

Suzano

Trees in the desert

Gansu province, China



In Minqin County, Gansu Province, China, the desert is spreading. Planting trees is a potential solution. FuturaGene, a subsidiary of Suzano, is running a field trial to test which species grow best in desert conditions and develop suitable management practices, enabling farmers to maximize the social, economic and environmental benefits of tree plantations.

Background

Surrounded by the Tengri and Badain Jaran deserts, 94 per cent of the land in Minqin County has become desert, and the desert continues to encroach on agricultural land at a rate of 3-4 metres every year. Desert expansion, land infertility and lack of water have brought continuous decline in living standards for local communities.

Government-led afforestation projects have been carried out for around 20 years; during 2008-2012, the Chinese central government invested RMB 5 million (US\$820,000) annually on sand-control afforestation. But the narrow ecological focus of this work has undermined its long-term success.

Species are selected solely for their drought resistance, with little attention paid to their potential economic value, and harvesting timber is forbidden – even though certain species would benefit from coppicing every two years. After the initial planting process, there is no support for plantation management, so survival rates are poor. Farmers lack the knowledge and the economic incentive to look after the plantations, or to carry out their own afforestation projects.

Is it possible to move away from this government-led model to create sustainable, profitable desert plantations that bring environmental and socio-economic benefits? FuturaGene, which specializes in genetic research and development in the forestry sector, is aiming to find out. The company, owned by NGP participant Suzano Pulp and Paper, is running a four-year (2012-2015) project in Minqin to select, analyse and breed trees that thrive in desert conditions, and develop appropriate management practices that integrate environmental, social and economic aspects.

FuturaGene is coordinating and funding the project in partnership with research institutions (Gansu Desert Control Research Institute and Shanghai Advanced Research Institute (SARI) of Chinese Academy of Sciences), the local community (farmers hired and trained to plant and manage the trees) and local government (the forestry bureau from neighbouring Jingtai County, which will provide funding to promote the project's findings in other desert areas). Other state-run plantations and companies have also supplied clones of high-performing trees and shared management experiences.



Can trees thrive in desert conditions? FuturaGene is carrying out a four-year field trial to find out.

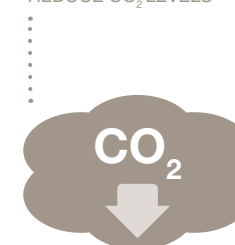
Photography © FuturaGene

PLANTATIONS IN MINQIN COULD:

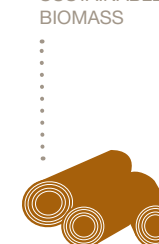
REVERSE DESERTIFICATION
& ENHANCE SOIL QUALITY



REDUCE CO₂ LEVELS



PROVIDE
SUSTAINABLE
BIOMASS



IMPROVE
LIVELIHOODS



“It is extremely encouraging to see the private sector engaging directly on projects such as this, that do not have an immediate economic benefit – and where most of the value is actually in indirect ecosystem services. We are of course delighted to see how our desert species germplasm collection is contributing to a project of such importance to the national ecological civilization development.”

Liu Shizeng, Director, Gansu Desert Control Research Institute

The project

The “Desert Species Field Trial Project” was established on 1.6 hectares of unused, degraded sandy land with low water availability in Minqin. Soil quality was poor, with depleted mineral and organic content.

The project began by testing 28 types of woody plants. These were further broken down into different clones. By testing these and selecting the best-performing specimens, the project aims to build up an elite genetic pool (or germplasm) of high-yield trees that can tolerate desert conditions. FuturaGene will carry out further breeding, testing and improvement of selected clones.

The project will also identify appropriate management practices for selected species. It is studying aspects such as include irrigation regimes, fertilization patterns, density, weeding, mulching, potential for intercropping, coppicing intervals and standardized working procedures. Gansu Desert Control Research Institute will provide technical training to local farmers in these techniques.

FuturaGene, with SARI, will also be analysing the wood characteristics of chosen species – for example to determine their potential for producing bioenergy.

The results of the field trials and laboratory analysis will enable economic models to be developed for the various species, uses and management regimes.

Benefits

Successful afforestation in Minqin has the potential to reverse desertification, improve soil quality and reduce CO₂ levels in the atmosphere, while providing a sustainable source of biomass and improved livelihoods for rural people. The results of the project will help farmers to develop profitable and environmentally beneficial plantations, both in Gansu province and in other desert areas.

The project is still in its early stages, but early results are promising:

Suitable species are being identified: During the first year of the project, a number of species with over 60 per cent survival rates were screened including types of tamarisk (*Tamarix*), *Caragana*, *Haloxylon*, *Calligonum*, *Eleagnus*, *Atraphaxis* and willow (*Salix*). These species have been selected for further evaluation and expanded field trials. Based on subsequent trial results, the most suitable species will be promoted to local farmers to plant on their land.

Local farmers are adopting better management practices: The project has established a more efficient system of planting and field management practices. This combines local practices with advanced techniques introduced from Israel and Brazil, where FuturaGene also has research facilities. These techniques, which save labour and water, will be explored in further trials.

Income for local farmers: During 2012, about 20 local farmers received RMB 95,600 (US\$15,600) for land rental, land preparation, field management and labour services. In the next three years the project will pay about RMB 70,000 (US\$11,400) to local farmers each year.



Irrigation schemes and other management practices can affect survival rates.

Photography © FuturaGene

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TYPES OF WOODY PLANTS WERE TESTED AT THE BEGINNING OF THE PROJECT



“It is very reassuring to see that concrete efforts are being made to better understand how to bring life to the desert. If this can be done together with increasing our income, this project could bring us much hope.”

Wang Hengjun, local farmer

Next steps

The most adaptable species identified have been replanted in a second round of field trials, to further assess their performance and characteristics. FuturaGene is continuing breeding and clone improvement work on selected species in its greenhouse and lab in Shanghai. Different irrigation regimes, fertilizer applications and other management practices will be designed and assessed based on lessons learned to date to develop an understanding of the most efficient practices for each species.

By the end of the trial, FuturaGene aims to identify suitable species/clones for different uses and develop a set of best management practices for each one. Sharing this information will enable governments and other organizations to promote, replicate and scale up the project.



The most adaptable species are being tested in a second round of trials.

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