

REGREEN VISITS CHINESE COUNTERPARTS AND NBS PROJECTS IN CHINA

Richard Hardiman, Hebrew University of Jerusalem

Facilitated by the recent opening of China since Covid lockdowns, in May-June 2023 REGREENER, Richard Hardiman, made the first visit to NBS projects and to our Chinese counterparts since the REGREEN project began and was warmly welcomed by REGREEN's Chinese colleagues. The visit was preliminary to a proposed REGREEN joint workshop to take place in Ningbo in October 2023. The visit comprised meetings with key counterparts: Kelly Dai of the ICLEI branch in Beijing; Professor Jun YANG at Tsinghua University, Beijing; Professor Yao Yang XU at the Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS), Ningbo; and Professor Bin ZHAO at Fudan University, Shanghai. In addition, meetings were held with the Asia Chapter of the international NGO, Client Earth, in Beijing. The joint meetings were accompanied by visits to several comprehensive NBS project sites in the three cities. At each of the meetings Richard Hardiman presented an overview of the work being undertaken by the REGREEN project giving due emphasis to the governance aspects of the project.

It is clear from the visit that the Government of China is taking NBS extremely seriously with many macro projects taking place in major cities in China. These include the urban reforestation programme whereby cities are required to afforest urban areas. For example Beijing is planting '1 million mu of trees' (66,700 Ha) to mitigate climate change, balance the heat island effect and provide recreational areas. Similarly, China has a two-phased Sponge City programme covering 30 pilot cities selected to introduce an NBS approach to reduce urban flooding.

Beijing:

Beijing Olympic Forest Park

Guided by Kelly Dai of ICLEI-Beijing, a site visit was made to the Olympic Forest Park in North Beijing to see NBS interventions. The 680-ha park is a newly man-made constructed park demonstrating excellent landscaping with lakes, extensive trees, grass areas, walkways and recreational facilities including boating. It also had nature-learning facilities for children comprising a petting zoo and



1 Petting Zoo Beijing Olympic Forest Park

teaching events with insects and butterflies. The park invites a large number of insects and animals and bird species, including migratory birds. However it was noted that the park was not very user friendly with numerous notices disallowing access and areas unnecessarily fenced off to the public, not allowing visitors to walk or sit on grass, and in many cases the grass species used was not suitable for recreation. It would appear that whereas the planning and design were excellent, governance and public intervention in design was lacking.



Professor Jun YANG, Dep. Earth Sciences, Tsinghua University.

Professor Yang is using remote sensing data with 2-metre resolution in multiple sampling sites in different areas of Beijing to identify changes in plant growth in various species between 2013 and 2022, and the relative change in biodiversity. The research is associated with monitoring changes in plants and fauna, especially birds, to understand growth rate and carbon sequestration of different species and demonstrated that the increase in greenery was attracting many migratory birds.

Professor Yang gave an excellent tour of the exquisite, traditionally landscaped Tsinghua University grounds, comprising small lakes, waterfalls, natural rock formations, and Chinese-style pavilions clearly aimed to provide a tranquil environment for contemplation for aspiring scholars.



Prof. Jun Yang and Richard Hardiman

Ningbo:

Professor Yao Yang XU, Institute of Urban Environment, Chinese Academy of Sciences (IUE-CAS), Xiamen branch (located in Ningbo).

A brief workshop was held with Prof. Xu together with his team during which research carried out by REGREEN Europe and REGREEN China was presented. This was followed by extensive visits to NBS projects areas.

Meishan Island

Professor Yao yang Xu provided a visit to Meishan Island located off the coast of Ningbo. Meishan Island and the coastland is a newly developed town and recreational area. In its original state the coastal waters are affected by heavy and continual siltation and mudflats from the Yangtze River estuary. 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 allowing the creation of a recreational beach, bathing area 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.



Meishan Island 'Floor Map'



Sanjiangkou Park was the first park area located at the junction of the three rivers in Ningbo. The park comprised grass areas, trees and open areas which are paved for exercises such as Tai Qi and Qi Gong. A notable feature of the park were the solar panel park benches.

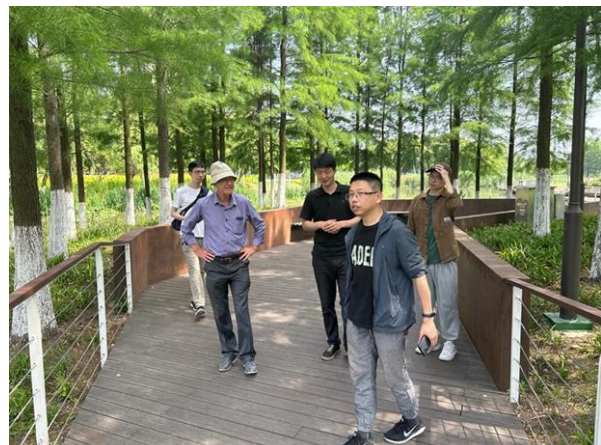
Beilun Central Lake is one of the pilot areas for the national sponge city programme in which 30 cities have been selected to test the sponge city initiative. The visit was guided by Mr. Wang Xuejun researcher from the Department of Science, Education, and Law and Mr. Yu of the Beilun Bureau of Agriculture, and Rural Affairs. The sponge city project comprised a large area, including a lake and surrounding park, trees, and wetlands. The area was originally agricultural land for rice production and was excavated to create an artificial lake in 2001. This was in advance of the National Sponge City program that started in 2012 and was a result of introduction by an Australian program. The main objective was to use the lake as a catchment area during heavy rainfall such as to prevent or reduce flooding.



Whilst it is difficult to monitor and test the lake's effectiveness in reducing flooding, it has been noted that, since the construction of this lake basin area, the severity of flooding at the time of strong typhoons have reduced significantly. There is continuous monitoring of pollution levels, and although it was noticed that there were several dead fish in the basin, suggesting that the catchment was not only rainfall, but also polluted storm water. A secondary impact of the lake construction and park has been the increase in value of property in the surrounding area.

Ecological Corridor in Ningbo East New City.

The Ecological Corridor project started in 2009 and is a long channel comprising 37.4 ha feeding into the river network of Ningbo municipality 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. The prime objective of the Ecological Corridor is to provide a drainage outlet for flood waters toward the main canal system of Ningbo; provide a natural wetland filter for sediment, silt and pollutants; establish a recreational area for the new city inhabitants and a natural habitat for animals, fish and migratory birds. The project plan is consistent with the original project design with the exception of the introduction of 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 waste water, particularly at times of high storm run-off.

Financial Arrangements:

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.

Shanghai

Fudan University and Mangrove experimental site

A workshop was held at Fudan University with Professor Bin Zhao, Professor (Ms.) Xing Xing Cai and Phd. Students in which Prof, Zhao introduced the research he was carrying out and Richard Hardiman presented an overview of REGREEN's work with emphasis on governance aspects. This was followed by a visit to an experimental mangrove area located about 60 km south east of Shanghai along the coastline which is part of a newly built city providing high rises, modern infrastructure and commercial facilities for approximately 5 million people.

The area was a previously a wasteland with coastal mudflats as a result of deposition from the Yangtze River. The new city area is a raised area built to defy sea level rise and is built upon saline mudflats upon which was added excavated material from expansion of the subway system in Shanghai city and from a large artificial lake that was excavated. In preparation for sea level rise a coastal infrastructure was built comprising two parallel lines of concrete Dykes about 100 m apart.

In order to protect the coastline from sea erosion a mangrove experimental area is planted between these two structures for a length of 17 km.



Traditionally, mangroves do not grow above 32 degrees latitude because it is too cold in the winter time. To test potential adaptation, three varieties were brought up from southern mangrove areas in Zhejiang and Fujian provinces, to test them in the more northerly climate in anticipation of warmer winter temperatures. The saplings were kept in greenhouse tunnels over winter to prevent the cold from killing them, and in a second experiment, they were kept underwater during the cold period where the water was warmer than the ambient air temperature. They were then planted between the two parallel Dyke areas to test survival. In addition seeds produced by the mangroves were put in a refrigerator at low temperature to see if the seeds adapt to lower temperatures therefore germinate in the following spring. If this mangrove pilot is successful, then plantings between the dykes can continue.

A second experiment underway is to counter invasive plant and shell species that have been imported by ships at the nearby port and have caused oyster populations to diminish which are necessary food for migratory birds on their way to and from Siberia. As a result the migratory birds are feeding in other areas close to the Pudong airport and are potentially a flight hazard.

To eradicate the invasive species a program has been initiated to completely cut down the plant and to bring excavators to dig out roots in the mud flats. Following this, oysters and shell, fish have the seeded into specially constructed circular areas for regeneration. It is anticipated that result of the pilot area will be seen within 5 years.

Beijing

Client Earth: Dimitri de Boer, Asia Director, Client Earth and Ms. Jia ZHAO, Research associate

Client Earth is working together with the Chinese Ministry of Ecology and Environment and the Supreme Court of China, assisting China to develop an environmental legal structure. It is also coordinating the EU-China Dialogue facility bring together experts from China and Europe to assist China in the development of its environmental policy. Recently it has evaluated 8 NBS case studies: 4 in China and 4 in Europe to understand differences between NBS in China and in Europe considering land, water, and urban environments and financing aspects of NBS. The report can be read [here](#).

A key element of Client Earth is its access to high level Chinese officials to ensure positive results from environmental research can be integrated in national or local policies. Client Earth offered to join the REGREEN workshop in China to bring government officials to join the workshop.

Kosima Liu, Environmental Education Media Project (EEMP): Contacts were given for environmental educationalists: Justin Howell and Tristan Fang Ke (WeChat contacts provided)

Terry Townsend, biodiversity, urban forest and ornithology specialist, Beijing: Terry has been working with the Government of China concerning the urban forestry program in Beijing city. His main comment is, whereas the urban forest program is aesthetically attractive. It is replacing vast areas of scrubland, which were homes to plants, animals, birds, and insects, therefore destroying their habitat in order to create a new habitat. This aspect needs to be investigated to ensure that the urban forest program does not reduce the biodiversity of the area.

Summary and Conclusions

There is no doubt that China has taken on NBS in a massive scale. In the main, initiatives are taken on by the central government and fed down to the municipal and provincial level, such as the urban forestry program or the sponge city program. Other initiatives are set by the municipalities and also there are small scale projects initiated by local communities. In instances viewed it is noted that NBS projects are often a part of an overall program for creation of new cities to accommodate increasing urbanisation. These new cities provide a 'blank page' for planning whereby NBS projects can be incorporated at the planning stage and accommodate mitigation measures including flood management, climate change, heat island effect, recreation, or even land reclamation from the sea.

Technically the NBS projects visited are extremely well planned, designed, and executed and they demonstrate consideration towards biodiversity, flora, fauna and migratory birds. However although there are examples of inclusiveness for and adult and child education, it appears to be on the basis of how the planners or local government consider the needs of the local population and governance aspects appear to be lacking. The question of why people want to go to a natural landscape area appear not to have been asked, such as children wanting to play in nature, young people for exercise, or simply family picnics. Too often, there are constraints either in the form of fencing, or notices preventing access to nature.

Persons Met

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| <i>Beijing</i> | | |
| Prof. Jun YANG | Tsinghua University | Dept. Earth Sciences |
| Kelly DAI | ICLEI (China) | |
| Dimitri de Boer | Client Earth (ASIA) | Director |
| Jia ZHAO | Client Earth (ASIA) | Research Associate |
| Ms. Kosima LIU | Environmental Education Media Project (EEMP) | Co-Director |
| Dr. Terry Townsend | Biodiversity consultant | |
| <i>Ningbo</i> | | |
| Prof. Yao Yang XU | China Academy of Sciences, Xiamen | Institute of Urban Environment |
| Assoc Prof Gang LI | China Academy of Sciences, Xiamen | Institute of Urban Environment |
| Dr. Dong LIU | China Academy of Sciences, Xiamen | Institute of Urban Environment |
| Dr. Sicheng AO | China Academy of Sciences, Xiamen | Institute of Urban Environment |
| Dr. Yuyao XU | China Academy of Sciences, Xiamen | Institute of Urban Environment |
| Mr. Lingwen Lu | China Academy of Sciences, Xiamen | |
| Mr. Cai CHEN | China Academy of Sciences, Xiamen | PhD. Candidate REGREEN participant |
| Mr. YuQin HE | China Academy of Sciences, Xiamen | PhD. Candidate REGREEN participant |
| Prof. Faith Ka Shun Chan | University of Nottingham (Ningbo) | Head of School of Geographic Sciences |
| Mr. Kewei CHEN | Jiangbei Bureau of Ecology and Environment | Dep. Director, |
| Mr. Xuejun WANG | Beilun Bureau of Agriculture and Rural Affairs | Investigator Dept. Science, Education and Law, |
| Mr. Dong WANG | Tian He Construction Company | |
| <i>Shanghai</i> | | |
| Prof. Bin ZHAO | Fudan University | Key Laboratory for Biodiversity Science and Ecological Engineering, |
| Prof. (Ms.) Xing Xing CAI | Fudan University | Key Laboratory for Biodiversity Science and Ecological Engineering, |
| Ms. Siqi ZHOU | Fudan University | PhD. student |
| Mr. Bing TAN | Fudan University | PhD. student |
| Mr. Qi YUAN | Fudan University | PhD. student |
| Mr. Dongfan XU | Fudan University | PhD. student |