Using hemp's superpower to fight climate change

Hemp provides a wide range of useful products while being exceptional at sequestrating carbon. Small wonder it's attracting serious attention in both agricultural and environmental circles. **Thomas Walker** reports.

Let's begin with the basics. Carbon dioxide (CO_2) is the main greenhouse gas and, as such, is the biggest contributor to climate change. The largest sources of CO_2 emissions are oil and coal (fossil fuels). Even after these have been burned, the CO_2 they contain remains in the atmosphere for thousands of years.

Carbon sequestration is the process of capturing CO_2 from the air, or from gases released by industrial activity, and storing it. Anything that stores CO_2 is called a carbon sink.

Plants are a prime example: they absorb CO_2 and convert it into biomass (and oxygen) during photosynthesis in a process called biosequestration.

Numerous studies have shown that hemp (*Cannabis sativa*) is one of the most effective CO_2-to-biomass converters. It starts to store CO_2 the moment it is planted and continues doing so for its full 120-day crop cycle. According to conservative estimates, 1t of harvested hemp fibre can sequester 1,62t of CO_2, contributing significantly to reducing emissions from transportation and other industries.

"It's even more efficient than trees," says Dr Darshil Shah, a senior researcher at the Centre for Natural Material Innovation at the University of Cambridge in the UK.

According to him, research has shown that industrial hemp can remove between 8t and 15t of CO_2/ha/year. By contrast, depending on factors such as the number of years of growth, the climatic region and the variety of trees, forest plantations normally capture between 2t and 6t of CO_2/ha/year.

STUDIES HAVE SHOWN THAT HEMP IS ONE OF THE MOST EFFECTIVE CARBON SINKS AMONGST PLANTS

At the same time, hemp yields more useful fibres per hectare than trees and gives builders and designers access to carbon-negative biomaterials.

In addition, says Shah, hemp fields produce significantly less carbon than conventional agriculture does. Agricultural land in the UK, for example, emits about 3t of CO_2/ha/year.

Interestingly, the fertilisation of hemp plants increases photosynthesis, which in turn increases the absorption of CO_2.

Considering all these crucial attributes, hemp's potential to help us build a better future is enormous.

In 2021, President Joe Biden enrolled the US in an international treaty on climate change which proposed that carbon markets pay directly to farmers. He also recently made meaningful steps towards federal legalisation when he pardoned all minor cannabis possession charges.

MANAGING SEQUESTRATION

In order to manage carbon sequestration on behalf of the landowner, carbon credit projects measure the land, calculate the measurement data, and convert it to carbon. The next step is an audit of the property, which can take six to nine months to complete.

The verifier delivers a report to the registry whenever the verification is finished. The registry issues serialised tons into the project's account after approval. At this point, there is a commodity, namely carbon credits, which can be transacted.

Landowners thereby receive compensation for carbon sequestration and the preservation of natural resources in addition to generating commodity crops.

CHALLENGES

Inevitably, the carbon credit system is not without its critics, some of whom claim that carbon markets serve as a cover for businesses that choose to buy credits over reducing their own emissions.

However, the three largest voluntary carbon registries in the world, namely the American Carbon Registry, Climate Action Reserve, and Verra, are currently striving to create a methodology for agricultural carbon credits.

There is little doubt that agriculture will play a crucial part in carbon sequestration in the years to come.

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