Adapting to desertification

Systems developed using LIFE funding are enabling trees to establish with less need for water and are promoting soil fertility, to help farmers adapt to desertification.

The impact of climate change-induced phenomena, such as heatwaves and prolonged drought, is expected to increase the risk of desertification and forest fires, particularly in regions where water scarcity is already a concern. Developing adaptation measures aimed at reducing the vulnerability of ecosystems and strengthening their resilience is therefore of crucial importance.

"LIFE The Green Link is trialling an innovative growing method that uses 'water buckets' made from recycled cartons to plant trees in arid areas without irrigation. Dubbed the Cocoon® system, it provides a water buffer for the young sapling, basically helping it to bridge the first prolonged drought period," explains Sven Kallen of Volterra, one of the project partners. The Cocoon® has a cylindrical shelter to protect the young tree from the sun, dry winds and feeding animals. "It basically creates a microclimate for the plant so it can focus on the development of its roots," he says.

The Cocoon® is designed to produce strong and independent trees, which do not need frequent external irrigation during establishment and which can survive in extreme conditions.

How does it work?

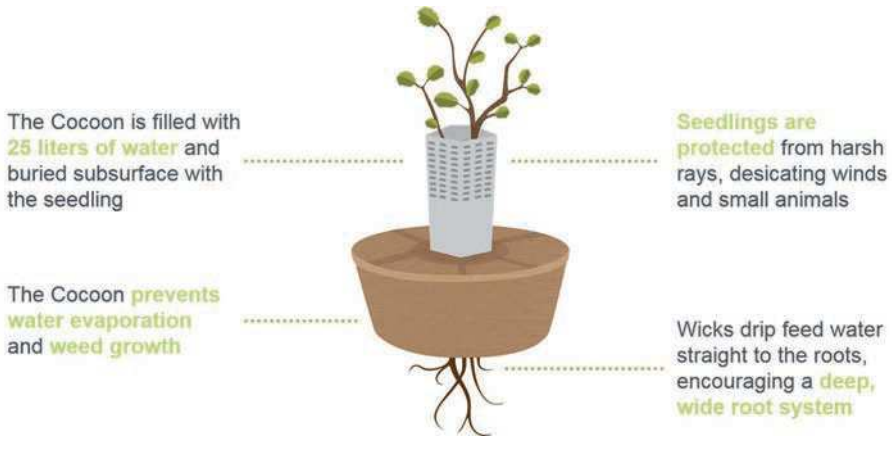
Sven Kallen: "The Cocoon® consists of a reservoir that is made of recycled waste cartons, and potentially also crop residues to ensure impermeability during the first survival period. It is only filled once during the planting process. The water is transported to the tree in a spaced and controlled way by seepage. As the reservoir degrades and empties over time, the pits serve as nano-catchment to collect water when it rains. In addition, the degraded deposit is converted into organic soil-enhancing substrate. The Cocoon® typically holds water for 2-4 months, then starts to slowly disintegrate. The idea is that after the tree survives its first summer, it will have become established with a sufficient root system to tap into underground moisture."

Huge water savings

According to the project, the Cocoon® system uses at least five times less water in the first year of a tree's life than conventional irrigation. "Over the lifetime of a tree we're talking thousands of litres," says Mr Kallen.

Success breeds replication

LIFE The Green Link has already planted 24 000 trees in three countries (four sites in Spain, plus one each in Italy and Greece). These have been joined by a further 125 000 trees planted through replication efforts. The project ends in March 2020 and, says Mr Kallen, "private sector involvement is really picking up. Companies are interested to plant trees to sequester carbon and offset their emissions." He expects an additional 300 000 trees with protective Cocoons to be planted in Spain by next March, fully financed by replication partners from the private sector.



Opportunities for farmers in adaptation

"Loss of land fertility and productivity is closely linked to economic impoverishment and social crisis," says Simona Castaldi from the University of Campania Luigi Vanvitelli in Italy. Adapting to climate change is not only a huge challenge, it is also an opportunity to address these issues and open up new income sources for farmers. Professor Castaldi is leading a project called LIFE DESERT-ADAPT which is testing a 'desertification adaptation model' (DAM) in parts of Italy, Spain and Portugal.

"DAM is based on three pillars: economic adaptation, environmental adaptation and social adaptation," she says. Economic adaptation means diversifying, using mainly local species suitable to climate extremes, avoiding methods that cause land degradation, and avoiding intensive agriculture in the most fragile areas.

"The land use plan must always be a mosaic where crops are alternated with natural areas where biodiversity is restored and nurtured to provide key ecosystem services for the whole area." DAM's holistic approach combines methods such as inter-planting, reforestation, water-saving technologies and soil protection to increase resilience. As well as improved biodiversity, the beneficiary expects to achieve an average net carbon removal of one tonne of CO_2 per hectare using the new model.

"Each landowner has to define the right balance of functions to be applied in his or her own land, but the final outcome should be a mosaic where no piece of land is abandoned or left without an appropriate function," she explains.

LIFE DESERT-ADAPT is working with 10 landowners across the three countries, a pilot area of 1 000 ha. During its preparation phase (2017-2018), the project team drafted 10 DAMs, as well as baseline scenarios of ecosystem services, desertification risk maps, and climatic projections to 2050 for each area.

SOCIO-ECONOMIC BENEFITS

The implementation phase (2019-2022) involves developing eight new sources of income for farmers: sustainable agro-products and ecosystem services adapted to projected changes in climate. These are expected to generate an extra €100 per hectare per year.

The project also seeks to include the local population ('social adaptation'): "locals might work part time on DAM development or on a voluntary basis in exchange for some of the produced income, for example, or organise and lead guided eco-tourism," says Professor Castaldi.

"We want to show the effectiveness of a sustainable and holistic framework of land management that can at the same time preserve land integrity and quality, generate income and support social inclusion."

"The aim is to make farmers less dependent on CAP funding as the sole solution to low productivity in areas under desertification risk. Only adaptive sustainable land management can allow farmers to continue to use their land in a productive way in the long term," says Professor Castaldi.

Find out more
Website: http://www.desert-adapt.it

If each hectare planted stores approximately 150-200 tonnes of CO_2, that means in total the project will sequester around 75 000 tonnes of CO_2 over the lifetime of the trees in a total area of some 500 ha. "For a LIFE demonstration project that is pretty spectacular," says Mr Kallen.

The system is already commercially available (www.landlifecompany.com), but "planting time (and thus investment costs) are still relatively high," he explains. Automation of planting to reduce costs is high on the Landlife Company's wish list.

Find out more
Website: http://thegreenlink.eu/

"Over the lifetime of a tree we're talking thousands of litres of water"