Farming For Carbon: Can It Work And Does It Pay?

Presented by Dr. Merle M. Anders
Rice Systems Agronomist, University of Arkansas RREC

There is a growing call for everyone to become more aware of climate change and the impact that carbon has on that change. Agriculture is unique in that it both uses and stores carbon thus is sometimes regarded as the problem and sometimes the solution. The exact role agriculture in this changing environment is not clearly understood and will not be until more is known about 'how farming can impact carbon cycles'. More recently, there have been some business structures developed that begin to address the issue of carbon trading; or paying those who can sequester carbon for doing so via payments from those activities that discharge carbon into the atmosphere. One such organization is the Chicago Climate Exchange. This organization has developed guidelines that farmers must follow if they are to participate in a carbon trading program. How these guidelines, if approved, fit into rice based production systems and if their adoption will be economical and result in carbon sequestration is the topic of this presentation.

In a meeting held in Arkansas CCX outlined some of the guidelines they are using to determine eligibility for their carbon exchange program. Those relevant to rice production are:

a. Enrolled land must be crop able ground.

b. Must be under no-till or strip-till: No greater than 33% soil disturbance and 33% residue removed.

c. Must submit annual signed attestation to aggregator.

d. Leased land-should have reasonable expectation that land will remain under their control through the contract period. If land is sold and taken out of contract all credits are voided and past credits must be replaced.

e. No credits issued if residue is removed or burned.

No-till or strip till are accepted based on NRCS guidelines which reads; "Managing the amount, orientation and distribution of crop and other plant residue on the surface year-round while growing crops in narrow slots or tilled or residue-free strips in soil previously untilled by full with inversion implements." CCX provides a list of the types of tillage implements that will and will not be allowed if producers wish to receive carbon payments. That list is as follows:

1. Full width inversion implements – Not allowed:
   a. Moldboard plow
   b. Chisel plow
   c. Field cultivator
   d. Tandem disk
   e. Offset disk
   f. Row-crop cultivator
2. Eligible implements:
   a. No-till / strip-till planter

b. No-till drill
c. Rolling harrow
d. Subsoiler / ripper
e. Anhydrous applicator
f. Manure knife applicator

To most rice farmers the decision of farming or not farming for carbon will center on the income potential for selling carbon and its relationship to how profitability is impacted by implementing the guidelines required for selling carbon. CCX provided the following summary of potential benefits:

Conservation tillage practices carried out on 1,000 acres of land is equivalent to approximately 500 metric tons of CO2. 20% or 100 metric tons of carbon is placed in a reserve pool.

Value of carbon offsets = 400 x $3.65	$1,460
CCX Trading fee = 400 x $0.20/metric ton of CO2	-$80
Aggregator Fee = 1,460 x 8%	-$116
Verification Fee	- 0
Annual Payment to Project Owner	$1,264

This annual return of $1.26 for each acre in a project will not be sufficient incentive for most producers to adopt a 'farming for carbon' management approach unless they can maintain or improve on current profitability levels using a standard management approach.

In 2000 work was initiated at the University of Arkansas Rice Research and Extension Center that begins to address the question; 'can you farm for carbon in rice production systems without compromising profits'? This work compares seven rotations in no-and conventional-till management schemes. Within each tillage treatment there are two fertility treatments with two varieties planted. This study has provided insights into the feasibility of farming for carbon via the inclusion of a no-till treatment. All no-till plots were last tilled in 1999. They have not been burnt thus all residues have been left on the soil surface. All fertilizers have been applied on the surface and not incorporated. There is a wide range of rotations with variations from every year to every third year in the frequency rice is found in any rotation. To date results from this study have shown that no-till rice farming is possible and that income levels would be similar to those on conventional-till fields. In this study rice grain yields from no-till plots were equal-to or greater than those from conventional-till plots in 4 of 6 years. In all years grain yields were higher than the state average. In a recent analysis of the economic returns from this study it was found that "both the tenant and the landlord can benefit monetarily from no-till management." "Risk-neutral and risk-adverse tenants would both benefit from no-till management as no-till increases mean (expected) returns for risk-neutral tenants and results in large risk premiums over conventional-till for risk-averse tenants." In summary the results from this study support no-till management over a range of lease agreements. It also illustrates the stability of grain yields from no-till production verses that from conventional-till production. Because the management of this study was such that no-till treatments would be eligible for carbon payments there would be a greater financial benefit from adopting these projects regardless of carbon prices. In that situation carbon sales would simply be frosting on the cake!

In the rotations studied soybean grain yields in the no-till plots were consistently higher than those from conventional-till plots indicating additional income gains from a rice-soybean rotation. Corn grain yields from no-till managed plots were lower than those from conventional-till plots up to the 5th year of the study. That trend has now changed and corn yields are higher in the no-till plots. Other management options particular to no-till rice production are weed control, disease control, and field draining. Information is available on how these practices need to be approached.