Challenges & Opportunities in Organic Field Crop Production

I. General Definition of Organic

- A. Prohibit chemical fertilizer and pesticide use in crop production
- B. Use crop rotation, legumes, livestock manure, naturally occurring soil amendments, & approved biological products to supply crop nutrients
- C. Weeds, insect pests, & diseases managed through cropping system design, biodiversity & mechanical implements
- D. Annual inspection & certification required for marketing
- E. Production system strives to use ecological principles and processes to produce high yielding, healthy crops

Crop rotation and soil building legume crop and manure management practices are the foundation practices for organic field crop production.

Key Fertility Practices and Supplemental Nutrients

1. Green Manure Crops (Primary source of N, Organic Matter, some other nutrient benefits)

2. Grain Legumes (Supplemental N)

C. Livestock Manure

(Supplemental N. major source of P and minor elements)

D. Lime (Raise soil PH for legume production)

E. Rock Phosphate (Phosphorous)

F. Chilean Nitrate (Supplemental N- up to 20% of crop N requirements)

G. Other amendments (Fish emulsion, Enzyme products, etc.)

Legume Cover/Green Manure Crops

- Forage Legumes
  - Alfalfa
  - Red Clover
  - Austrian Winter Peas
  - Spring Peas
  - Soybeans
- Other Legumes
  - Hairy Vetch, Sweet clover, Sunn Hemp

Grain Legumes

Soybeans

Field Peas

Cow Peas

Edible Beans

Weed Control

- Key strategy is to deplete weed seed bank in the soil & prevent weeds from making seed;
- Also eliminate weeds in growing crop that compete for sunlight, nutrients and water.

1. Crop Rotation is the key practice for weed control.

2. Timely & Effective pre-plant (conservation) tillage

Weed control continued

3. Mow or graze (better conservation practice than tillage)

4. Timely & effective row crop cultivation

5. Maintain tillage & row crop cultivation equipment in good condition.

6. Use cover crops whenever possible

Insect & Disease Prevention & Treatment

Key insect issues and treatments

Alfalfa weevil *(Fall and winter graze, burn, interseed other species, cut hay early, tillage, biological treatments)*

Chinch bugs *(Plant corn instead of milo, separate cereal grain from corn or milo, plant corn early, biological treatments, substitute crops)*

Disease Issues

Organic tends not to have serious disease problems

Use disease resistant varieties

Crop rotation is a key practice.

Conservation & Tillage

A. Transitioning Farmer should have conservation structures in place, i.e. terraces, waterways, grass buffers.

B. Use conservation tillage & minimize tillage operations, manage crop residue

C. Cereal & sod crops in rotation, used more extensively on highly erodible fields.

CROP ROTATION SUMMARY

Farm: Ave. An. Rainfall: Date of Plan:

Crop Acres: Livestock Enterprises:

Year in Rotation:	1	2	3	4	5	6	7	8
Basic Rotation:	Wheat / Red Clover	Red Clover	Corn	Soybeans				
Yield Goal:	40 bu.	3 ton	100 bu.	40 bu.				
Seeding Rate:	Wheat - 90#, Red Clover - 10#		22,000 seeds/ac	180,000 seeds/ac				
Tillage	Disc - 1	None	Plowdisk red clover, disk 1, field cult - 2	Disk - 2, Field Cult - 1				
Nutrient Management:	Legume & manure N & P	5 ton beef lot manure late summer	Legume N., incorporate red clover green manure	Soil test, 5 ton beef lot manure				
Weed Control:	Crop rotation, Preplant tillage, cut hay	Cut hay	Crop rotation, preplant tillage, Rotary hoe, Row cult. - 2	Crop rotation, preplant tillage, Rotary hoe, Row cult. - 2				
Cover Crop:	red clover	red clover	milo/corn stubble	wheat				
Other Practices:	FALL AND WINTER GRAZE CATTLE							

CROP ROTATION SUMMARY

Farm: Ave. An. Rainfall: Date of Plan:

Crop Acres: Livestock Enterprises:

Year in Rotation:	1	2	3	4	5	6	7	8
Basic Rotation:	Wheat / Sweetclover	Milo or corn	Soybeans					
Yield Goal:	40 bu.	90 bu.	40 bu.					
Seeding Rate:	35 # / acre	4-5 # /acre	180,000 seeds/ac					
Tillage	Disc - 1	Plowdisk sweetlcover. disk 1, field cult - 2	Disk - 2. Field Cult - 1					
Nutrient Management:	Legume & manure N & P	Legume N., incorporate sweetclover green manure	Soil test, 5 ton beef lot manure					
Weed Control:	Crop rotation, Preplant tillage, mow	Crop rotation, preplant tillage, Rotary hoe, Row cult. - 2	Crop rotation, preplant tillage, Rotary hoe, Row cult. - 2					
Cover Crop:	sweetclover	milo/corn stubble	wheat					
Other Practices:								

CROP ROTATION SUMMARY

Farm: Ave. An. Rainfall: 34" Date of Plan: 2005

Crop Acres: 258 Livestock Enterprises:

Year in Rotation:	1	2	3	4	5	6	7	8
Basic Rotation:	Cereal Grain Alf./Clover	Alfalfa	Alfalfa	Corn	Soybeans	Corn	Soybeans	
Yield Goal:	Wheat - 40 bu. Alf. - 1.5 ton	4 ton	4 ton	100 bu.	40 bu	100 bu.	40 bu.	
Seeding Rate:	Wheat - 1.5 bu. Alf. - 12 # R. Clover - 3#	None	None	16,000 seeds/ac.	175,000 seeds/ac.	16,000 seeds/ac.	175,000 seeds/ac.	
Tillage	Disc - 1	None	None	Plow Green Manure, Disc - 1 Field Cult. 1-2	Disc - 1 Field Cult. 1-2	Disc - 1 Field Cult. 1-2	Disc - 1 Field Cult. 1-2	
Nutrient Management:	Soybean N. Soil Test. Add Lime & rock phos. if needed or 5 ton manure	None Added	None Added	Alfalfa Green Manure	Soil Test (primarily for P). Supplement as needed.	Legume N Credit, 5 ton manure	None added	
Weed Control:	Cut hay	Cut hay	Cut hay	Crop rotation, Pre-plant tillage, Cult. 2	Crop rotation, Pre-plant tillage, Cult. 2	Crop rotation, Pre-plant tillage. Cult. 2	Crop rotation, Pre-plant tillage, Cult. 2	
Cover Crop:	Alfalfa	Alfalfa	Alfalfa	Stubble or winter cereal	Stubble or winter peas	Cereal grain or field peas	Stubble or winter cereal	
Other Practices:	F A L L A N D W I N T E R G R A Z E C A T T L E							

CROP ROTATION FIELD PLAN

Operator: Initial Date of Plan: Farm #:

Basic Crop Rotation Plan:

Field #:	Acres	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Acres										
Acres/Each Crop										

Crop Rotation Economic Summary

Farm Operation:
Crop Year: 2011

Acres in Crop Rotation Plan: 250

Crops in Rotation:	Alfalfa	Alfalfa	Alfalfa	Corn	Soybeans	Corn	Soybeans
Variable Costs ($/ac)							
Tillage							
Plow				$ 15.00			
V-Rip							
Chisel							
Disc	$ 9.00			$ 9.00	$ 9.00	$ 9.00	$ 9.00
Field Cultivate				$ 18.00	$ 18.00	$ 18.00	$ 18.00
Planting							
Row plant				$ 12.50	$ 12.50	$ 12.50	$ 12.50
Drill	$ 11.00						
Broadcast							
Seed	$ 32.75	$ 14.00	$ 14.00	$ 60.00	$ 38.00	$ 60.00	$ 38.00
Fertilizer							
Soil Nitrate Test							
Manure (applied)	$ 14.50					$ 14.50	
Weed Control							
Herbicides							
Herb. Application							
Rot. Hoe							
Row Cult.				$ 17.00	$ 17.00	$ 17.00	$ 17.00
Harvest							
Combine	$ 23.50			$ 28.00	$ 28.00	$ 28.00	$ 28.00
Bale	$ 19.50	$ 52.00	$ 52.00				
Swath hay	$ 10.50	$ 42.00	$ 42.00				
Soil Impact							
Haul Hay	$ 8.50	$ 17.00	$ 17.00				
Total Costs:	$ 127.25	$ 125.00	$ 125.00	$ 159.40	$ 120.50	$ 149.90	$ 120.50
Returns							
Yield: Bu/ac Grain	40			100	40	100	40
Tons/ac Forage	5.5	4	4				
Price: $/bu Grain	$ 12.50			$ 13.75	$ 26.00	$ 13.75	$ 26.00
$/ton Forage	$ 100.00	$ 150.00	$ 150.00				
Total Returns:	$ 850.00	$ 600.00	$ 600.00	$ 1,375.00	$ 1,040.00	$ 1,375.00	$ 1,040.00
Net Income / Acre	$ 722.75	$ 475.00	$ 475.00	$ 1,215.60	$ 920.00	$ 1,225.10	$ 920.00
Return to Crop Rotation Overall							
Total Crop Acres	36.74	36.74	36.74	36.74	36.74	36.74	36.74
Total Crop Returns	$ 33,211.50	$ 31,426.00	$ 31,426.00	$ 49,501.25	$ 37,196.40	$ 49,501.25	$ 37,196.40
Total Crop Costs	$ 4,544.10	$ 4,483.75	$ 4,483.75	$ 5,556.75	$ 4,399.30	$ 5,302.93	$ 4,399.30
Total Net Returns	$ 18,667.40	$ 16,962.25	$ 16,962.25	$ 43,736.47	$ 32,853.30	$ 43,748.53	$ 32,853.30
Relative % of All Crops	14.29%	14.29%	14.29%	14.29%	14.29%	14.29%	14.29%

Total Gross Returns:	$ 236,542.90	**Ave.. gross return per acre:**	$ 954.17
Total Variable Costs:	$ 32,765.71	**Ave.. variable cost per acre:**	$ 131.06
Total Net Returns:	$ 206,777.20	**Ave.. net returns per acre:**	$ 823.11

III. Key Challenges to organic crop production

- A. Learn new planning & management skills – How to manage crop production as an ecological system
- B. Systematically integrate forage & cover crop legumes into cropping system as primary nitrogen source
- C. Most beneficial use of on-farm & community sources of livestock manure
- D. Weed control in row crops
  - Crop rotation is fundamental
  - Timing & attention to detail make all the difference
  - Skilled use & good maintenance of cultivators critical
- E. Conservation tillage; offset tillage with cover crops
- F. Tap into new grain marketing channels

IV. Opportunities with Organic Crop Production

- A. Lower fertilizer, pesticide and seed costs
- B. Increase diversity & resilience to sudden changes in weather, inputs costs & markets
- C. Price premiums on production
- D. May offer beginners easier entry into farming
- E. Reduced personal exposure to poisons
- F. EQIP transition cost share