REGREEN
NATURE-BASED SOLUTIONS

Fostering nature-based solutions for smart, green and healthy urban transitions in Europe and China

WP N°8 Innovation and impact creation

REPORT ON REGREEN WORKSHOP IN NINGBO, CHINA

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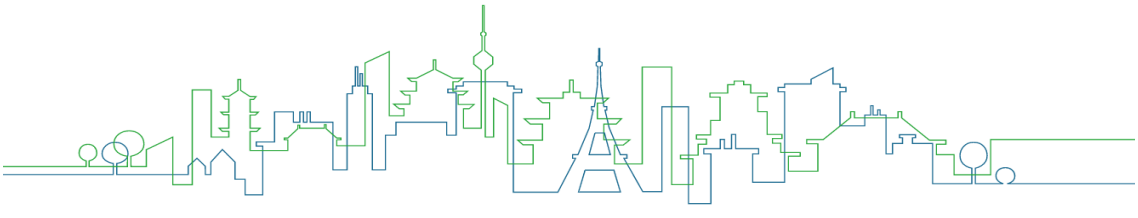

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EXECUTIVE SUMMARY

- For the first time since the beginning of the REGREEN project, REGREENERs were able to meet our Chinese colleagues face-to-face at a joint International Workshop on "REGREEN: Nature-Based Solutions for Smart, Green and Healthy Urban Transitions in China and Europe" held 27-30 October 2023 hosted by the Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS) in Ningbo, China.
- The workshop in Ningbo was a demonstration of bonding between European and Chinese counterparts after working together through virtual media and exchange of email texts and documents over 4 years. Technically and scientifically the same outcomes could have been achieved through virtual media. However, the Ningbo workshop demonstrated that face-to-face meetings are irreplaceable in order to gain mutual understanding of common scientific, social and cultural challenges between European and Chinese colleagues.
- The success of the workshop was due to the excellent organisation by Professor Yao Yang XU (IUE-CAS), Professor Jun YANG, Tsinghua University, Beijing and Professor Bin ZHAO at Fudan University, Shanghai. It comprised field visits to NBS sites in Shanghai and Ningbo and a one-and-a-half-day workshop in Ningbo. There were 48 participants in all of which 11 were from REGREEN Europe.
- The workshop featured academic exchanges through presentations and roundtable discussions on topics on: NBS governance and enablers, urban environmental challenges, NBS evidence dataset, ecosystem services mapping and model construction, business investment models of NBS, urban planning transformation, collaborative NBS design, education, and citizen science, all within the conceptual framework of reshaping and greening urban areas.

TABLE OF CONTENTS

LIST OF FIGURES

1 INTRODUCTION

With the joint support of the National Key R&D Program, the EU Horizon 2020 Program, and the Ningbo Top Talents Science and Technology Program, the International Workshop on "REGREEN: Nature-Based Solutions (NBS) for Smart, Green, and Healthy Urban Transitions in China and Europe" was hosted by the Institute of Urban Environment, Chinese Academy of Sciences (IUE, CAS), Ningbo Academician Center and Ningbo South Intelligence & Creation Corridor held at the Ningbo Academician Center located in Yinzhou District, Ningbo, 28 - 30 October 2023.

The overall goal of the China-Europe cooperation project is to enhance urban liveability. Through systematic simulation and integration of ecosystem services and biodiversity, it aims to establish NBS and its scientific basis that can be widely implemented by both public and private practitioners. This initiative seeks to empower urban planners and policymakers to better address current and future challenges in climate resilience, public health and well-being, and social inclusivity. Together, it aims to accelerate the equal, green, and healthy smart transformation of cities in China and Europe.

2 PROGRAMME DEVELOPMENT

2.1 Objective of the workshop

To facilitate exchange between academics on outcomes of research carried out on Nature Based Solutions in Europe and China.

2.2 Preparation of the workshop

In order to facilitate the workshop, Richard Hardiman held meetings with the main organisers of the workshop (Professors, XU Yao Yang, ZHAO Bin and JUN Yang), in China and paid visits to NBS sites in the three ULLs (Beijing Shanghai and Ningbo) in May 2023. The meeting finalised the format, location and site visit for the workshop.

2.3 Workshop description

The workshop featured academic exchanges through keynote speeches, roundtable discussions, and on-site visits. The keynote speeches will focus on NBS and cover topics such as identifying urban environmental challenges, NBS evidence dataset, ecosystem services mapping and model construction, and the multiple benefits and business investment models of NBS. The roundtable discussions will encompass topics related to urban planning transformation, collaborative NBS design, stakeholder engagement, education, and citizen science, all within the conceptual framework of reshaping green. On-site visits will facilitate the exchange of practical experiences in NBS between cities such as Ningbo, Beijing, Shanghai, Paris, Aarhus, and Velika Gorica.

2.4 Overall Programme

Date	Time	Schedule	Venue
25th Oct Wednesday	/	Arrival (Volunteers will pick up guests at the airport)	Bolin Hotel, Shanghai (1258, Yinhang Road, Yangpu District)
	18:00	Dinner	Cafeteria at Jiangwan Campus of Fudan University (No. 2005 Songhu Road, Yangpu District)
26th Oct Thursday	/	Arrival (Volunteers will pick up guests at the airport)	Bolin Hotel, Shanghai (1258, Yinhang Road, Yangpu District)
	15:00	Visit to Zuga Museum, Fudan University Handan Campus	Fudan University Handan Campus (No. 220 Handan Road, Yangpu District)
	18:00	Welcome dinner	Liangzao Compound (No.918 Songfa Road, Baoshan District)
27th Oct Friday	8:30 – 10:00	Go to Wetland Park	Dongtan Wetland Park, Shanghai (Complex road conditions, need to be on time)
	10:00 - 10:40	Arrive at the Wetland Park, visit the Yangzi Alligator Pavilion, Large plot, and the Yangtze River Estuary Wetland Station Scientific Research Pavilion	
	10:40 - 11:30	Introduction to Ecological Restoration Project	
	11:45	Lunch	
	13:30	Leave for Ningbo	Ningbo Academician Center
28th Oct Saturday	09:00 -10:00	Opening Session	Ningbo Academician Center
	10:20 - 12:00	Workshop	
	12:00 – 14:00	Lunch	
	14:00 – 18:00	Workshop	
	18:00 – 20:00	Dinner	
29th Oct Sunday	08:30 – 12:10	Workshop	Ningbo Academician Center
	12:10 – 12:30	Ending session	
	12:30 – 14:00	Lunch	
	14:00 – 17:00	Visit to Meishan Bay	Meishan Bay, Ningbo
	17:00 – 19:00	Dinner	Institute of Urban Environment, Chinese Academia of Sciences, Ningbo Station
	After dinner	Return to Academician Center	Ningbo Academician Center
30th Oct Monday	9:30 - 12:00	Visit to Eco-corridor	Eco-corridor, Ningbo
	12:00 - 13:00	Lunch	Downtown, Ningbo
	After Lunch	Return to Shanghai	

3 SUMMARY & INSIGHTS OF WORKSHOP AND FIELD VISITS

3.1 Workshop Session 1

Saturday, 28 October, Ningbo Academician Center		
Chair: 赵斌 Bin Zhao & Gregor Levin **Rapporteur: Francesca Tedeschini**		
Opening Session		
Time	**Arrangement**	**Speaker (Institute)**
09:00 - 09:30	Opening Speech	朱永官 Yongguan Zhu (IUE, CAS); Wuwei You (Ningbo Municipal People's Government); Shaohua Chen (IUE, CAS)
09:30 - 09:45	Overview of REGREEN Project	Gregor Levin (Aarhus University)
09:45 - 10:00	Transition handbook	Elena Petsani (ICLEI Europe)
Scientific Workshop		
Time	**Title**	**Speaker (Institute)**
10:20 - 10:45	NBS governance: Barriers and enablers	Anders Branth Pedersen (Aarhus University)
10:45 – 11:10	Cross-Cultural Assessment of NBS: development of an evaluation framework	Hans-Peter Ellmer & Francesca Tedeschini, (Joanneum Research)
11:10 - 11:35	Exploring community perceptions and engagement of nature-based solutions: The case of Ningbo, a Chinese coastal sponge city	Faith Chan (University of Nottingham, Ningbo, China)
11:35 - 12:00	NBS and Public Participation in China	Richard Hardiman & Kelly Guyu Dai, (Hebrew University of Jerusalem, Israel & ICLEI East Asia)

General information of the session

Presentation	**Transition handbook**
Invited Speakers	Elena Petsani
Key highlights • Emphasis on creating a Chinese version of the handbook • Duration of REGREEN project in China for one more year	
Good ideas: • *Prof Zhu:* ○ *Translate the handbook specifically for policy makers and practitioners in China (absence of such handbook in the country)* ○ *Aim to publish it before the conclusion of the Chinese phase of the project* • *Daniela:* ○ *Propose further collaboration in Network Nature, potential engagement in more than 50 projects.*	

Presentation:	**NBS governance: Barriers and enablers**
Invited Speakers:	Anders Branth Pedersen
Good ideas: • *Richard Hardiman:* ○ *Suggested exploring alternative technologies for mapping, such as utilizing infrared for heat maps.* • *Anders:* ○ *Shared insights from Aarhus, where discussions included the potential use of virtual reality for engaging with political representatives.*	

Presentation:	**Sustainable business model development**
Invited Speakers:	Hans-Peter Ellmer
Key highlights • Linking financially sustainable projects to the value creation of real estate properties and the connections with SDGs → not only a way to organize the economy but also social well-being and health • Stressed the importance of avoiding the risk of green washing • Challenge of creating financial value in a sustainable way while still generating profit	
Good ideas: • *Prof Bin Zhao:* ○ *Introduced the concept of Gross Ecosystem Product (GEP) for valuing nature in decision-making processes – but the calculation of this measure brings a lot of uncertainty*	

Presentation:	**Exploring community perceptions and engagement of nature-based solutions: The case of Ningbo, a Chinese coastal sponge city**
Invited Speakers:	Faith Chan
Key highlights • People in China are very busy – no time to enjoy green spaces • High level of trust in the government's ability/responsibility to address/take care of climate adaptation-related issues. • Green branding is a great drivers for Chinese cities • People reluctant to disclose personal information, especially job info (maybe due to lack of understanding of NBS) + very busy	

Good ideas:
• *Faith Chan:*
  ○ *Education goes through social media for young people. Chinese app (similar to YouTube) to approach the female target*
• *Daniela:*
  ○ *"Nature based economy" as a way to connect NBS with job creation, entrepreneurship, new services from companies*

Presentation:	**NBS and Public Participation in China**
Invited Speakers:	Richard Hardiman & Kelly Guyu Dai
Key highlights • Elements of public participation: naivety, social cohesion and environmental decision making • Possibility for other cities to replicate similar approaches? Shanghai trough bottom up movements and agency	
Good ideas: • *Richard:* ○ *replicability should start from pilot cities that set the example (e.g. sponge city project) and then organize meetings in other cities to create a mushroom effect*	

3.2 Workshop Session 2

Saturday, 28 October, Ningbo Academician Center		
Chair: 肖航 Hang Xiao & Richard Hardiman; **Rapporteurs: Hans-Peter Ellmer and Gregor Levin & Daniela Rizzi**		
Time	**Tittle**	**Speaker (Institute)**
14:00 – 14:25	Mangrove plantation: a possible Nature-based Solution for Coastal Wetland Restoration in Shanghai	蔡星星 Xingxing Cai (Fudan University)
14:25 – 14:45	Can ecosystems with a higher rate of carbon sequestration maintain their high value in response to extreme high temperature-drought weather?	袁祺 Qi Yuan (Fudan University)
14:45 – 15:05	"Photovoltaic Achieves multiple Benefits in Northwestern China:	谭兵 Bing Tan (Fudan University)
15:05 - 15:25	Grazing Initiatives and Cooling"	周思齐 Siqi Zhou (Fudan University)
15:25 - 15:45	Why Do Cities earn the name ''Spring City''?	许冬凡 Dongfan Xu Fudan University

Saturday, 28 October, Ningbo Academician Center		
Chair: 肖航 Hang Xiao & Richard Hardiman; Rapporteurs: Hans-Peter Ellmer and Gregor Levin & Daniela Rizzi		
Time	**Tittle**	**Speaker (Institute)**
16:05- 16:25	Assessment of urban ecological risks with multimodal remote sensing and machine learning	王琳 Lin Wang (IUE, CAS)
16:25 - 16:45	Quantitative study on the cooling effect of green roofs in a high-density urban area: A case study of Xiamen, China	林美霞 Meixia Lin (IUE, CAS)
16:45 - 17:10	Urban green spaces reduce heat related mortality risk in Paris **(Online)**	Ben Wheeler (European Centre for Environment and Human Health (ECEHH); University of Exeter)
17:10 - 17:35	A functional typology for NBS, and opportunities to implement in research & practice **(Online)**	Laurence Jones (UK Centre for Ecology & Hydrology (UKCEH))
17:35 – 18:00	Education, Awareness and Participation **(Online)**	Sally Anderson (Aarhus University)

General information of the session

Session title:	**Nature Based Solutions in Europe and China**
Date and hour:	28/10/2023 14:00 - 14:25
Rapporteur:	Hans-Peter Ellmer
Facilitator:	肖航 Hang Xiao & Richard Hardiman
Invited Speakers:	蔡星星 Xingxing Cai, Fudan University
Presentation(s)	Mangrove plantation: a possible Nature-based Solution for Coastal Wetland Restoration in Shanghai

Key points of the discussion:

Highlighted quotes Xiao: • This action faces the threats: Reclamation of the space, exotic species invasion, coastal erosion and climate change • Necessary because of severe water and soil pollution • First mangroves have been planted in 1950; due to increased temperature, mangroves survive Shanghai's winter • Found out that two mangrove species have potential for natural growth at the coast of Shanghai • Challenge: in the early stage, the problem of flood – the upper leaves get killed Q: When would the mangroves die under water? A: They survive zero degree, under water they are fine, only the upper parts are freezing and die.. Q: Do you measure ES-services? A: No natural habitat Shangai, measure how artificial plantation works. No specific research on which effect on ecosystem services.
List of good ideas for taking action: • New situation with higher temperatures due to climate change requires trials and research with new plants. • Necessary to find out which – more tropical plants – are suitable for the local climate and the purpose of coastal protection

Session title:	**Nature Based Solutions in Europe and China**
Date and hour:	28/10/2023 14:25 - 14:45
Rapporteur:	Hans-Peter Ellmer
Facilitator:	肖航 Hang Xiao & Richard Hardiman
Invited Speakers:	袁祺 Qi Yuan, Fudan University
Presentation(s):	Can ecosystems with a higher rate of carbon sequestration maintain their high value in response to extreme high temperature-drought weather?

Highlighted quotes Qi Yuan: • The goal of this research was to show limitation of carbon sequestration as a NBS • Alien vegetation has a higher carbon sequestration, but decreases rapidly with increasing temperature • Well-arranged vegetation with varying tree heights can better maintain a stable carbon sequestration Q: Did you also analyse plantations in cities? A: No Q: Is it possible to transfer the results to a city context?

A: No, it is not possible. In cities for example heat islands are an important aspect. Here it is hard to say, what is human made and what is nature based – this needs to be considered. Q: What was a native species yesterday, and what will be one tomorrow? A: Just follow temperature (changes) means native, planted is artificial. It is possible that mangroves are a native species in Shanghai in some decades
List of good ideas for taking action: • *The importance of planning the plantation:* If planting think of divers species and the heights (fitting in the context of the region). Bigger canopies provide bigger shadows for the smaller trees. This leads to a healthier and more sustainable vegetation • *Work out the differences between rural and urban regions, include influence of humans*

General information of the session

Session title:	**Nature Based Solutions in Europe and China**
Date and hour:	28/10/2023 14:45 - 15:05
Rapporteur:	Gregor Levin
Facilitator:	肖航 Hang Xiao & Richard Hardiman
Invited Speakers:	谭兵 Bing Tan, Fudan University
Presentation(s):	Photovoltaic Achieves multiple Benefits in Northwestern China: Grazing Initiatives and Cooling

Key points of the discussion:

Key highlights • Large-scale establishment of photovoltaics has made the desert turn green > changes soil temperature and humidity > improves soil conditions • Manure from sheep breeding improves soil fertility • Scrub encroachment affect the efficiency of power production and can lead to fire hazards • The cooling effect of photovoltaics decreased with distance
Good ideas: • *Can photovoltaics be a NBS strategy to achieve multiple ecosystem services?* • *Need to adjust modelling/assessments of benefits from photovoltaics to different geo-climatic regions*

General information of the session

Session title:	**Nature Based Solutions in Europe and China**
Date and hour:	28/10/2023 15:05 - 15:25
Rapporteur:	Gregor Levin
Facilitator:	肖航 Hang Xiao & Richard Hardiman
Invited Speakers:	周思齐 Siqi Zhou, Fudan University

Session title:	Nature Based Solutions in Europe and China
Presentation(s)	Quantifying the optimal green coverage considering urban greenspace cooling efficiency

Key points of the discussion:

Key highlights • Existing research tends to focus on the cooling effect at local scale, while little attention is paid to the surrounding thermal effects of land cover and thus the cooling effect of green roofs at city scale • The cooling effect of green roofs is context and scale dependent (building height and density; wind pattern; type of green roof; seasonal weather variations)
Good ideas: • *You might consider also to assess the effects on human health and well-being*

General information of the session

Session title:	Nature Based Solutions in Europe and China
Date and hour:	28/10/2023 15:25 - 15:45
Rapporteur:	Gregor Levin
Facilitator:	肖航 Hang Xiao & Richard Hardiman
Invited Speakers:	许冬凡 Dongfan Xu, Fudan University
Presentation(s)	Why Do Cities earn the name ''Spring City''?

Key points of the discussion:

Key highlights • Spring cities can be defined as cities with a mild climate and relative seasonal climatic stability supporting human well-being. • The “secret” of spring cities is commonly linked to geographic location with unique natural conditions, not taking into account human factors. • Out of 80 examined cities, only 13 have remained unchanged (can still be defined as spring city) and only 5 will remain unchanged under future climate change • Nature-based solutions can help keeping spring cities
Good ideas: • *Could the “spring city” definition be used as a benchmark / threshold to promote implementation of NBS?* • *Would be interesting to quantify the effect of spring cities on e.g. human health and well-being*

General information of the session

Session title:	**Nature Based Solutions in Europe and China**
Date and hour:	29.10.2023 16:05-18:00
Rapporteur:	Daniela Rizzi
Facilitator:	杨军 Jun Yang, Tsinghua University
Invited Speakers:	王琳 Lin Wang, 林美霞 Meixia Lin, Ben Wheeler, Laurence Jones, Sally Anderson
Key thematic areas that this session belongs to:	Assessment of urban ecological risks with multimodal remote sensing and machine learning Quantitative study on the cooling effect of green roofs in a high-density urban area: A case study of Xiamen, China Urban green spaces reduce heat related mortality risk in Paris **(Online)** A functional typology for NBS, and opportunities to implement in research & practice **(Online)** Education, Awareness and Participation **(Online)**

Key points of the discussion:

Highlighted quotes (including who said what):

- Lin Wang's Presentation
  - Topic Overview: assessment of urban ecological risks; Importance of early warning technologies.
  - Key Stressor analysed: PM2.5 concentrations as a primary stressor; analysis and discussion on the levels of PM2.5.
  - Risk Assessment and Prevention: The need for more comprehensive risk assessments; implementing stricter measures for better prediction and prevention.
  - Geographical Focus and Findings: central and north-eastern coastal areas Identified as high risk; Case Study: Fujian's market-based approach and public participation.
  - Policy Implications and Recommendations: quantitative evaluation of policy efficacy; suggestions for future environmental policies; the importance of joint regional planning.
  - Methodological Insights: necessity of considering different scales in risk assessment.
- Meixia Lin's Presentation:
  - Urbanization and Heat Islands: High-density urbanization exacerbates the Urban Heat Island (UHI) effect.
  - Mitigating UHI with Green Roofs: Roof greening shows a significant cooling effect in urban areas; Importance of considering biodiversity in the implementation of green roofs.
  - Research Gaps and Challenges: Existing research has paid little attention to the surrounding environment of green roofs; Professional models for evaluating green roofs are often too complex for urban planners.
  - Case Study: Xiamen Island: Green roofs cover 2% of the total rooftop areas on Xiamen Island; Land Surface Temperature (LST) measurements ranged from 30m² to

500m²; A decrease of 0.4 degrees Celsius for every 100m² of green roofs was observed; The larger the green roof area, the greater the cooling effect; Limitation: The research did not account for the height of buildings in evaluating the cooling effects.

- Ben Wheeler's presentation
  - Research Focus: Exploring the impact of green spaces on urban heat-related mortality rate reductions in Paris; Analysing the health economic value associated with these reductions.
  - Key Findings: The research examined cooling intensity and cooling distance of green spaces; A cooling distance boundary of 200 meters was adopted for the study; Larger green spaces were found to have a greater cooling effect; The study included 90 green spaces in Paris, ranging from 1,000m² to 750km².
  - Impact on Mortality and Population: Estimation of lives saved due to the cooling effects of green areas; Calculation based on the value of statistical life: €71,971,150; Approximately 21.5 lives estimated to be saved; 57% of the Parisian population lives within the maximum cooling distance of green spaces.
  - Research Insights and Limitations: The age-heat-mortality aspect was not considered in this study; Detectable effect of green spaces on temperature reduction; Larger green spaces also cooled a larger surrounding area (buffer); Interaction observed between different green spaces.
  - Future Research Considerations: Importance of considering land uses around green areas; The study suggests examining the effects of edges in future research.
- Laurence Jones's presentation
  - Typology Overview: Introduction to the REGREEN Typology for Nature-Based Solutions (NBS).
  - Scenario Development and Policy Exploration: Describing the development of scenarios for future policy planning; Emphasis on policies in European and Chinese Urban Living Labs (ULLs).
  - Typology and Ecosystem Services Linking: Opportunities for connecting European and Chinese ecosystem services modelling.
  - Purpose of Developing a Typology: To support decision-making processes; Balancing natural capital elements with human usage elements.
  - Typology Details: Classification into 40 subcategories; Analysis of the 3-30-300 rule.
  - Challenges in Implementation: Difficulty in adhering to the 3-30-300 guidelines, especially in dense urban areas; Challenges in transforming built areas into green spaces.
  - Multifunctionality of NBS: Evaluating how multifunctional Nature-Based Solutions are; Balancing cultural needs with cost-effectiveness.
  - Modelling Time and Effort: The modelling process takes about 4 to 6 weeks for one scenario.
- Sally Anderson's presentation
  - Overview of Learning Platforms: Analog and digital platforms developed to encourage children to engage with nature; Focus on schools, neighbourhoods, and cities as areas of exploration.
  - Educational Platforms and Initiatives: Landscape Laboratory in Sweden: 'Biotopes for Playing'; Citizen Science Project in Paris: 'Vigie Nature Ecole'; Digital Mediation Tool: 'Greenopolis' with exercises for teachers; Field E-BOOKS: Children creating books illustrating their nature interactions; Walkable Floor Maps (WP3): Engaging children in spatial learning.

- Research and Community Engagement: Researchers interviewing politicians and children using maps; Utilizing maps as a creative and engaging tool for meaningful discussions;
- Challenges Encountered: Teachers' time constraints to implement new methodologies; Lack of funding for educational initiatives; Bureaucratic hurdles in taking children outdoors; Overloaded national curricula; Transportation and logistics complications; Limited support from colleagues in educational settings.
- Events and Awareness: Organizing events like Earth Day, Eco Ecole, Green Festival, and Nature Meet to encourage action.
- Observations and Conclusions: Acknowledgement of contradictions in the importance placed on nature; Methods to assess children's learning outcomes; Children's notes to politicians compiled into an e-book.

List of good ideas for taking action:

- Connect REGREEN's findings (see Sally's presentation) with the NBS EduWorld platform (NBS and Education CSA funded by the European Commission).
- The analysis of the 3-30-300 is a very interesting output of REGREEN: it would be recommended to engage with other NBS projects analysing the rule as well and compare findings.
- Throughout the sessions it becomes clear that biodiversity is part of the discussion, but not treated as intrinsic to the NBS concept. A good idea is to reflect on this and take the biodiversity value further in upcoming research, also considering urban settings.

3.3 Workshop Session 3

Sunday, 29 October, Ningbo Academician Center		
Chair: 杨军 Jun Yang & Elena Petsani **Rapporteurs: Anders Branth Pedersen & Richard Hardiman**		
Time	**Title**	**Speaker (Institute)**
08:30 – 08:55	Assessing access to recreational areas	Gregor Levin (Aarhus University)
08:55 - 09:20	Assessing the potential of large-scale urban forest projects as a natural climate solution	杨军 Jun Yang (Tsinghua University)
09:20 – 09:40	Aquatic benefits and beyond: How urban tree planting enhances ecosystem services	Yueming Qu (UK Centre for Ecology & Hydrology - UKCEH))
09:40 – 10:00	Implementing Urban Agriculture as Nature-Based Solutions in China: Challenges and Global Lesson	朱者 Zhe Zhu (Institute of Urban Environment, Chinese Academy of Sciences)
10:00 – 10:20	“Nature-based Solutions for Cities" in Research Wave	徐耀阳 Yaoyang Xu Institute of Urban Environment, Chinese Academy of Sciences

General information of the session

Session title:	**Scientific Workshop**
Date and hour:	29.10.2023 08:30-10:20
Rapporteur:	Anders Branth Pedersen & Richard Hardiman
Facilitator:	杨军 Jun Yang & Elena Petsani
Invited Speakers:	Gregor Levin, 杨军 Jun Yang, Yueming Qu, 朱者 Zhe Zhu, 徐耀阳 Yaoyang Xu, Elena Petsani, Daniela Rizzi & Kelly Guyu Dai
Key thematic areas that this session belongs to:	Assessing access to recreational areas Assessing the potential of large-scale urban forest projects as a natural climate solution Aquatic benefits and beyond: How urban tree planting enhances ecosystem services Implementing Urban Agriculture as Nature-Based Solutions in China: Challenges and Global Lesson “Nature-based Solutions for Cities" in Research Wave

Key points of the discussion:

- Gregor Levin & Julius Knopp analysing equitability in access to green-blue spaces (private/public).
  - What we see very clearly is that in the centre of Aarhus you have much less green space per inhabitant than in the outskirts. If you move further out to the rural areas the green space might decrease again, because the land is not public. Single family houses have the best access, lower for apartments privately owned, and further lower for rented apartments. Tested also differences between age and income groups. Large differences between the ULLs. Much less access in particular in Paris. Discussion on applicability to a Chinese context – there are probably differences in how spaces are used.
- Jun Yang
  - potential of large-scale urban forest projects as a natural climate solution. Million mu project in Beijing 2013-2022. Sampling. Trees and shrubs increased size. Trees contributed 99% of the carbon storage. Shrub only 1%. Large increase in carbon storage. Number of tree species increased. The forest is very managed and therefore the risk of forest fires is low.
- Yueming Qu
  - Trees and aquatic benefits. Hydrological benefits of urban NBS. Share of woodland is positively correlated with aquatic macroinvertebrate biodiversity. Woodland does not need though to be located inside of the urban area. Is riparian tree planting improving water quality. Benefits depend on the river hydraulics, the city and…
- Zhe Zhu
  - Implementing urban agriculture as NBS – can improve food security. Many benefits of it. Three types small-scale, capital-intensive, tourism-type – each have their challenges. Unauthorized use of land is not allowed etc.
- Yao-Yang Xu.
  - NBS for cities. Three steps: protect intact ecosystems, manage working lands; restore native cover to avoid emissions and enhance carbon sinks. We need to understand the interconnected challenges between climate, biodiversity, and society. Decision-makers are requesting updated evidence synthesis of NBS. This can speed up the integration of NBS into policies. Four principles: Inclusive, rigorous……. Stakeholders' co-design bridges science and policy on NBS into practice. Urban living lab enhances replicability of successful NBS. What is the biggest barrier: involving decision-makers broadly – making decision-makers come to interact with scientists.

- *Good ideas for taking action:*
  - Jun Yang: Urban forest project feasibility in other countries need to be evaluated. GL: Is it an idea to extract tree when it grows older, because the largest effect is in young trees. JY: Yes, would be a good idea to extract trees over time.
  - *YYX: Stakeholders co-designing. And more ULLs in different context.*

  - *Best practices*
  - Jun Yang: Million mu project in Beijing for urban forest.
  - Yueming Qu*: Riparian woodland is in general beneficial. Street streets provide multiple environmental and health benefits, but there also some negatives to consider.*
  - Zhe Zhu*: Good experiences with urban agriculture at some places in the global North and elsewhere in Asia. Could be copied to a Chinese context.*

3.4 Workshop Session 4 and Ending Session

Sunday, 29 October, Ningbo Academician Center		
Chair: 杨军 Jun Yang & Elena Petsani **Rapporteurs: Anders Branth Pedersen & Richard Hardiman**		
Time	**Title**	**Speaker (Institute)**
10:40 - 12:10	Stakeholder Mapping and Engagement in China	Elena Petsani, Daniela Rizzi & Kelly Guyu Dai (ICLEI Europe & ICLEI East Asia)
12:10 - 12:30	Ending Session	杨军 Jun Yang & Richard Hardiman (Tsinghua University & Hebrew University of Jerusalem, Israel)

Introduction:

The in-person stakeholder engagement workshop held in Ningbo marked a successful collaboration between the REGREEN team, comprising both Chinese and European partners. The primary objective was to brainstorm effective ways for stakeholders to collaborate more efficiently in the context of nature-based solutions (NbS).

Workshop Structure:

Four breakout groups were formed, each tasked with selecting a case study or scenario. The participants engaged in a structured exercise following the elements of WHY, WHO, and HOW. The sequence involved questioning the purpose (WHY) of engagement in the chosen scenario, identifying the groups of stakeholders (WHO) and categorizing them, and brainstorming various formats for stakeholder engagement (HOW).

Time Constraints:

The groups faced a challenging time constraint of 30 minutes for brainstorming. Consequently, the workshop's outcomes are somewhat generalised. Ideally, the workshop format would have demanded an entire afternoon or even a full day of collaborative effort. Unfortunately, extending the duration wasn't feasible within the framework of the REGREEN event in Ningbo due to agenda and time constraints.

Added Value and Future Prospects:

Despite the time limitations, the workshop provided valuable insights and served as inspiration for our Chinese partners. The aim is for them to organise similar workshops with their stakeholder groups in an extended format, allowing for more in-depth exploration. ICLEI Europe received exceptionally positive feedback on this interactive session, highlighting its significance throughout the REGREEN event in Ningbo.

Conclusion:

The workshop successfully initiated collaborative thinking on stakeholder engagement for NbS. The appendix shows images display the results generated by the four working groups, showcasing the diversity of perspectives and ideas explored during the session.

3.5 Field Trips

3.5.1 Chongming Island Dongton Wetland Park

Chongming Island, situated at the mouth of the Yangtze Delta north of Shanghai, is a vital destination for birdwatchers. Its extensive marshes and mudflats serve as a crucial stopover for migratory birds travelling from Australia to Siberia and back each year. The Chongming Dongtan Ramsar Site is situated on the eastern side of Chongming Island, the world's largest estuarine alluvial island. Notably, it hosts the largest and sole remaining natural mudflat in the Yangtze estuarine region. The Dongtan National Wetland Park attracts thousands of weekend tourists, while the western end, including the tidal mudflats, is a protected nature reserve and Ramsar site designated in 2002.

The site is currently experiencing significant land accretion, expanding by approximately 4 square kilometres each year. This growth is attributed to the abundant sand, mud, and nutrients carried by the Yangtze River, which deposit in the area. The wetland boasts thriving mudflat vegetation, well-developed tidal creeks, and a diverse benthic ecosystem, making it a valuable reservoir of natural resources in Chongming Dongtan Wetland.

The wetlands support various waders, such as Kentish plovers, curlews, whimbrels, greenshanks, sandpipers, egrets, and herons, while parrotbills nest in the reeds. Over 20 bird species are easily spotted on the mudflats on any given morning, with over 290 species visiting the wetland throughout the year. The wetland management works closely with local fishermen and shrimp farmers to promote sustainable, organic approaches to their livelihoods within the wetland. (See source: https://www.ramsar.org/news/visiting-chongming-dongtan-nature-reserve-ramsar-site-no-1144
The wetland is monitored through observation, but also through aerial photography using drones, which track the rehabilitation work of clearing invasive Spartina plants and landforming to create bird islands within the restored area.

3.5.2 Meishan Island

Meishan Island and the coastland is a newly developed town and recreational area located 80kms east of Ningbo City. In its original state the coastal waters are affected by heavy and continual siltation and mudflats from the Yangtze River estuary. It is also subject to strong Typhoon. To improve coastal recreational facilities a barrage and weir have been constructed between the island and the mainland to prevent incoming silt and to clarify the seawater transforming this yellow strait into a “blue lagoon”. There is also an artificial 2 km beach along the strait, with recreational and bathing area open to the public and boating facilities. Further north, a wetland area planted with reed species has been created for migratory birds to settle and as a visitors’ park. An explanation was given by Mr. Chen who also manages an exhibition centre with an excellent viewpoint, demonstrating the barrage to keep out silt, an impressive large ‘floor-map’ of the area, a video and a photographic exhibition of fish, bird, and wetland species. Unfortunately, the exhibition is not open to the public.

The site plays a crucial role in providing key services such as tourism, water services, and flood retention. The implementation of a large-scale “sponge city” concept addresses flooding control, for events with a recurrence of 1 in 100 years. The ecological performance of the area is demonstrated by the good water quality thanks to upstream sedimentation.

Due to its exposure to extreme weather events like typhoons, the area is equipped to anticipate and control flooding from the sea. In 2018, a flood caused a high level of pollution in the water, resulting

in the death of a large number of fish. In response, an ecological project was launched in 2019 to address water quality issues, specifically to remove nitrate.

One interesting sustainable practice is the use of native mussels from salty waters to purify the water of the lagoon. To protect these mussels during floods, the gates of the basin are opened, allowing more salty water to enter and maintain optimal conditions.

3.5.3 Ecological Corridor, East New City, Ningbo

Ningbo is among the wealthiest cities in China with a long and culturally rich history. Located in the Yangtze River Delta and with a port of global relevance it has become an important economical centre with a population of over 5 million[1]).

Due to fast industrial development since the late 1970s, cities in China suffered more and more from life-impacting pollution. Under the light of poisoned ecosystems and effects on public health a national plan to fight pollution came up. The responsibility for implementation lay with the regional governments. Moreover, with the urban expansion as a result of rural-urban migration new cities sprung up in previously rural or neo industrial areas and government-built parks and green spaces in cities with new buildings around. The Ningbo Planning department worked out a masterplan for the creation of the “Ningbo Eastern New City” and is part of a program for the construction of a new city of approximately 1 million people due to Ningbo’s expansion. The new city and the ecological corridor were constructed on previous agricultural rice paddy land and villages and also polluting factories. This included 10 square kilometres of mixed-use urban development around an “Eco-Corridor”, a interconnected network of green spaces for humans, animals and plants.

The prime objective of the Ecological Corridor is to provide a drainage outlet for flood waters toward the main canal system of Ningbo. The Eco-Corridor project was initiated by the “Ningbo Planning Bureau – East New Town Development Committee” and supervised by SWA (2), a leading US landscape architecture, operating all over the world. After several stages of expansion the corridor has been finalized in 2016 with a total area of 37 ha. The corridor was built on highly polluted wasteland or brownfields with dysfunctional ecosystems. It addresses public health and quality of life and increased the value of properties around. The corridor also helps to strengthen neighbourhood communities and also stands as a best practice example for other cities to encourage them on their way of sustainable developments.

The corridor functions as a living filter: The replaced canal system with different streams, ponds and marshland helped to increase water quality massively and also acts as protection against flooding and a natural habitat for animals, fish and migratory birds. Constructed hills and valleys support the cleaning water flow, provide spots with good views for visitors, increasing the habitat diversity. The architects have chosen evergreen species and native vegetation to cleanse rain water, but also for aesthetic reasons[2]. (2) The project plan introduces a dual drainage system surrounding the area: one for sewage water, and one for drinking water. This dual drainage system is persistent in many areas of Ningbo in order to facilitate treatment of wastewater, particularly at times of high storm run-off.

[1] https://www.swagroup.com/projects/ningbo-east-new-town-eco-corridor/

[2] https://www.swagroup.com/about/

Overall, the eco-corridor is a good example for a Nature-based Solution addressing multiple challenges. Beside restoring ecosystems, flood protection and increasing biodiversity, the corridor became a popular spot for locals and tourists[3].

As one of the Chinese participants observed, access to the area is very open compared to parks in e.g. Beijing, which are often surrounded by walls and gated. Consequently, the corridor is more integrated with the daily life of the inhabitants.

Financial aspects of the project: The visit was guided by Mr. Wang Dong, from the Tian He Construction Company which won the tender to undertake the project. The Ningbo municipal government set a public tender for the project which was won by Tian He Construction Company on the basis of design and price. An American consulting company, SWA Group was also part of Tian He's tender (and with which Richard had previously discussed the project). The municipal government paid instalments of 80% of the project during the process of its construction. The project was completed by 2018 and upon completion and inspection of the project, the government paid the remaining 20% of the tender. Tian He then had the responsibility of managing the project for nine years until 2027. Tian He is an ecological and environmental restoration company which has been engaged in two large projects in Ningbo. The first was a PPP project of the Yue Lake (Moon Lake) in 2001. The arrangement was such that the local government set the initiative for restoration of the lake. The national bank provided a loan to Tian He to carry out the work, and only when the work was completed, passed, and certified by the municipal government was the loan to the bank paid off by the government.

[3] https://www.world-architects.com/en/turenscape-haidian-district-beijing/project/sponge-greenway-ningbo-eastern-new-town-ecological-corridor-phase-iii

4 OUTCOMES OF THE NINGBO WORKSHOP AND FIELD VISITS

4.1 Overview

The REGREEN workshop in Ningbo was not just a workshop on Nature-based Solutions in Europe and in China, it was an opportunity for bonding between European and Chinese counterparts after working together through virtual media and exchange of email texts and documents over the past 4 years. Technically and scientifically the same outcomes could have been achieved through virtual media. However, the Ningbo workshop demonstrated that face-to-face meetings are irreplaceable in order to gain mutual understanding both culturally and scientifically. This was emphasized by the fact that at the beginning of the meeting the emphasis was towards the differences between Europe and China regarding Nature base solutions, whereas towards the end of the meeting, the similarities between the two entities were emphasized. Many aspects regarding policy, government administrations, society and technical and science were similar, if not the same.

4.2 Proposals and outcomes of the Ningbo Workshop

- It was suggested that the REGREEN transition handbook be translated to Chinese specifically for policy makers and practitioners in China, because there was no such handbook available in the country. It should be published before the conclusion of the Chinese phase of the project.
- It was proposed there be further collaboration with Network Nature For potential engagement of more than 50 projects.
- It was suggested that Floor Maps could be adapted according to need such as utilizing infrared mapping to demonstrate heat maps in urban areas.
- 3-D virtual reality could also be applied alongside Floor Maps to engage political representatives.
- It was suggested introducing the concept of Gross Ecosystem Product (GEP) for valuation of nature in decision-making processes.
- Europe could apply the concept used in China of central government directed pilot cities for demonstrating and evaluating Nature-base Solutions, and then replicate on a larger scale.
- The adaptation of mangroves in colder climates could be applied to other plants species in the process of adapting to climate change.
- Increasing biodiversity should not only consider spatial biodiversity, but also vertical biodiversity, whereby larger trees can provide shade to smaller trees and shrubs, thereby protecting them in drought and high temperature prone areas.
- Green roofs: research assessment has primarily been on considering thermal and cooling effects of green roofs. It is also suggested to assess their effect on human health and well-being.
- Spring Cities, defined as southern high-altitude cities with mild climates and seasonal climatic stability, are changing as a result of climate change. Adaptation through Nature-based Solutions may be able to retain the qualities of spring cities.
- The benefits of curbing urban heat island effect through green roofs can be quantified not only in regard to their cooling effect but also their consequential impact upon human health and human lives. This, in turn can be quantified monetarily.

- The analysis of the 3-30-300 is a very interesting output of REGREEN: it is recommended that the concept be applied to other NBS projects, analysing this concept and comparing findings.
- Profitability and investment in Nature-based Solutions is demonstrated in China, where double density trees are planted in drainage ditches along roadsides, and then harvested after five years to single density and again after 20 years for a second cycle of replanting. Such an approach could attract private investment.

5 CLOSING MESSAGES

A reverberating message from the workshop was how joint research and exchange of ideas can continue, beyond conclusion of the REGREEN-EUROPE project in February 2024 and although the REGREEN-CHINA project will continue until September 2025.

This face-to-face workshop and previous meetings held virtually, demonstrate that close cooperation has been achieved allowing researchers to continue their collaboration with other sources of funding. The main achievement of the workshop was to provide an amicable setting for exchange and mutual understanding, and elaboration on common interests, methodologies, policy approaches that can be addressed beyond the lifetime of the REGREEN project.

6 ANNEXES

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6.2 ORGANISATION

Institute of Urban Environment (IUE) is a national research institution affiliated with Chinese Academy of Sciences (CAS). It is established in 2006 and specializes in comprehensive research on urban environment. The institute is located in the beautiful southern coastal city of Xiamen, and has an observation and research station in Ningbo. The key research areas are urban environmental quality changes and ecological health effects, urban environmental pollution control and waste resource utilization, urban planning and environmental management. At present, the institute offers master's and doctor's degrees in Environmental Science and Engineering and Ecology.

After 17 years of development and accumulation, IUE has made important research progresses in urban ecological health and environmental safety, urban environmental pollution control and resource technology, urban environmental engineering and circular economy, urban ecological environment planning and management. It has authorized 441 patents and published 3433 articles, among which international cooperative papers account for 42% of the total SCI papers of the institute. IUE has 280 employees, including one academician of the Chinese Academy of Science, one academician of the Chinese Academy of Engineering, six national-level distinguished young scholars, five national-level excellent young scientists and thirty-four PIs. Three of them are selected as the top 2% of the world's top scientists and 2 of them are listed in the world's "Highly Cited Scientists" list. In 2020, the ESI international rankings (top 1%) in the disciplines of Environmental and Ecology and Environmental Engineering, and Nature Index (NI) in the field of Earth and Environmental Science ranked highly among the institutions of CAS.

IUE hosts ISC-Urban Health and Wellbeing Programme Office, CAS Center for Excellence in Regional Atmospheric Environment, International Science & Technology Cooperation Base and National Center of Excellence for Sci &Tech Cooperation and Exchanges to Taiwan under Ministry of Science and Technology. It has CAS key laboratories of urban environment and health and urban pollutant conversation, CAS Engineering Laboratory for Recycling Technology of Municipal Solid Waste and other research platforms. Its laboratories have passed the national laboratory accreditation. It has a bank of talents in the field of urban environmental science, which will provide firm scientific and technological support for the development of local ecological civilization and environmental protection industries.

6.3 FIGURES

Figure 1: Delegates of International Workshop on "REGREEN: Nature-Based Solutions (NBS) for Smart, Green and Healthy Urban Transitions in China and Europe"

Figure 2: Workshop Venue

Figure 3: Workshop Venue

Figure 4: Workshop Venue

Figure 5: Chongming Island Dongtan Wetland Park

Figure 6: Ecological Corridor Ningbo East New City

Figure 7: Meishan Island Wetland Area

Figure 8: View from Meishan Island