



CLIMATE  
FRIENDLY FARMING™

## The Economics of Climate Friendly Farming™

Climate Friendly Farming™ Research Brief No. 4, April 2004  
WSU Center for Sustaining Agriculture and Natural Resources  
Prepared by Chad Kruger

### Background

A key consideration in research and education on agricultural practices and technologies that mitigate global climate change is whether or not farmers will adopt the technologies. The economic feasibility and technical capabilities to reduce GHG emissions and sequester carbon are not necessarily the same.

There are three basic economic issues that need to be addressed for each technology or practice to be adopted: (1) *financial* – whether the technology or practice is financially practical, (2) *adoptability* – non-financial decision-making, and (3) *supportive policy framework* – removing barriers to and creating incentives for technology adoption.

The more capital intensive the technology or practice is, the more important the *financial* issue becomes. For instance, the capital cost of constructing an Anaerobic Digester on a dairy farm may be prohibitive based on the financial return from the energy produced – especially in the Pacific Northwest. However, if the dairy can recover added value for the mitigation of greenhouse gas (GHG) emissions or from the marketing of by-products from the digester than digesters may become financially feasible (See Climate Friendly Farming™ Research Brief No. 1). On the other hand, less capital-intensive or cost-saving practices and technologies, such as improved irrigation and nitrogen management, may provide sufficient financial incentive for farmers to adopt.

Financial feasibility is critical when farmers are considering adopting new technologies or practices; however it is not the only consideration. Non-financial considerations, such as a farmer's stewardship values as well political and social factors all play an important role in farmer decision-making. For instance, in a period of 5 years, Washington orchardists adopted pheromone mating disruption practices in approximately 50% of orchards despite the increased cost of the practice (Daniels, C. 2002).

In addition to farm level decision-making, public policies can have a beneficial or detrimental impact on the adoption of new technologies. Policies that create barriers to technology adoption, such as arduous building permit processes for anaerobic digesters could deter a farmer from adopting the

technology even if it is financially feasible. Similarly, cost-share plans, such as the USDA Natural Resource Conservation Service's Environmental Quality Incentive Program (EQIP), and state regulations requiring electric utilities to offer renewable energy to consumers, such as Washington's House Bill 2247 (2001) can facilitate the adoption of global climate change mitigating technologies.

### What are the "economics" of Climate Friendly Farming™?

Climate Friendly Farming™ is a recent concept that encompasses a number of existing technologies and practices with a new emphasis on capturing multiple benefits of agricultural systems for both farmers and society as a whole. Markets for Climate Friendly agricultural products are under development, such as carbon credit trading through organizations such as the Climate Trust (Portland, Oregon), the Chicago Climate Exchange and the Sydney Carbon Exchange. The following concepts clarify some aspects in current thinking about the economics of Climate Friendly Farming™.

*"Green Tags":* Green Tags, or Renewable Energy Certificates (REC), are premiums paid for renewable energy. Some states, such as Washington, require that electric utilities offer consumers the option to purchase renewable energy (such as wind, solar or biomass energy). The rationale for green tags is that renewable energy is still slightly more costly to produce than fossil fuel or hydro-power energy, and needs the additional price incentive to make it financially feasible. Climate Friendly Farming™ technologies, such as Anaerobic Digestion or biomass-based fuels may qualify for green tag premiums in states with supportive policies.

*Carbon credits:* The United Nations Framework Convention on Climate Change (1992), otherwise known as the Kyoto Protocol, opens the potential for reductions in global and national GHG emissions through market-based trading of carbon credits. This works by allowing "emitters" (ie. fossil fuel power plants) to purchase carbon credits from "fixers" of carbon dioxide (ie. typically landowners who plant trees). Carbon credit trading is conceptually based on the successful sulfur dioxide trading program of the US Environmental Protection Agency. Credits can be sold

outright or leased for preset periods of time. While still in its infancy, with many hurdles to cross, carbon credit trading provides the potential for another source of income for farmers who adopt Climate Friendly Farming™ technologies and practices. An example of carbon credit trading is the relationship between Entergy (an energy company in the southern US) and the Pacific Northwest Direct Seed Association. In 2002, Entergy and PNDSA entered a lease agreement for the trade of 30,000 tons of CO<sub>2</sub> over 10 years.

The government could also serve as a partner in carbon credit trading. A new study released by the USDA's Economic Research Service (ERS) suggests that "the economic potential to sequester carbon is substantially lower than the technical potential" (Lewandrowski et al 2004). Certain carbon sequestration activities are less costly and these activities can be "purchased" through carbon credits for much more reasonable subsidy payments (ie. \$10 per metric ton CO<sub>2</sub>). In order to meet our technical potential for carbon sequestration through agriculture, payments for carbon sequestration would have to approach \$125 per metric ton CO<sub>2</sub>. The ERS study also concluded that a combination of incentive subsidies and penalties for GHG emissions would facilitate the adoption of Climate Friendly Farming™ technologies and practices.

*Multiple benefits of agriculture:* Another way to look at the economics of Climate Friendly Farming™ practices and technologies is to see them as a piece of a larger package of benefits that agriculture provides to society. Many of the practices and technologies, such as anaerobic digestion, direct seeding for carbon sequestration and irrigation and nutrient management, provide benefits beyond the mitigation of global climate change. These practices and others provide improved soil and water quality, public health, wildlife habitat and other benefits to society.

Consumers and policy-makers alike are beginning to inform themselves about the important role that agriculture plays in serving the public benefit – and are taking steps to make sure that farmers are able to make operational decisions for reasons that previously were not financial. For instance, taxpayer supported cost-share programs for environmental quality are becoming a priority in federal programs for agriculture (ie. Conservation Security Program and Environmental Quality Incentive Program). In addition, more consumers are using their food dollars to purchase food produced with methods that are sustainable and promote the health of the environment.

Marketing these "multiple benefits of agriculture" could be an influential element of farmers' decisions about whether to adopt Climate Friendly Farming™ practices and technologies. For instance, a Harrington, Washington grain farmer has packaged a number of environmental benefits, including

carbon sequestration, with third-party certification of his practices through Food Alliance to market a grain product that commands a premium price from consumers willing to pay for the added benefit as well as his payment for carbon credits through the PNDSA.

## Resources

There is still much to learn about the economics of and the extent to which farmers will adopt Climate Friendly Farming™ practices and technologies. The following resources are available for more information.

The Washington State University Center for Sustaining Agriculture and Natural Resources' Climate Friendly Farming™ Research and Demonstration Project is a resource for research and educational outreach on the economics of Climate Friendly Farming™ practices and technologies. The web page for the Project is <http://cff.wsu.edu/>.

The USDA, ERS report on the Economics of Sequestering Carbon in the US Agricultural Sector is available at [www.ers.usda.gov/publications/tb1909](http://www.ers.usda.gov/publications/tb1909).

Food Alliance, a third party certifier of agricultural practices is a resource on the environmental benefits of agricultural production. [www.foodalliance.org](http://www.foodalliance.org).

## References

Daniels, C. 2002. Sustainable Agriculture in Washington State. Center for Sustaining Agriculture and Natural Resources, Washington State University. CSANR publication No. 5.

Lewandrowski, J., M. Peters, C. Jones, R. House, M. Sperow, M. Eve, and K. Paustian. 2004. Economics of Sequestering Carbon in the U.S. Agricultural Sector. USDA Economic Research Service Technical Bulletin No. (TB1909).

PNDSA. 2002. A Synopsis of the PNDSA Soil Carbon Sequestration Lease Contract. <http://www.directseed.org/>

Funding provided by:



THE PAUL G. ALLEN CHARITABLE FOUNDATION

Climate Friendly Farming™ Research and Demonstration Project  
Center for Sustaining Agriculture and Natural Resources, Washington State University  
1100 N. Western Avenue, Wenatchee, WA 98801  
509-663-8181 x235 <http://cff.wsu.edu/>