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Farming systems that manage crop residue are becoming more and more popular today. Interest and enthusiasm in crop residue management indicates that these farming practices will be part of farming in the future. Profit and conservation are driving these upward trends.

In 1992, 9,743,000 acres, nearly half of Iowa's cropland, were planted using crop residue management systems that left at least 30% of the soil surface covered by crop residue. These acres were managed using no-till, ridge-till and mulch-till (full-width tillage) systems. The acreages farmed with these systems in 1992 represent nearly 140 percent of the acres farmed with these same practices in 1991. The three basic systems that make up this overall trend are changing at different rates. No-till, where the soil and crop residues are not disturbed between harvest and planting except for nutrient injection, increased from 973,000 acres in 1991 to 2,762,000 acres in 1992. This change in no-till acres represents a 2.8 fold increase in one year. Mulch tillage, full width tillage systems that leave at least 30 percent of the ground covered by residue after planting, increased from 5,700,000 acres in 1991 to 6,699,000 acres in 1992. This represents nearly a 20 percent increase. Ridge-till is a system where the soil and crop residues are not disturbed between harvest and planting but is distinguished from no-till with the crop being planted on ridges and the importance placed on cultivation for both weed control and maintaining the ridges. Ridge-till showed a slight decrease this year dropping from 324,000 acres in 1991 to 282,000 acres in 1992.

The shift to crop residue management systems are being driven by several things -- economics, recent innovations in no-till equipment, new herbicides, increased management knowledge and conservation issues such as the highly erodible land (HEL) provisions. Of these, economics is having the most influence. As farms continue to get bigger, farmers are looking for ways to find savings in labor, time, and machinery while maintaining yields. Crop residue management has been able to fit the bill. Below are a few examples of savings shown using crop residue systems:

-- Indiana soybean fields with more than 30% crop residue after planting netted $7.03 per acre more than field with less than 30%. (1991 MAX summary)

-- Typical diesel fuel requirements

Tillage System	Fuel use (gal/acre)
Moldboard plow	5.28
Chisel plow	3.34
Disk	3.03
Ridge-till	2.69
Rotary till	2.58
No-till	1.43

(Source: CTIC)

-- Average hours per acre for various tillage systems.

Tillage Systems	Corn hrs/acre	Soybeans hrs/acre
Moldboard Plow	.8	.6
Mulch-till	.3	.4
No-till	.2	.1

(Source: Economic Research Service, February 1992)

Looking at two quick examples of specific counties in north central Iowa points out the importance that economics is playing in the increased adoption of crop residue management systems. Humboldt County, thought of as Iowa's "flattest, blackest" county, had 1,000 acres of no-till in 1991, while in 1992 20,000 acres were planted using no-till systems. Kossuth County had approximately 3,700 acres of no-till in 1991, and had nearly 42,000 acres of no-till in 1992. Humboldt and Kossuth counties have approximately 3,000 and 9,000 acres, respectively, classified as highly erodible (HEL) for conservation compliance purposes.

Crop residue management, of whatever type, really just boils down to applying a crop production system that uses crop residue to meet your objectives. Common objectives include: raising the highest economic yield possible, lowering production costs, performing operations such as controlling wind and water erosion. You must set your objectives and use these objectives as goals for your system. Then as you look at your current system or a crop production system you are switching to make sure that each part of that system works toward these goals.

The issue of fall tillage and meeting the objectives of a crop production practice is a good example. If you are currently fall tilling, ask yourself why. Any tillage operation is too costly to do it for any reason that won't help you reach one of your crop production goals. Let's say you

are doing fall tillage to eliminate soil compaction, which is a valid reason. Ask yourself Do I really have a compaction problem? If I do, how deep is it? How deep should I run my equipment to eliminate it? What equipment will do the best job? Are conditions right to eliminate compaction? The bottom line is for each operation you do, know how it will help you to reach your crop production objectives.

In 1992, crop residue management systems were found to contain many advantages and some perceived disadvantages by Iowa farmers. Several of these are listed below and some are briefly discussed.

Advantages:

- -- soil erosion control
- -- less labor
- -- less time
- -- less chance for compaction with fewer trips across the field
- -- improved water quality
- -- lower fuel costs
- -- fewer hours on machinery like tractors
- -- equal to slightly better yields
- -- better germination, due to the fact the seed zone was not dried out by excessive tillage.

Disadvantages:

- -- side wall compaction from planting, some planting performed on soils that were too wet, then combined with dry, hot weather after planting caused some side-wall compaction this spring.
- -- increase in scouting and management time.
- -- weed control; the dry spring hurt the performance of some chemical programs.
- -- fertilizer placement or stratification continues to be a concern of no-till and ridge-till farmers; many options exist to place fertilizer into the root zone and to date no research has shown stratification to be a yield issue.
- -- crop appearance early in the growing season bothers many producers; the key to remember is you get paid for how the crop looks in November, not June.

The biggest challenge to overcome as you make the transition to higher levels of residue is the fear of change. Change is something that we all resist to some extent, but in agriculture today change is becoming a daily event. The best way to overcome this fear of change is to prepare yourself as well as you can. Below are a few ideas for preparing yourself and your farm for farming with more residue.

Preparing yourself and others involved.

-- Learn as much as you can from other farmers through seminars, field days, tours, etc.
-- Gather and read as much information as you can.
-- Begin the new system with a positive, "it will work" attitude

Preparing the farm.

-- Sample the nutrients and pH levels on your farm. If nutrients and/or pH are low, bring both up to desirable levels.
-- Evaluate your fields for compaction problem and correct any problems found.
-- Choose fields carefully; don't start with a field on which you have a bad weed problem.

In summary, crop residue management systems are growing rapidly in popularity. The management knowledge along with the agri-chemical and machinery tools are now available to make the transition much easier. If you make the commitment and prepare yourself and your farm, you can farm with higher levels of residue and make your crop production system profitable and environmental at the same time.