



DISPATCHES FROM THE SILK ROAD

In May 2017, NGP participants travelled to the Chinese province of Gansu, at the eastern end of the ancient Silk Road. With China promising billions of dollars of investment into a new Silk Road for the 21st century, Gansu is looking to the future. But can development in this fragile, dry region be green and sustainable? And what role can plantations play?

During this study tour, our guiding question was: *How can we realize the potential of plantations to transform rural community livelihoods and stabilize land degradation in desert areas?* And in particular, we considered how to make this happen in the context of China's One Belt, One Road initiative.

Here are some of the things we discussed...



1 A GREEN BELT ROAD

One Belt, One Road offers opportunities to roll out NGP solutions on a significant scale.

Our study tour took place just before a global summit showcasing China's One Belt, One Road (OBOR) initiative. Perhaps the most ambitious infrastructure and development programme ever, OBOR aims to pour some US\$900 billion of investment into infrastructure linking China with the rest of the world. From roads and railways stretching from South East Asia to Europe, to ports linking the South China Sea with East Africa and the Middle East, to new energy infrastructure across Central Asia, it's a plan that's going to change the planet.

While President Xi Jinping has stressed that OBOR will be green and sustainable, infrastructure development on such a scale is bound to have environmental impacts. Equally, there's a risk that inward investment doesn't necessarily benefit the people living nearby, who are often those in greatest need.

These are issues that NGP has grappled with, and demonstrated solutions for. Smart land-use planning at the landscape scale can integrate mosaics of productive areas (like plantations) with conservation, while maintaining ecosystem integrity, protecting areas of high conservation value, restoring degraded land and increasing resilience. And doing so in a way that involves all stakeholders can create shared value for businesses, society and the environment.

As OBOR gathers pace, there's a really opportunity to roll out these solutions on a scale that can make a significant difference to the natural environment, the climate, socio-economic development and the supply of renewable raw materials.





2 GREEN BELT BONDS

From international development finance to green bonds, what finance solutions can support plantation development in desert areas?

Realizing this opportunity will require serious investment. To date, tree planting in China has mostly been subsidized by the government – but with growing public debt (resulting in the recent downgrading of China’s credit rating by Moody’s), government stimulus can’t be the only long-term solution. Hundreds of billions of dollars will be channelled through OBOR – so how can we ensure that well managed and located, inclusive and profitable plantations can contribute to an environmentally sound and financially sustainable development model?

A number of finance mechanisms could contribute. The Sustainable Development Goals (SDGs) set the international development agenda, and plantations along the Silk Road could contribute to a number of these – notably SDG15.3, to “combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-

neutral world”. On a similar theme, there are also funding opportunities around the United Nations Convention to Combat Desertification (UNCCD).

Climate finance also provides opportunities. The China Green Carbon Foundation (CGCF) provides one example of how this can work. A non-profit organization affiliated to the State Forestry Administration of China (SFA), CGCF raises funds from businesses, citizens and organizations who want to voluntarily offset their carbon emissions, and channels them into forestry projects that generate carbon credits. By the end of 2016, CGCF had collected around US\$100 million in donations, and managed around 80,000 hectares of forestry projects.

But well-managed plantations should also provide economic returns as well as environmental and social value. NGP is keen to make this case to responsible investors: discussions are under way toward developing “Green Belt Road Bonds”. Watch this space...

3 DESERT TREES

Tree planting has a crucial role to play in halting desertification.

Desert covers 28% of China's territory, and it's expanded by 55,000km² in the last 40 years. With 400 million people in the country affected by desertification and dust storms, and direct economic losses estimated at US\$7.7 billion per year, controlling the spread of the desert is an urgent imperative.

Globally, desertification and land degradation in dry areas is a massive though often overlooked threat – and one that will only become more pronounced with water stress growing and climate change upsetting rainfall patterns. Without efforts to stabilize and restore soils in arid and semi-arid areas, food shortages and mass migrations will increase.

Since 1978, China has been attempting to control desertification by planting trees. The “Three Norths Forest Shelterbelt Programme” – also known as the Great Green Wall – is the biggest tree-planting project in the world. By 2050, it's expected to cover 350,000km² along a length of 4,500km. Currently, the government invests ¥2 billion (US\$300 million) into the programme each year.

Trees can provide a windbreak against dust storms and help to stabilize soils. Their roots bind the soil together while leaf litter adds organic matter, helping to retain moisture and nutrients. This in turn can improve agricultural productivity.

While there are some question-marks over the scheme's effectiveness, officials tell us that desertification in Gansu has been reduced and vegetation cover has increased. With the OBOR passing through many drylands, from the steppes of Central Asia to the Middle East and North Africa, there's a clear opportunity to share lessons from China and use tree planting to restore landscapes and increase resilience.





4 TWO FLOWERING TREES

Why yellowhorn and peony offer more than just beautiful flowers...

While poplar has been the species of choice for much of China's Great Green Wall, more attention has been turning recently towards local species – notably yellowhorn (*Xanthoceras sorbifolium*) and tree peony (*Paeonia suffruticosa*). The SFA's current development plan (2011-2020) wants to see 1.6 billion yellowhorn trees planted across China – amounting to 940,000 hectares, with more than a third (340,000 hectares) in Gansu.

These two small, flowering trees can withstand the droughts, the extremes of temperature and the poor soils of northern China. Both have deep cultural significance, and can provide a range of economic benefits as well as ecological ones.

Yellowhorn trees may live for more than a thousand years. Their flowers and leaves can be used to make tea, and their leaves and seeds are rich in nervonic acid, which can be used to fight dementia and Alzheimer's disease – clinical tests are under way. The oil in its seeds is richer in healthy unsaturated fats than olive oil or soy oil, making it an attractive edible oil.

It can also be used in cosmetics, or even to make biodiesel.

Peonies may be most familiar as ornamental flowers – they are considered one of China's national flowers – but are also a rich source of seed oil. As with yellowhorn, the flowers and seeds provide a range of uses, from tea and wine to high-quality cooking oil. Peony bark has been used for centuries in traditional Chinese medicine, and peony oil capsules are now an expensive health supplement.

As planting of both species increases, new techniques are needed to improve efficiency and productivity. FuturaGene, a subsidiary of NGP participant company Suzano and a co-host of the study tour, has developed a yellowhorn nursery, capable of producing millions of seedlings. The company is also working on the first selective breeding programme for yellowhorn, and has successfully reproduced the species in its labs using tissue culture: that means promising cultivars can be cloned and reproduced, giving farmers a higher-yielding tree.



5 LOCAL LIVELIHOODS

Plantations in desert regions are only likely to be sustainable if there's an incentive for local people to look after them.

Afforestation efforts in desert areas in China and elsewhere haven't always proved successful. One reason for this is a lack of economic incentives for local people. Trees need ongoing management, including watering, while they're being established. If local people aren't involved, then the survival of the trees depends on continuing government or development grants.

One advantage of species like yellowhorn and oil peony is that they can provide an ongoing income for farmers, which is likely to improve the trees' long-term viability, as well as offering a better livelihood in arid rural areas where opportunities are few. Nevertheless, establishing a plantation is a risk for farmers – and while trees may provide a long-term return, farmers also need a regular income in the short term.

During the study tour, groups discussed possible incentives and ways to maximize incomes for rural communities. The importance of diversification was highlighted: we visited one farm where, along with yellowhorn, liquorice and goji berries are cultivated, while an oil peony farmer also grows shitake mushrooms.

The rise of e-commerce offers potential for people in rural areas to maximize their income by selling high-value products like yellowhorn tea or peony oil directly to consumers. Online sales are booming in China thanks to the likes of Alibaba, now the world's largest retailer, and investment into building an "online Silk Road" is an important part of OBOR. While this opens up the possibility to sell products to consumers thousands of miles away, another proposal was for "picking gardens", where people can pay to pick their own peony or yellowhorn flowers.

Finally, how can farmers in arid regions access climate finance to develop plantations? Small trees like yellowhorn don't sequester anything like as much carbon in their woody biomass as, say, a tropical rainforest, or a bamboo plantation. As a result, carbon credits that are based only on above-ground biomass don't provide much of an incentive for farmers. Could carbon credits be designed that also take account of soil carbon levels, offtake such as shells and husks (which could be used to make biochar to improve soils and sequester carbon), or avoided emissions through the use of biodiesel?



6 UNLOCKING THE VALUE CHAIN

What support could industry provide?

While e-commerce and direct sales offer opportunities for some enterprising farmers, they are only a part of the picture. Yellowhorn and peony oil have a number of potential uses, in industries as diverse as cosmetics, food, pharmaceuticals and transport. As yet, though, demand is small. Growing these markets could help accelerate the development of plantations in Gansu and elsewhere, and the ecological and livelihood benefits they can bring.

There's a real need to communicate the benefits of yellowhorn and peony – to tell the story, make the business case, and build the value chain. Engaging a cosmetics company, pharmaceutical firm or food manufacturer could be a way to kick-start the establishment of yellowhorn plantations. There could also be a role for NGOs like WWF to play here, in providing credibility and ensuring that production brings ecological and social benefits.

A point of reference is argan oil from Morocco. Like yellowhorn, argan trees help stabilize soils, prevent desertification and improve agricultural productivity in an arid region. Argan oil – largely produced by women's cooperatives – has been embraced by the cosmetics industry. Production now employs 2.2 million people in Morocco, bringing significant socio-economic and ecological benefits.





7 THE ROLE OF GOVERNMENT

Government plays an essential role in supporting forestry in China – but needs to understand challenges on the ground.

Despite the reforms of recent decades, what happens in China is still firmly dictated by the government. That can enable hugely ambitious schemes like OBOR or the Great Green Wall to be enacted: it's hard to imagine tree planting on the vast scale we've seen in China happening without strong state support. But there's also a risk that policies drafted in central government offices don't fully reflect local challenges and the realities on the ground.

Sometimes policies can have unintended consequences, or the objectives of different departments can come into conflict. And policy changes or inconsistencies can create uncertainty that may put off investors or jeopardize long-term planning.

One example that raised a lot of discussion during the study tour was China's recent ban on logging in state-owned natural forests – including plantations of native species. Officially, these forests are now all managed for their

ecological benefits, not for timber production. While this commitment to conservation and recognition of the non-monetary value of forests is welcome, a logging ban may not be the best approach.

China has a substantial timber deficit, and if it doesn't use its own resources, it's likely to increase pressure on natural forests in other countries – including places where illegal logging is rife. And again it's questionable whether forests will continue to be conserved and well managed without an economic incentive for doing so. Many NGP participants would argue that a mosaic landscape that integrates intensive timber production with forest conservation and restoration is a more viable long-term approach.

Sharing different perspectives, learning from real-world examples and exchanging good practices is at the heart of NGP. The active participation of many SFA staff members has been an important part of this study tour.

8 KNOWLEDGE AND TRANSPARENCY

Increasing understanding, mitigating risks and sharing knowledge is crucial.

Large-scale tree planting in drylands takes us into new territory. Equally, our knowledge of yellowhorn is currently very limited. More research is needed into the possible impacts (and benefits) of growing yellowhorn and other species in arid and semi-arid regions.

Water is a particularly significant issue, and is a risk that any investor is likely to flag. While yellowhorn and tree peony can tolerate drought, irrigation is needed to establish plantations and improve yields. How much water can be transferred from rivers before there are negative impacts downstream, or taken from the ground before aquifers become depleted? How will other water users be affected? Or are there management methods or cultivars that could reduce water demand? And how will climate change affect these issues?

It's important that this information is made available in a transparent way, that decisions are made according to the latest scientific evidence, and that management practices continue to adapt and improve.

Of course, these considerations don't just apply to yellowhorn trees in Gansu: environmental impact assessments, transparency and science-based decisions should be part and parcel of all OBOR developments. Equally, with increasing numbers of people living in arid regions, the need for new models of sustainable development that can be shared and replicated has never been greater.

