

MYCORRHIZAL FORESTRY, CHILE



**MYCORRHIZAL TECHNOLOGY
INCREASES BIOMASS BY 41-119%**

**STABILISES SOIL AND HELPS WITH
WATER TABLES**

**EMISSION REDUCTIONS HIGHER
THAN VERIFIED VOLUMES AS SOIL
CARBON EXCLUDED**

USING THE POWER OF FUNGI TO RESTORE DEGRADED LAND IN RURAL CHILE

Chile is one of the most developed countries in the Southern Hemisphere but an astounding two-thirds of the country (48 million ha) is affected or threatened by desertification and drought (CONAF 2006). Of the 1.3 million people inhabiting the most affected areas, approximately 60% live in poverty.

Between 50 and 150 years ago vast areas of the country were cleared for wheat production for export, to feed gold prospectors in North America. Without the forest cover, particularly in hilly regions, soil is eroded and the land degrades quickly. These degraded areas are unproductive and liable to flooding and drought, making rehabilitation of the forest very difficult.

An innovative partnership between biotech company Mikro-Tek and the Chilean forestry department is changing this. Mycorrhizae are fungi that work symbiotically with trees. The fungi grow on the trees' roots, encouraging the formation of larger, healthier root systems, enabling plants to absorb additional nutrients and moisture from the soil. In exchange the host trees provide the fungi with energy in the form of carbohydrates from photosynthesis.

Local communities have established nurseries where saplings are inoculated with the fungi to ensure its strong presence when the trees are planted. When planted, these saplings (now covering over 6,000 hectares) stabilise soil, reduce flooding and erosion risk, and provide an income for the landowners when they are harvested. This takes place 10-20 years after planting – at which point they are replaced with new saplings and the cycle continues.

DELIVERING THE GLOBAL GOALS (SDGS)

1 NO POVERTY



Landowners receive income for lumber products and a 50% of share of carbon revenues

4 QUALITY EDUCATION



Training in forestry methods, measurements and mapping. Facilitates access to technical advice and support services provided by government agencies

5 GENDER EQUALITY



The majority of nursery employees are women - including at senior levels

7 AFFORDABLE AND CLEAN ENERGY



Trimmings of lower branches for fire control are turned into charcoal which is used for cooking in rural areas.

8 DECENT WORK AND ECONOMIC GROWTH



Multiple jobs supported in nurseries and forestry operations, as well as the boost to the local economy from extra income for landowners

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Local teams have been trained on the biotechnology of cultivating mycorrhizae appropriate for their localities

13 CLIMATE ACTION



Thousands of hectares of afforested land are now sequestering carbon, reducing climate change risk

14 LIFE BELOW WATER



Protects waterways and their sources through the reduction in run-off and siltation



WHAT THE CARBON FINANCE DELIVERS

The land was so heavily degraded that before the project began it couldn't be put to use – severe soil erosion was common and valuable topsoil was being lost annually.

The carbon finance made the development of the project possible by introduction of the mycorrhizal technology. It also facilitates loans from the government for landowners to do the initial planting and forestry plan – as a guaranteed income is forthcoming later down the line.



Mycorrhizae under a microscope



In consultation with landowners and the Chilean state forestry department, three tree species were selected:

- Fast-growing *Eucalyptus* are prized for their soil stabilising properties and high-quality lumber. Harvested every 10 years, the resulting shoots that re-grow from stumps are then thinned to the two or three best-growing ones after a further two years.
- *Quillay saponaria* is a tree species native to Chile, which is famous for its honey and inner bark extracts that can be used to produce an internationally-marketable frothing agent. The mycorrhizae **increase biomass growth on the Quillay trees by a staggering 119%**.
- Pine trees make up the bulk of planted species and are harvested after 20 years. Saplings are planted between harvested stumps to make use of the existing mycorrhizal networks and preserve the soil organic carbon.