

## Carbon biological capture ...technology driven



Conservation tillage can sequester over an estimated 286,000,000 tons of CO<sub>2</sub>.

Biological carbon sequestration is the process of removing carbon from the atmosphere and storing it over long periods of time in biomass or indefinitely in soil. Forestry management and conservation tillage along with bio char can reduce Ohio's CO<sub>2</sub> emissions by more than **315,000,000 tons**. Ohio should focus on commercializing the proven technologies of today as well as promoting the development of new technologies.

### Technology Options

#### Conservation tillage (no-till farming)

No-till farming is a way to grow crops with minimal cultivation of the soil. The vegetation and soil prevents the carbon from escaping into the atmosphere.

Read all details of the OEC's global warming study, *Climate Road Map, Part 2* at [www.theOEC.org](http://www.theOEC.org).

## the OEC'S Top Ten

### 1. Carbon bio capture

2. Carbon geological capture
3. Bio products
4. Methane emission reductions
5. Greenhouse gas markets
6. Electric & heating efficiency
7. Vehicle efficiency
8. Wind & solar power
9. Low or no-carbon energy systems
10. Cleaner diesel

In addition, the maintenance of cover crops can help reduce soil erosion. According to recent research by the Ohio State University, switching from conventional tillage to no-till can lock in over 286,000,000 tons of carbon over a 25-year time period.

#### Bio char

Bio char is charcoal or biomass-derived black carbon. It was initially developed by Amerindians in the Amazon Basin before the arrival of Europeans. The process in which biomass is turned into char by pyrolysis (the chemical decomposition of organic materials by heating in the absence of oxygen) is called charcoal fertilization.

Advantages to bio char include: locking carbon in for centuries, reducing nitrous oxide and methane emissions, potentially improving the ability of soils to lock in carbon, increase soil fertility, and generate bio fuel or oil as a by-product of char production through pyrolysis.

#### Forestry management

Forests can act as carbon sinks (holding carbon in the vegetation and soils) for over a century. An example of proper management techniques include letting a forest mature before timbering.



# Recommendations for a better Ohio

## Develop a state tax credit for farmers

Adopting a state tax credit for conservation tillage equipment for farmers can promote no till farming. Other states have programs with various tax credit limits: North Carolina (25%), Virginia (25%), and Maryland (100%).

## Establish equipment cooperatives

Equipment Purchasing Cooperatives can reduce the costs and allow farmers a wider variety of options in regard to tillage practices that best suit their needs.

## Government-private sector insurance programs

Crop insurance programs help manage the economic impacts of crop loss on farmers. For the first three to five years there is an increased risk of lower yields.

## Creating limited property tax credit for conservation tillage

The Current Agricultural Use Value (CAUV) assessment is a program that allows farmers to have their parcels taxed according to their value in agriculture, rather than full market land value. The state of Ohio should consider a one time, three to five year adjustment to the CAUV that reflects the increased crop loss risk during the transition period.

## Next Steps

1. The Ohio Department of Agriculture, farm groups and non-governmental organizations should explore with crop insurers possible designs for a no-till crop insurance program and what, if any, changes in federal law are necessary.
  2. The Ohio Department of Agriculture, in conjunction with the Department of Taxation, should work with Ohio growers, non-governmental organizations, and state agriculture and tax officials to outline a state tax policy for promoting conservation tillage equipment purchases, crop insurance programs, and CAUV adjustments.
  3. The Ohio Department of Natural Resources should consult with the Maine Forest Service, the U.S. Forest Service, and Environmental Northeast to identify the best methods to estimate how management practices can improve forest sequestration of carbon.
  4. Ohio's Congressional Delegation should secure federal funds to further research the environmental, economic, and agriculture benefits of bio char.
- \*For more steps see p. 34 of the Ohio Climate Road Map, Part 2

## Foundation for Action

- The Ohio Air Quality Development Authority and the Ohio Coal Development Office are participating in the Midwest Regional Carbon Sequestration Project. This project is focused on moving research and development of carbon sequestration forward through small initial test projects.

- The Ohio State University Carbon Management and Sequestration Center focuses on understanding and enhancing the science, management, and policy of carbon within



Experiments at Cornell University found that applying bio char to soil can not only dramatically improve the soil and increase crop production, but also can provide a long-term sink for atmospheric CO<sub>2</sub>.



**Toward a cleaner earth**