-funded LIFE Urbangreen project is trying to improve urban green area management through innovative tools, which help to assess and maximise ecosystem services and prepare cities to better adapt to the effects of climate change. To put this into practice, the main objective is to develop and demonstrate in real-life an innovative technological platform to improve management of green areas in 2 European and one Asian city.

Ramona-Elena Scriban (University Ștefan cel Mare of Suceava, Romania) importantly assessed urban cultural values identified in the forest certification process. Using Romania as a case study, Ramona examined the role of the voluntary forest certification process for the identification of urban cultural values additional to the mandatory forest management planning process and discussed a range of practical examples.

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Last but not least, Sally Torres Mallma (Universidad Ricardo Palma, Peru) took participants on a trip to the Peruvian Lomas Ecosystems Landscape. Her research focuses on integrating Ecosystem-based Adaptation (EbA) in Lomas Ecosystems into urban policies for climate change adaptation. Taking into account Lima's rapid and uncontrolled urbanisation as well as land traffic and inappropriate use, reflecting climate risk management and adaptation gets ever more important. Sally concluded that inside the landscape approach, Lomas Ecosystems within its environmental, social, and economical components should be considered.

CONCLUSION

The first stage of the learning mechanism was heavily impacted by the Covid-19 situation. The 1st call, the task force and the twinning mechanism was postponed to further stage of the project. However, the 1st international thematic workshop was able to be organized in a virtual way on March 2021. Despite being organized online after a year where a lot of virtual events have been organized, the numbers shown at registration (more than 1000 attendees registered) indicates that the thematic has a very strong appeal to a diversity of actor. This is very positive for the next phase of the project, where we could hope for a great participation for the different mechanisms of the learning architecture of CLEARING HOUSE.

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