Nature-Based and Innovative Solutions

Nature-based solutions rely on nature to provide part of the answer to many of the climate challenges being faced, from air and water filtration to natural growth cycles.

Title:	Deployment of a Digital Agricultural Brain in Shanghai, China
Summary of Case:	In 2019, Shanghai started to create a digital agricultural base map. A series of technical solutions were formulated by a specialized technical team. Under the unified technical standard framework, the agricultural geospatial data from different departments were integrated and collected. The digitisation of 2.3 million mu (approximately equal to 153 thousand hectares) agricultural land was completed. At the same time, three types of foundational spatial data including remote sensing image data, basic vector data, and agricultural thematic data were gathered. In 2020, in constructing the city's big data system and platform, the integration of government information systems was conducted. This included cleaning up redundant information systems and establishing an agricultural data source library. Integrated business application scenarios were developed, including scenarios like planting, vegetables, animal husbandry, fishery, agricultural machinery, and safety supervision. Subsystems were integrated to support business modules of Shennong Pocket, animal husbandry management, and grid supervision of agricultural products. A digital agricultural management platform based on the agricultural digital map and other thematic databases were provided to participants. The system aims to increase agricultural yields through yield prediction, while minimizing likelihoods of crop failures and use of fertilisers. This is done through simulated modelling using collated data. It simultaneously, aims to generate market demand signalling to farmers and mediate demand and supply signals for agriculture products. Integration of financial services, such as crop insurance will also protect farmers, in the event of poor harvests. The platform mainly provides data support for the management of rural agriculture in Shanghai. To date, the database has collected 385 million units of data, with a total data storage capacity of 3.2TB.
Key Stakeholders:	• Shanghai City Government • Local Farmers • Local Agriculture Procurers • Financial Institutions
Key Finance method:	• Public Financing
Key Messages and Lessons Learnt:	• Regional digital agriculture tool for integration relies on incentivising sharing of data amongst stakeholders and exchange of products / services. • Data sharing allows for better demand matching and maximising agriculture earnings by both buyers / sellers. It also supports research and policy formulation. • Digital Cloud Platform can also share geospatial data from various sources to predict agricultural output and aid required for specific areas during planning. • Standardisation and filtering of data are required for such a platform to function effectively. Initial public funding is necessary to drive the enhancement of sectoral efficiency, along with coordination with scientific research institutes.

Title:	Climate-Smart Grassland Management Project in Xilin Gol, Inner Mongolia, China
Summary of Case:	The Nature Conservatory (TNC), in collaboration with the University of Inner Mongolia, and Lao Niu Foundation, initiated the Climate-Smart Grassland Management Project in Xilin Gol, Inner Mongolia. Xilin Gol administers major grassland areas in Inner Mongolia, which is one of the 35 priority areas for biodiversity conservation in China. Climate-smart management of grassland is based on the natural grass restoration, combined with seasonal grazing moratoriums to promote the recuperation of grassland, and the application of "warm grazing and cold feeding" to balance grassland productivity and livestock production efficiency. Through spatial and meteorological technologies, ground corrective grassland monitoring, combined with analysis of the climate dynamics throughout the year, the project can more accurately determine the period optimal for grazing, allowing the grassland to sufficient time for regrowth. After the start of grazing, farmers use hand-held terminals to conduct rapid assessments of the status of the grassland, allowing them to forecast the grassland's productivity and develop flexible grazing management plans. Eight herding households were involved in the pilot, and it was discovered that a longer grazing moratorium will allow the grass to retain a larger vegetation base and carrying potential of livestock. Although, appropriate intervals of grazing will lead to improved grassland regeneration levels and potentially carbon sinking. Using the forage reserve during resting periods encourages herders to conscientiously adjust livestock numbers, addressing the issue of overgrazing and achieving a balanced grazing management of grass and livestock.
Key Stakeholders:	• The Nature Conservatory • Lao Niu Foundation • University of Inner Mongolia • Local Herder Households
Key Finance method:	• Philanthropic Funds
Key Messages and Lessons Learnt:	• Geospatial technology can allow for more accurate management of grasslands to prevent overgrazing and mitigate land degradation. • Grazing moratoriums require minimum agricultural facilities and little management or technical expertise, allowing for a relatively cost-efficient balance for sustainable development of grazing herds.

Title:	Novartis Southwest Sichuan Carbon-sink Forestry, Community and Biodiversity Project in Liangshan Prefecture, Sichuan Province, China
Summary of Case:	Novartis launched the project in 2010 with a 100-million-yuan investment over 30 years. However, during the initial phase, sapling survival rates were low, in part due to grazing by local communities. Careful negotiation and integration into local efforts for poverty alleviation and giant panda conservation were undertaken. An agreement was reached to block off sapling growth areas until they were mature enough to be reopened for grazing. At the same time, residents were trained as forest protection personnel to regularly inspect forested areas. Since the project's launch in 2010, more than 21 million trees have been planted in 5 counties, restoring more than 4,000 hectares of land, and creating land care and maintenance jobs that benefit over 4,000 rural families. It also fostered the enhancement of skills in seedling cultivation, afforestation techniques, and forest maintenance and management. By engaging the local communities, it has raised environmental conservation awareness of local inhabitants. Apart from carbon sequestration, the restoration of forest ecosystems is anticipated to enhance the climate resilience of both local ecosystems and communities. Furthermore, the initiative is anticipated to boost biodiversity, given that rehabilitated forests create improved environments for a diverse array of flora and fauna, including imperilled species like the giant panda and the red panda.
Key Stakeholders:	• Novartis Group • The Nature Conservancy (TNC) • Shanshui, Sichuan Forestry Department • Sichuan Daduhe Forestation Bureau • Residents
Key Finance method:	• Carbon Financing
Key Messages and Lessons Learnt:	• Nature-based solutions can serve multiple purposes, carbon sinking, poverty alleviation and protecting the land from degradation. • Consultation and involvement of residents and stakeholders are important to ensure the success of a project.

Title:	Mongolia's One Billion Tree Initiative
Summary of Case:	Mongolia established a fund to create a structure and system to provide sustainable financing of afforestation, tree planting, and other environmental activities. At least 2 billion Mongolian Tugriks (679,000 U.S. dollars) are expected to be donated annually to the fund by member organisations of the Mongolian Bankers Association. Meanwhile, the presidential press office claimed that green loans in the banking sector would be increased to 10% by 2030. In addition to a top-down approach, the government also leverages bottom-up climate actions. The Forest Law of Mongolia obliges every citizen to plant one tree and every organisation to plant five trees per year. The province of Ömnögovi has committed to grow at least 70 million trees and provides financial packages to people for conserving new trees in the area. Public-private sector partnerships are well established. Several big firms have committed to planting 20 million to 120 million trees per company over the coming decade. In addition, attractive incentives are offered to mining companies and corporations to contribute to environmental afforestation. The country's nomadic herders can earn extra income by planting trees on their land. The government anticipates that one billion dollars will circulate through this project. The program aims to increase the proportion of forest covered area from 7.9% to 9% between 2020 and 2030. Those newly planted trees can reduce sandstorms, forestall wind erosion, and contribute to carbon sinks. They can also improve soil nutrients and water preservation. The program seeks to restore 4% of extremely desertified land. If the plan is successful, the sequestration of carbon dioxide is estimated to increase by 2.5 million tons in 2030.
Key Stakeholders:	• Mongolian Government • Affiliated Businesses Organisations • Individuals
Key Finance method:	• Public Financing • Private Financing
Key Messages and Lessons Learnt:	• Grassroots participation is crucial. The government in this instance, leverages its administrative power to make it an obligation for individuals and companies to make efforts in greening the environment. • Nationwide commitments and a consistent supply of funds are important to ensuring sustained implementation of environmental programs, including their maintenance.

Title:	Urban Forest in Pyongtaek, Republic of Korea
Summary of Case:	Pyeongtaek City is an industrial city that used to serve as a gateway to foreign countries in the past. It has undergone significant development and has evolved into an international industrial city today, hosting the world's largest semiconductor factory and experiencing a substantial increase in its population. However, this growth has resulted in a lack of green spaces. In 2018, the city promoted synergistic effects by participating in the 'Improvement of Quality of Life and Fine Dust Reduction Initiative' led by the Ministry of Economy and Finance and the Korea Forest Service. Through collaboration with the national government, relevant agencies, and public engagement efforts, the city is accelerating its urban greening initiatives, aligning with its vision of 'Pyeongtaek, Let's Breathe in the Wind Forest City'. In order to reduce the heat island effect and fine dust while providing green spaces for residents, the city has undertaken a large-scale tree planting project. The goal is to promote wind channels for cooling, function as barriers against fine dust and pollution ibn industrial areas, control noise, and offer landscaping that provides cool shade and recreational areas for enjoying nature. In addition to replanting trees removed due to urban development, over 3 million trees have been planted in urban forests, carefully considering various local landscapes, including national highways, industrial zones, and harbour areas. This urban forest building initiative has significantly increased the city's green area ratio, rising from 16.9% in 2019 to 18% in 2020. The expansion of green urban areas has led to a remarkable reduction in average fine dust (PM10) concentration by 20.8% and ultrafine dust (PM2.5) concentration by 23.9% in 2020.
Key Stakeholders:	• Pyongtaek City Government • Ministry of Environment (Republic of Korea) • Affiliated Businesses • Non-governmental Organisations
Key Finance method:	• Public Financing
Key Messages and Lessons Learnt:	• Well-designed urban neighbourhoods and green spaces can significantly improve the quality of life and environment for humans and animals. • Tree redeployment from the development of urban areas can mitigate loss of carbon sinks while speeding up green belt developments. • Existing laws and regulations can, in certain cases, may delay the establishment of green spaces and need to be considered well in advance of starting a program. These factors may also impact the type of green space that can be created. and may affect the type of green space. • Multiple stakeholders are required for urban forest governance to ensure effective management of urban forests over the long term. Public engagement is also needed to understand requirements and facilitate planning.