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Ag Decision Maker

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A Business Newsletter for Agriculture

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Energy agriculture - carbon farming

by Don Hofstrand, value-added agriculture specialist, co-director AgMRC, Iowa State University Extension, 641-423-0844, dhof@iastate.edu

Sixth in a series

During the past year, scientific evidence has been piling up supporting the concerns about global warming. Melting glaciers, rising ocean levels and volatile weather are all signs of things to come. In response to this evidence, the focus in coming years will be on ways of slowing or actually reversing this trend.

Greenhouse gases have been identified as the major culprit of global warming. Sunlight reaching the earth's surface is reflected back into space as heat. Greenhouse gases act to capture this heat and trap it in the atmosphere.

Many gases have the greenhouse effect. Probably the most common is water vapor. Gases from human activity are shown in Table 1. Carbon dioxide is by far the most prevalent. Methane and nitrous oxide exist in much smaller amounts. However, all greenhouse gasses are not equal. Methane is 25 times more powerful as a greenhouse gas than carbon dioxide. Small amounts of man-made gases act as greenhouse gases also.

Table 1. Greenhouse Gas Emissions from Human Activity by Type, 2001*

Gas	Percent
Carbon Dioxide	84
Methane	9
Nitrous Oxide	5
All Others	2
Total	**100**

* Energy Information Administration, Emissions of Greenhouse Gases in the United States 2001, Washington, D.C. 2002.

The build-up of carbon dioxide in the atmosphere has been substantial. The atmospheric concentration of carbon dioxide has increased greatly in the last 50 years. This corresponds to the increase in carbon dioxide emissions from human activity (anthropogenic) starting in 1850, and climbing rapidly after 1950.

Most of the exchange of carbon dioxide between the earth and the atmosphere is a natural cycle. When plants grow they take in carbon dioxide in the process of photosynthesis. When plants die and decay or are processed, they release carbon dioxide back into the atmosphere. The same type of cycle occurs between the oceans and the atmosphere. *continued on page 2*

Handbook updates

For those of you subscribing to the handbook, the following update is included.

Lease Termination and Other Legal Considerations for Lease Contracts – C2-06

Computing a Cropland Cash Rental Rate – C2-20 (4 pages)

Test Weights and Conversions – C6-82 (2 pages)

Please add these files to your handbook and remove the out-of-date material.

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Inside . . .

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Carbon dioxide buildup occurs when new carbon dioxide is added to the atmosphere. Burning fossil fuels (oil, coal, natural gas) takes carbon that was stored deep in the ground and releases it as carbon dioxide into the atmosphere. The same thing occurs with the release of carbon from the soil through farming practices.

The soil is a huge storehouse of carbon. Organic carbon (humus as we know it) is what makes soil nice and black. This organic carbon comes from thousands of years of prairie grasses growing, dying, decomposing and entering Midwestern soils. To learn more on the carbon cycle, visit the National Energy Information Center web site on greenhouse gases at: http://www.eia.doe.gov/oiaf/1605/ggccebro/chapter1.html.

Tillage or tearing up the soil stimulates the activities of microorganisms and exposes the humus to oxygen and the sun. These forces act to destroy the organic carbon and release carbon dioxide into the atmosphere. This change can be seen by comparing native or virgin sod to land that has been farmed for 100 years. The virgin sod is black while the farmed land has a shade of gray to it. According to scientists, the organic carbon content of Iowa soils has gone from 5 percent to about 3 percent over the last century.

On a world-wide basis, from the time agriculture began, almost 80 million tons of carbon have been released from the soil (Rattan Lal, soil scientist, Ohio State University). Up until the late 1950s, tillage (plowing) released more carbon dioxide into the atmosphere than all the burning of oil and coal in history.

However, that's all in the past and we can't do anything about it. But what this does tell us is the potential for once again using the soil as a great storehouse of carbon. Theoretically, American soils could soak up more than 100 million tons of carbon annually. That's enough to offset the emissions from half of the cars in the country (Rattan Lal).

Carbon Credit Programs

If tilling the soil releases carbon dioxide into the atmosphere, not tilling the soil stops the release of carbon dioxide. In fact, not tilling the soil begins to build up the carbon content of the soil. You might call this "carbon farming". Examples include no-till farming and planting cropland to permanent grass or trees.

Some large U.S. companies want to voluntarily reduce their greenhouse gas emissions. However, instead of reducing their own carbon emissions they have the option of paying someone else to reduce their carbon emissions.

Programs have been developed that facilitate the buying and selling of carbon credits between farmers and large companies. Farmers receive carbon credits for storing carbon in the soil. The credits are then aggregated and sold to companies wanting to reduce emissions. Examples include programs by Iowa Farm Bureau and North Dakota Farmers Union.

Typically, the program aggregates or pools the credits from many farmers and manages and administers these pools. Specific steps involve:

1) Registering the individual farm projects
2) Maintaining the database of ag-based credits.
3) Managing the sales of the credits to the Chicago Climate Exchange (CCX)
4) Distributing proceeds back to participants
5) Collecting a fee for services provided (e.g. 10 percent of net proceeds).

Chicago Climate Exchange (CCX)

The Chicago Climate Exchange (www.chicagoclimatex.com) is a global marketplace for trading greenhouse gases. It provides a marketplace where companies and other entities can purchase carbon credits to offset their greenhouse gas emissions. Members make voluntary but legally binding contracts to reduce emissions. Well-known member companies include Ford, DuPont and IBM.

The chart on the next page shows the price of carbon traded on the CCX since January of 2004. The price is shown in dollars per metric ton (2,204 pounds). Since April of 2006, the price has traded in the $3 to $5 range. During 2007, the volume of trading increased.

To be eligible the land must be capable of being cropped. Producing an acre of crop using the no-till practice provides a credit of .6 of a ton of carbon dioxide in Iowa and the Corn Belt in general. The size of the credit is different for other parts of the country.

In addition to no-till farming, other acceptable methods of storing carbon include:

- Converting cropland to permanent grassland or trees.

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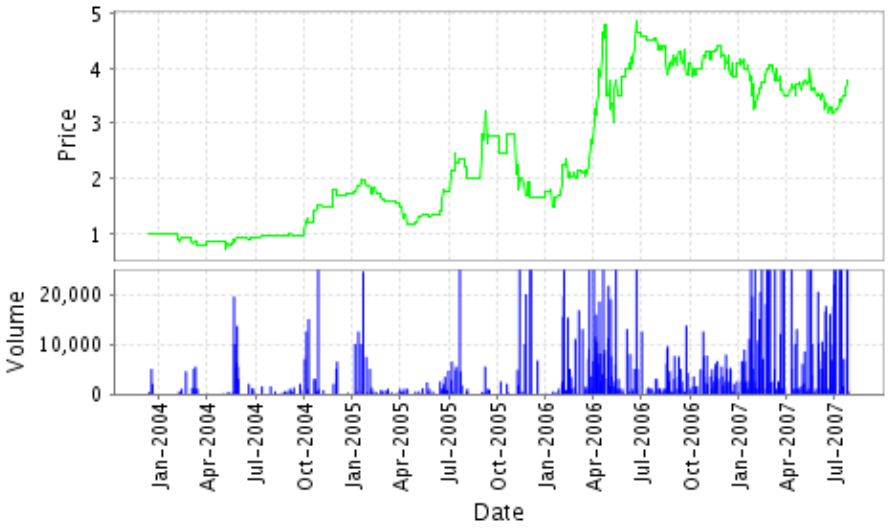
CCX Carbon Financial Instrument (CFI) Contracts Daily Report



Source: Chicago Climate Exchange (CCX)

- Restoring wetlands
- Rangeland improvement
- Cover crops
- Planting conservation buffers
- On-farm methane digesters

Methane digesting of manure and other feed-stocks is of special interest because one ton of methane converts to 18.25 tons of carbon dioxide credits on the Chicago Climate Exchange.

Obviously, these programs are currently not big money-makers for farmers. With carbon selling between $3 and $4 per ton and a carbon credit of .6 ton, the return per acre is pretty small. However, be patient, with increasing concerns about the devastating effects of global warming nationally and globally, the price of carbon will increase and increase substantially. The benefits of no-till farming include reduced production costs and less soil erosion. Now there is an additional benefit of no-till which is to rebuild the organic carbon content of our soils – and get paid for it.

More information

For more information on these projects, contact the following:

Iowa Farm Bureau Federation
515-225-5431
http://www.iowafarmbureau.com/carbon

North Dakota Farmers Union
1-800-366-8331 ext. 116
http://carboncredit.ndfu.org/

There are other public and private sector Carbon Credit Programs that are not included in this listing.

References

Carbon Credit Aggregation Pilot Project. Iowa Farm Bureau Federation. 17 July 2007. <www.iowafarmbureau.com/special/carbon/default.aspx>.

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Charles, D. Iowa Farmers Look to Trap Carbon in the Soil. 2007. National Public Radio-Climate Connections. 17 July 2007. <http://www.npr.org/templates/story/story.php?storyId=11951725>.

Greenhouse Gases, Climate Change, and Energy Balance. 2004. Energy Information Administration. 17 July 2007. <http://www.eia.doe.gov/oiaf/1605/ggccebro/chapter1.html>.

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Custom fit your farm lease

by William Edwards, extension economist, 515-294-6161, wedwards@iastate.edu

Iowa farms come in all sizes and shapes. Finding the right lease arrangement for each farm requires some careful thought. Fortunately Iowa land owners and operators have several common and some not so common types of leases to choose from.

Table 1 shows how the number of acres under each of the most common types of lease agreements has changed over the last few decades.

Table 1. Ownership and Leasing Agreements, percent of Iowa Farm Acres

	1982	1992	2002
Operated by owner	55	49	40
Cash rent lease	21	26	39
Crop share lease	21	22	18
Custom farmed, other	3	3	3

Source: Farmland Ownership and Tenure in Iowa, Iowa State University Extension PM 1983, 2004.

The number of acres under traditional crop share lease agreements has declined slightly since 1982, but the biggest shift has been from owner-operated acres to cash rented acres. It is likely that many of these acres are held by retired farmers or their heirs, who wish to retain ownership as an investment or for a steady source of income.

Cash Leases

Cash lease agreements are popular with land owners because they provide a fixed income, at least for the length of the contract, and require very little involvement in the management aspects of growing and marketing the crop. Many tenants prefer cash leases, as well. When a tenant is renting from multiple owners, cash rents reduce the amount of record keeping needed and let the tenant manage all the rented acres as a single unit. Grain can be commingled for purposes of storage and marketing. Some tenants feel that they can rent land based on average expected yields in the area, and if they are able to achieve superior yields they will retain all the additional income.

The primary disadvantage of a cash lease is the need to agree on a rental rate that accurately reflects the profit potential of the farm. Tenants and owners need to re-evaluate the amount of rent periodically, sometimes annually. When yields and prices are relatively stable, setting the rent may be fairly easy. However, when conditions are more volatile it becomes more difficult to determine a mutually agreeable rent.

Crop Share Leases

Sharing of costs and production has been a traditional means of renting land in Iowa for over a century. Rental terms have changed very slowly, even when technology has changed the relative values of the contributions from the owner and the tenant. The most desirable feature of a crop share lease is that both parties automatically share in increases or decreases in profits, making yearly negotiations about rental terms unnecessary. Share leases also allow young operators to benefit from the expertise of experienced landowners, and decrease the amount of operating capital the tenant has to supply by over 50 percent. If a tenant is farming enough acres to reach the limitations on USDA commodity program payments, a share lease may prevent some payment dollars from being lost.

Whether land owners are willing to take on the added financial risk and management considerations of a crop share lease is a very individual question. Retired operators who still want to have active involvement are good candidates for share lease agreements. In other cases a professional farm manager may be hired to carry out the owner's management and marketing responsibilities.

Other Choices

Owners or managers who wish to assume all price and production risk and be very involved in management may choose to have their land custom farmed. Tenants who custom farm often find that adding some extra land with a guaranteed return allows them to fully utilize their machinery and labor with adding financial risk.

Tenants and owners who are willing to share risk but want the simplicity of a cash lease may prefer some type of flexible cash rent agreement. A future article will examine flexible leases in more detail.

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Custom fit your farm lease, continued from page 4

Comparing Returns

Figure 1 shows how the returns to a landowner under three different types of lease agreements would have varied since 1990. The crop share lease income is based on one-half of the revenue received from the state average yields and cash prices from each year, plus one-half of any USDA commodity payments and crop insurance indemnities paid each year. One-half of the estimated costs of seed, fertilizer, pesticides, crop insurance, drying and operating interest were deducted, but land ownership costs were not deducted. The land was assumed to be planted half to corn and half to soybeans.

The returns to a cash lease were the average cash rental rates for Iowa as estimated by the annual Iowa Farmland Cash Rental Rate Survey carried out by ISU Extension. Again, no land ownership costs were deducted. The return to a flexible cash lease assumed that the rental rate was equal to 35 percent of the gross value of the corn crop and 45 percent of the gross value of the soybean crop each year. These terms were chosen for purposes of illustration, but many other variations could be used.

Figure 2 shows the return to the tenant each year after subtracting estimated production costs and cash rent payments. The average returns from the three types of leases were nearly identical over the 17-year period, for both the owner and the tenant. However, the fixed cash lease put nearly all the income variability on the tenant's shoulders. The crop share lease and the flexible cash lease shared risk between the two parties, and provided very similar returns in most years.

Figure 1. Return to Owner for Corn-Soybean Rotation

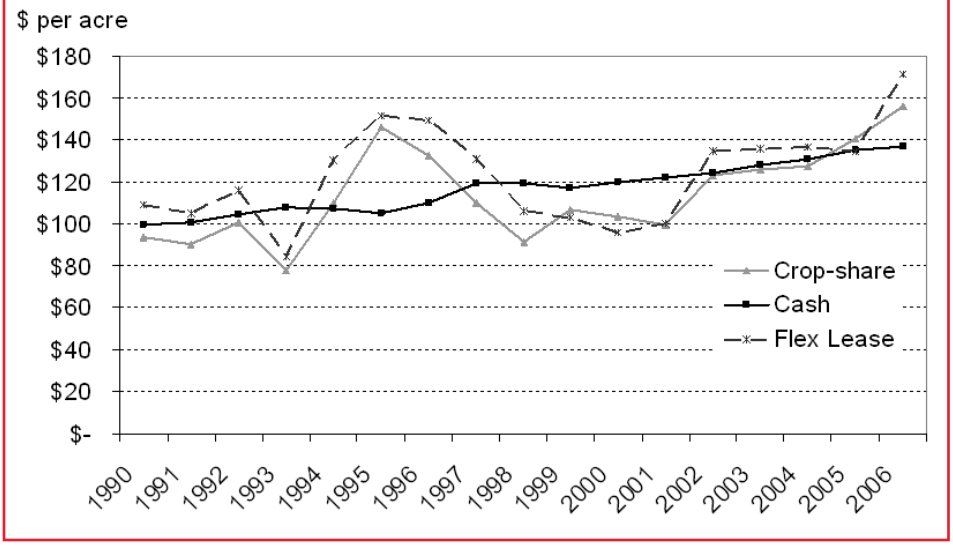
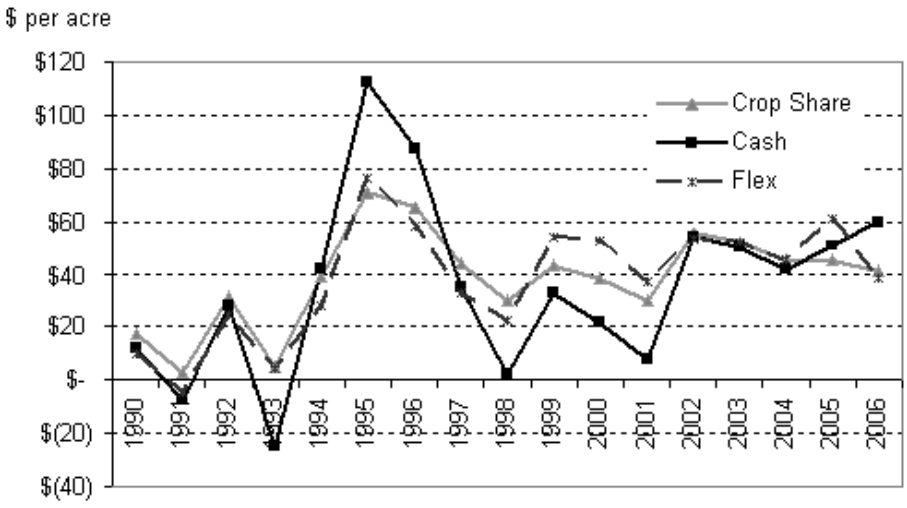


Figure 2. Return to Tenant for Corn-Soybean Rotation



Domestic fair trade

by Craig A Chase, extension farm management field specialist, 319- 882-4275, cchase@iastate.edu

In our economics classes we are taught that in a capitalistic or free market society, two parties voluntarily exchange or trade commodities or services. For example, when we buy a cup of coffee we receive the cup of coffee for a set price. We don't often think about what happens to the money we gave to the retailer and how that money goes back to the original provider of the commodity; in this case the coffee grower. When people become more aware of how profits are divided, they begin to think about things such as "fair trade" and "fair wages" to those providing the original commodity and the processes that occur between the original production and the final consumption.

"Fair trade" coffee has been around for awhile and the concept of domestic fair trade is beginning to become more noticed and talked about. So what is needed to have domestic fair trade? First and foremost, the agreed upon exchange price has to cover not only the cost of production and marketing to the original grower, but also a "fair" return to his/her land, labor, and management. It is up to each individual grower to determine what "fair" means based on their particular monetary and non-monetary goals. Regardless of goals, transparency is critical to the "fair" pricing dialogue that needs to take place between the buyer and seller.

How do we achieve transparency? The first thing that needs to be done is the grower has to know how much it costs him/her to produce and market the product for sale. Secondly, all parties need to be transparent in the dialogue. The grower has to share production and marketing costs with the buyer when discussing price. The informed grower will be able to state a price that covers not only costs, but includes the economic returns needed to reach the established goals.

In a Sustainable Agriculture Research and Education funded project, four Iowa Community Supported Agriculture businesses tracked what they provided in their weekly share boxes and "valued" those products by using local grocery store prices. The weekly valuations occurred for 20 weeks and a final evaluation was determined for the share box subscription. This information can be used to develop a competition-based price comparison. The next step for the growers would be to add premiums to the base price for attributes such as product quality, organically-produced, home-delivery, and any other product differentiation between the grocery store and share box products (the publication detailing the study will be out later this year).

But how high do the premiums need to be? Again, the growers need to determine the cost of producing and marketing their share boxes and then add a "fair" return. Once costs are known, then the growers can share information with their share box membership. If the consumers of the share boxes value the local food (i.e., their receipt of the exchange), then they will be willing to trade their dollars for local food at a "fair" price.

Updates, continued from page 1

Internet Updates

The following updates have been added to www.extension.iastate.edu/agdm.

Grain Storage Alternatives: An Economic Comparison – A2-35

Condominium Grain Storage – A2-36

Leasing Arrangements and Self-employment (Social Security) Tax – C2-41

Managerial Costs – C5-209

Opportunity Costs – C5-210

Product Life Cycle – C5-211