Economics of producing advanced oil seeds, perennial crops, and Kernza in Minnesota

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Key points

- A set of crop enterprise budgets is available in MS Excel with a document describing the data sources.
- The oil seeds, perennials, and Kernza are compared with current crops of corn grain, soybeans, spring wheat, and sugar beets (main source: FINBIN).
- We calculate the amount of subsidy, if any, required for net returns to land comparable to current crops.
- We look at both marginal soils and better soils. Budget crop yields vary with SSURGO crop productivity index (0-100).
- Limitations such as erodibility or poor drainage are another consideration (capability classes 1-8).

Focusing on six pilot watersheds with varying soil productivity based on SSURGO crop productivity index

The amount of marginal land varies among the watersheds.

Watershed	Average Crop Productivity Index	% marginal (capability class 3+)	Crop Prod Index, marginal
Rogers Creek	87	7%	55
Shakopee Creek	82	20%	63
Getchell Cr/Co. Ditch 9	79	20%	31
Freeborn Lake-Cobb R	91	22%	77
Watson Creek	80	41%	68
Whiskey Cr, part L & U	71	46%	50
Surrounding counties	81		

Crops requiring the lowest subsidy, 2012-6 prices & costs

Average of all cropland in the entire watershed

	All watersheds
1	Alfalfa hay
2	Grazing dairy (organic)
3	Camelina Corn-Soy Rotation

Severely erosive or poorly drained cropland (Capability class 3+)

HUC 12	Freeborn L	Shakopee Cr	Getchell Cr	Rogers Creek	Watson Cr	Whiskey Cr
Crop Prod	77	63	31	55	68	50
1	Alfalfa hay	Grazing dairy (organic)	Grazing dairy (organic)	Grazing dairy (organic)	Grazing dairy (organic)	Grazing dairy (organic)
2	Grazing dairy (organic)	Alfalfa hay	Grass-fed beef	Alfalfa hay	Alfalfa hay	Alfalfa hay
3	Camelina	Camelina	Beef cow-calf	Beef cow-calf	Camelina	Beef cow-calf

Crops requiring the lowest subsidy, current prices & costs:

Average of all cropland in the entire watershed

HUC 12	All watersheds except for Whiskey Creek	Whiskey Cr
Crop Prod		71
1	Camelina Corn-Soy	Pennycress
2	Pennycress	Camelina Corn-Wht-Soy
3	Camelina Corn-Wht-Soy	Camelina Corn-Soy

Severely erosive or poorly drained cropland (Capability class 3+)

HUC 12	Freeborn L	Shakopee Cr	Getchell Cr	Rogers Creek	Watson Cr	Whiskey Cr
Crop Prod	77	63	31	55	68	50
1	Camelina Corn-Soy	Pennycress	Grass-fed beef	Grazing dairy (organic)	Pennycress	Grazing dairy (organic)
2	Pennycress	Camelina Corn-Wht-Soy	Land retirement	Switchgrass	Camelina Corn-Wht-Soy	Switchgrass
3	Camelina Corn-Wht-Soy	Grazing dairy (organic)	dairy heifers	Grass-fed beef	Camelina Corn-Soy	Grass-fed beef

Crops requiring the lowest subsidy, average of all cropland in the entire watershed

At 2012-6 average prices and costs:

	All watersheds
1	Alfalfa hay
2	Grazing dairy (organic)
3	Camelina in a Corn-Soybean Rotation

At current prices and costs:

	All watersheds except for Whiskey Creek	Whiskey Creek
1	Camelina in Corn-Soybean Rotation	Pennycress
2	Pennycress	Camelina Corn-Wheat-Soy
3	Camelina Corn-Wheat-Soybeans	Camelina Corn-Soy

Crops requiring the lowest subsidy, severely erosive or poorly drained cropland (Capability class 3+)

	All watersheds
At 2012-6 average prices and costs:	
1	Alfalfa hay
2	Grazing dairy (organic)
3	Camelina Corn-Soy Rotation

At current prices and costs:

HUC 12	Freeborn L	Shakopee Cr	Getchell Cr	Rogers Creek	Watson Cr	Whiskey Cr
CPI	77	63	31	55	68	50
1	Camelina Corn-Soy	Pennycress	Grass-fed beef	Grazing dairy (organic)	Pennycress	Grazing dairy (organic)
2	Pennycress	Camelina Corn-Wht-Soy	Land retirement	Switchgrass	Camelina Corn-Wht-Soy	Switchgrass
3	Camelina Corn-Wht-Soy	Grazing dairy (organic)	dairy heifers	Grass-fed beef	Camelina Corn-Soy	Grass-fed beef

Amount of subsidy, if any, required for net returns to land comparable to current crops on ALL land with 2012-16 prices and costs

Update the Net Returns Comparison Below (it will not automatically update when changes are made in the budgets)						2012-6 average
	Freeborn Lake-Cobb R	Shakopee Creek	Getchell Cr/Co. Ditch 9	Rogers Creek	Watson Creek	Whiskey Cr, part L & U	State
These net returns are based on land in the entire watersheds. (See above for the Land Capability Class 3+ crop acreages))							
Subsidy required/A							
Land retirement	309	243	259	246	264	145	
Switchgrass	206	158	**181**	153	184	82	
Miscanthus	267	232	260	220	262	172	
Kernza	208	**165**	190	157	193	**95**	
Covercrop Sm Grain	8	0	**2**	1	-1	-18	
Covercrop Corn Soy	**34**	36	35	36	**36**	14	
Camelina Corn-Soy	-30	**-22**	-19	**-32**	-29	-24	
Camelina Corn-Wht-Soy	10	3	9	0	5	-13	
Pennycress	10	3	9	0	5	-13	
Grass-fed beef	245	191	211	189	215	**105**	
Beef cow-calf	200	154	178	148	181	79	
Grazing dairy (organic)	-84	-87	-46	-114	**-47**	-108	
dairy heifers	231	181	203	177	206	100	
Alfalfa hay for sale	**-115**	-108	-62	**-140**	-64	-113	

Note: the required subsidies are shown as positive numbers. A negative number means that the crop shown is MORE profitable than the current corn and soybeans etc., and so in theory should need no subsidy.

Amount of subsidy, if any, required for net returns to land comparable to current crops on ALL land with current prices and costs

Update the Net Returns Comparison Below (it will not automatically update when changes are made in the budgets)						current
	Freeborn Lake-Cobb R	Shakopee Creek	Getchell Cr/Co. Ditch 9	Rogers Creek	Watson Creek	Whiskey Cr, part L & U	State
These net returns are based on land in the entire watersheds. (See above for the Land Capability Class 3+ crop acreages))							
Subsidy required/A							
Land retirement	215	161	175	163	177	79	
Switchgrass	113	75	**96**	69	97	16	
Miscanthus	173	149	175	137	175	107	
Kernza	115	**82**	105	74	105	**29**	
Covercrop Sm Grain	4	-4	**-1**	-3	-5	-6	
Covercrop Corn Soy	**39**	39	39	39	**39**	24	
Camelina Corn-Soy	-24	**-17**	-14	**-26**	-24	-20	
Camelina Corn-Wht-Soy	-11	-17	-11	-19	-16	-29	
Pennycress	-11	-17	-11	-19	-16	-29	
Grass-fed beef	148	105	124	102	125	**37**	
Beef cow-calf	133	95	115	89	116	33	
Grazing dairy (organic)	64	40	66	28	**65**	-5	
dairy heifers	151	109	128	105	129	43	
Alfalfa hay for sale	**123**	109	140	**92**	138	80	

Note: the required subsidies are shown as positive numbers. A negative number means that the crop shown is MORE profitable than the current corn and soybeans etc., and so in theory should need no subsidy.

Amount of subsidy, if any, required for net returns to land comparable to current crops on MARGINAL land with 2012-16 prices and

	B	C	D	E	F	G	H
40	Update the Net Returns Comparison Below (it will not automatically update when changes are made in the budgets)						2012-6 average
41		Freeborn Lake-Cobb R	Shakopee Creek	Getchell Cr/Co. Ditch 9	Rogers Creek	Watson Creek	Whiskey Cr, part L & U
42	These net returns are based on the Land Capability Class 3+ crop acreages in the CPI_by_watershed_LLC sheet. (See below for results for the entire waters						
63	Subsidy required/A						
64	Land retirement	201	94	-124	20	168	-11
65	Switchgrass	127	47	-107	-11	111	-32
66	Miscanthus	210	151	45	105	207	90
67	Kernza	137	65	-71	11	126	-8
68	Covercrop Sm Grain	0	-12	-28	-20	-11	-14
69	Covercrop Corn Soy	35	37	40	39	37	18
70	Camelina Corn-Soy	-25	-22	-5	-19	-27	-35
71	Camelina Corn-Wht-Soy	2	-11	-24	-20	-5	-40
72	Pennycress	1	-11	-24	-20	-5	-40
73	Grass-fed beef	156	63	-132	-3	132	-31
74	Beef cow-calf	125	45	-128	-15	109	-39
75	Grazing dairy (organic)	-89	-106	-159	-132	-63	-136
76	dairy heifers	148	61	-128	-4	128	-30
77	Alfalfa hay for sale	-102	-95	-45	-103	-63	-95

Note: the required subsidies are shown as positive numbers. A negative number means that the crop shown is MORE profitable than the current corn and soybeans etc., and so in theory should need no subsidy.

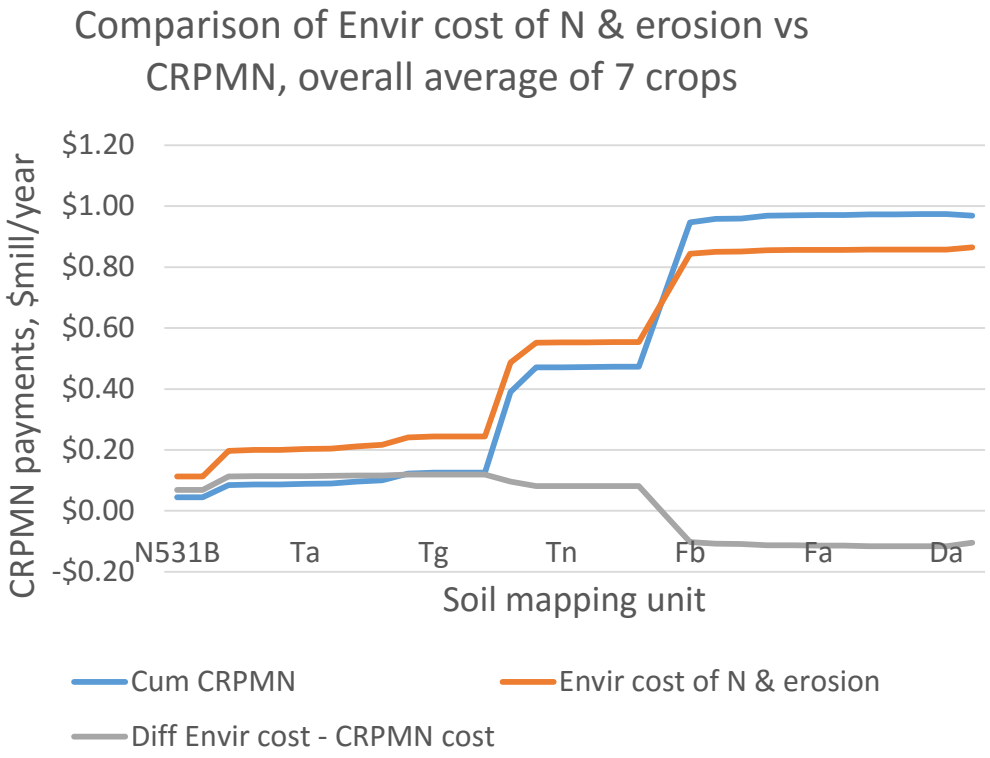
Amount of subsidy, if any, required for net returns to land comparable to current crops on MARGINAL land with current prices and costs

Update the Net Returns Comparison Below (it will not automatically update when changes are made in the budgets)						current	
	Freeborn Lake-Cobb R	Shakopee Creek	Getchell Cr/Co. Ditch 9	Rogers Creek	Watson Creek	Whiskey Cr, part L & U	State
These net returns are based on the Land Capability Class 3+ crop acreages in the CPI_by_watershed_LLC sheet. (See below for results for the entire watersh							
Subsidy required/A							
Land retirement	127	39	-139	-21	98	-47	
Switchgrass	54	-7	-121	-52	42	-68	
Miscanthus	136	96	31	63	137	54	
Kernza	64	10	-86	-30	57	-44	
Covercrop Sm Grain	-2	-12	-22	-18	-12	-4	
Covercrop Corn Soy	39	39	39	39	39	24	
Camelina Corn-Soy	-19	-16	0	-13	-22	-26	
Camelina Corn-Wht-Soy	-16	-24	-30	-30	-22	-47	
Pennycress	-16	-24	-30	-30	-22	-47	
Grass-fed beef	79	7	-146	-46	60	-68	
Beef cow-calf	72	6	-135	-43	58	-62	
Grazing dairy (organic)	26	-20	-127	-59	25	-72	
dairy heifers	85	14	-138	-38	67	-59	
Alfalfa hay for sale	103	79	52	55	115	52	

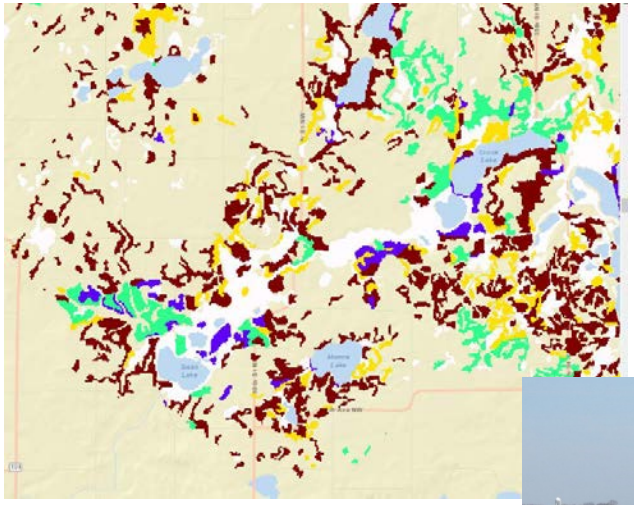
Note: the required subsidies are shown as positive numbers. A negative number means that the crop shown is MORE profitable than the current corn and soybeans etc., and so in theory should need no subsidy.

One possible way to prioritize individual soils would be to sort them with the greatest to least environmental benefit (for soil erosion, P & N loading, etc.)/dollar of CRPMN payment.

The program could possibly resemble the CRP but allowing harvesting, so is referred to here as CRPMN payment.



Marginal soils tend to be mixed in with good soils so that with modern farm equipment it may not feasible to farm them separately within a field.



It may make the most sense to enroll whole fields large enough to be farmable, with the terms and conditions based on the mix of soils in each field.

Our assumptions don’t “lie” per se, but they may change as more data becomes available. You are invited to plug your own numbers into the spreadsheet to explore other scenarios.

Thank you!

Questions?