

**Jim & Sue Keating
Ottawa County**

**Resource Conserving
Crop Rotation**



Cooperator:

Jim & Sue Keating
1765 K-18
Bennington, Ks. 67422-9446

Water Quality Concern:

Leaching and run-off from agricultural fertilizers and chemicals to city water supply wells and creek

Watershed:

Solomon River Watershed

Demonstration

- * Develop a resource conserving crop rotation using non-chemical weed controls
- * Establish a tree-shrub border between fields

Jim and Sue Keating began farming in the last 10 years when they began purchasing land in Ottawa County in central Kansas. The Keating's farm totals about 200 acres with just over 150 acres in wheat, soybeans, milo and alfalfa. They purchased the first fifty acre tract of their farm in 1991, and then the additional 150 acre tract in 1994.

The Keating's farm borders the City of Bennington and straddles Sand Creek. The City of Bennington recently dug a water well on the

Keating's land for the city water supply. Given these factors and an awareness of water quality concerns, the Keatings realized their farming activities could have significant impact on their neighbors and community.

Thus they applied for a Clean Water Farm grant to help them assess and develop farming practices that would protect water quality and be economically feasible. Currently, Jim teaches full time at Kansas State University in Salina. Their plans are

to develop farm enterprises that can fully support them at some point in the future.

The Keatings developed a water quality plan that would provide city well-head protection for Bennington and prevent surface water pollution to Sand Creek.

To do this they converted the 50 acres of cropland surrounding the Bennington well to organic practices thus eliminating synthetic fertilizer and chemicals. They also established a grass buffer strip along Sand Creek, reduced fertilizer and chemical applications on their remaining cropland as they transition it to organic practices, and planted tree/shrub windbreaks for increased biodiversity and soil conservation.

With a goal to eventually farm full time, the Keatings are working on several options to maximize net income on their small farm. These include producing and marketing organic field crops - wheat, soybeans, feed grains, alfalfa - at premium prices, producing and marketing some high value crops such as asparagus and squash, and marketing some value-added products like bread mixes.

Their marketing plan involves cooperative marketing with Kansas Organic Producers on the organic grains, and collaborative marketing of the vegetable crops and value-added products through the central Kansas Land to Hand direct marketing group.



A strict crop rotation utilizing legumes, especially alfalfa and clovers, is key to an organic production system. The Keating's are phasing in their organic system field by field as each field comes out of the alfalfa phase of the rotation.

Organic production involves much more than elimination of synthetic chemical fertilizers and pesticides. The development and use of a conscientious soil building crop rotation is required to meet organic certification standards.

The Keatings developed a seven year crop rotation: alfalfa, alfalfa, alfalfa, soybeans, milo, soybeans, wheat. To accommodate this rotation the Keating's changed field boundaries, and the direction in which some fields were farmed, so that they are all farmed east to west. Most of the fields are laid out in wide strips, with the tree/shrub windbreaks between every two field strips.

The Keatings are phasing the farm into organic certification field by field as each field comes out of the alfalfa phase of the crop rotation. They believe the amount of legumes in the rotation will produce sufficient nitrogen. They are also using composted cow lot manure and mined phosphate



The Keatings have transitioned to an organic crop production system, which helps protect the city water well located on their property.

organic fertilizers for phosphorus and other nutrient requirements.

With the use of mechanical cultivation and a variety of crops, there is more turning and traffic at the ends of fields, and it becomes more difficult

to control weeds with cultivation in the turn row areas. Jim said, "we decided that establishing a grass buffer strip along the creek at the end of the field for a turn row makes good sense for field operations, along with providing soil conservation and water quality protection."

"Weed control in row crops is the main challenge in organic production." Jim explained that they had never used much herbicide in their operation, just a preplant application of Dual in soybeans. He had always cultivated for post-emergent weed control. The Keating are experimenting with different equipment and techniques to improve early weed control in row crops. Jim remarked, "We are still pretty new at this. We have good weed control in parts of the field, but in other parts not good enough. We continue to study and learn."

Another unique aspect of the Keatings farm is the planting of tree/shrub windbreaks running east to west for soil conservation, land-

Yr. In Rotation	Keating Crop Rotation Summary						
	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Yr. 7
Basic Rotation	Alfalfa	Alfalfa	Alfalfa	Soybeans	Milo/Corn	Soybeans	Wheat
Yield Goal	4 T./ac.	4.5 T. /ac.	4.5 T./ac.	35 bu./ac.	80 bu./ac	35 bu./ac.	50 bu./ac.
Seeding Rate	10-12#/	None ac.	None	175,000	50,000/20,000	175,000	90-120#/ac.
Tillage	Plow Disc Field Cult.	None	None	Plow Alfalfa Disc- 2 Field Cult.	Disc in Hairy Vetch Disc & plant	Disc- 1 No-till plant	Disc 1-2 Field Cult1-2
Fertility	Manure	None	None	Manure	Legume N	Hairy vetch cover crop	Turkey manure
Weed Control	Cut hay	Cut hay	Cut hay	Crop rotation Harrow -2 Cult. -2	Crop rotation Harrow-2 Cult. 2	Crop rotation Harrow-2 Cult. 2	Crop rotation Disc residue
Cover Crop	Alfalfa	Alfalfa	Alfalfa	Stubble + hairy vetch	Stubble + Hairy vetch	Wheat planted after harvest	Fall seeded alfalfa

scape aesthetics, wildlife enhancement, increased biodiversity, and improved crop yields. There are two full field length windbreaks 660 feet apart, and one partial length. Each windbreak is about 18 feet wide and has two rows of trees, consisting of Cedar, Sandhill Plum and Choke Cherry. The Keatings also planted London Plane trees along Highway 18 leading into Bennington.

The Keatings keep detailed financial records including the amount of time and money they invest, along with crop yields and sales, on a field by field basis. They use both a standard variable cost and returns format, using average custom rates for the cost of field operations, along with a gross margin analysis that measures the actual annual expenses and income.

In 1999 the average per acre yield on wheat was 41.5 bu., soybeans - 43 bushels, and milo - 94.6 bu. For net income the Keatings averaged about \$114 per acre, not including farm program payments, and they had not yet started marketing any crops as organic.



To provide more water quality protection and prevent soil erosion, they have established a grass buffer strip along Sand Creek. The City of Bennington water well, above, is located within this buffer.

The Keatings have done an impressive job of planning and implementing a farming system that protects water, controls production costs, and moves toward alternative marketing options, while also enhancing landscape aesthetics.

Keating Farm Characteristics

Farm Size: 200 acres total, 150 crop acres

Crops: wheat, soybeans, milo, alfalfa, asparagus; **Livestock:** none

Equipment: Conventional tillage, planting and harvesting equipment

Labor: Provide own labor.

Crop Management: Part of farm is certified organic; other fields are in organic transition.

Weed Management: Crop rotation, preplant tillage, mechanical cultivation, some hand roguing.

Insect and Disease Management: Crop rotation

Soil Fertility Management: Soil test as needed. Legume green manure crops, livestock manure from area farms(experimenting with composting); soft rock phosphate.

Crop Yields: Wheat 35 - 50 bu./acre; Milo 80-100 bu./acre; Soybeans 25 - 50 bu./acre.

Water Quality Management: Adopt organic practices esp. near city water well; plant grass strip along creek as a turn row for crop production and buffer for city well.

Profit Strategy: Keep production costs low. Seek price premiums for certified organic grains. Test high value crop production, on-farm processing, and direct marketing. Cooperative marketing of organic grains. Process and market flour mixes and produce directly and in collaboration with local Community Supported Agriculture (CSA) marketing group.