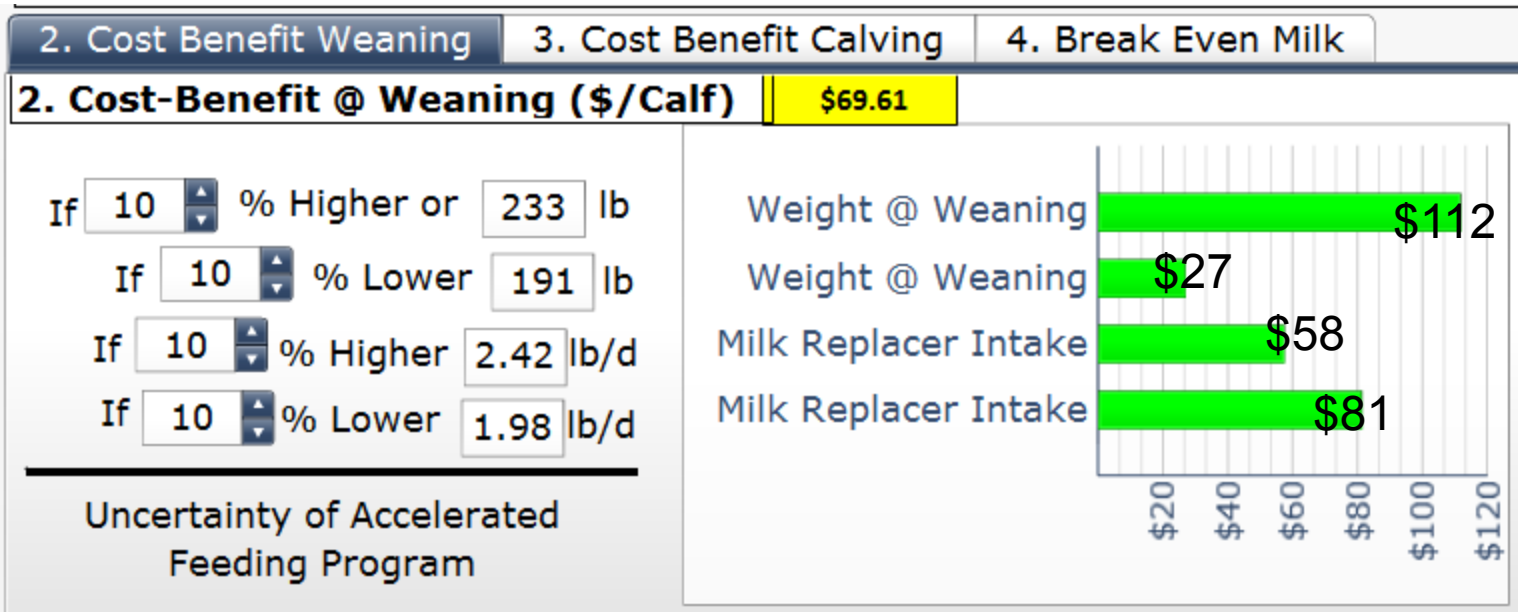
Wisconsin Report

	Feeding Program	
Parameter	**Conventional**	**Accelerated**
Birth Weight (lb)	95	*
Weaning (d)	56	56
Weight at Weaning (lb)	150	212
Live Weight Value ($/lb)	2.00	*
Milk Replacer Intake (lb/d)	1.20	2.20
Calf Starter Intake (lb/d)	1.30	0.80
Milk Replacer Cost ($/lb)	0.84	1.00
Calf Starter Cost ($/lb)	0.2	0.2
Weaning to 19 month Maintenance ($/d)	2	*
20 month to Freshening Maintenance ($/d)	2	*
Calving Age (d)	730	700
Discount Rate (%/yr)	12%	*

* Parameters commonly used for both conventional and accelerated feeding programs.

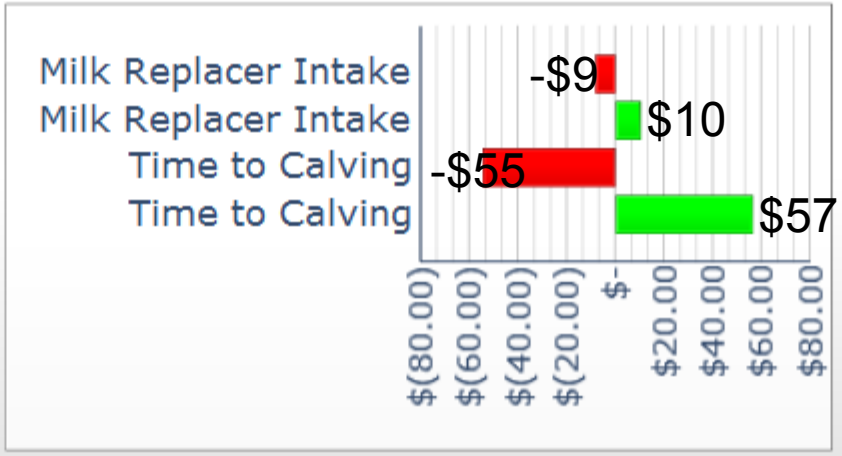

2. Cost Benefit Weaning
3. Cost Benefit Calving
4. Break Even Milk
2. Cost-Benefit @ Weaning ($/Calf)
$69.61
If 10 % Higher or 233 lb
If 10 % Lower 191 lb
If 10 % Higher 2.42 lb/d
If 10 % Lower 1.98 lb/d
Uncertainty of Accelerated Feeding Program
Weight @ Weaning $112
Weight @ Weaning $27
Milk Replacer Intake $58
Milk Replacer Intake $81
$20
$40
$60
$80
$100
$120

2. Cost Benefit Weaning | 3. Cost Benefit Calving | 4. Break Even Milk

3. Cost-Benefit @ Calving ($/Heifer) $0.98

If 10 % Higher or 2.42 lb/d
If 10 % Lower or 1.98 lb/d
If 5 % Longer or 735 d
If 5 % Shorter or 665 d

Uncertainty of Accelerated Feeding Program



http://www.uwex.edu/ces/dairymgt/tools/Accelerated.swf

Heifer Reproductive Program	Conception Rate (CR) (%)	Female Calves (%)
Conventional Unsexed Semen	34.0 to 83.0, Avg. 56	46.7
Sexed Semen	27.2 to 66.4, Avg. 45	89.0

Economic Parameter	Unsexed Semen	Sexed Semen
Semen dose ($)	15	45
	Female Calf	**Male Calf**
Calf value ($)	562	48
Dystocia cost ($)	34.91	22.15
	Unsexed and Sexed Semen	
Heifer maintenance 15 to 20 mo old ($/d)	2.4	
Weight of a 20-mo non-pregnant heifer (kg)	505	
Salvage value of 20-mo non-pregnant heifer ($/kg)	1.79	
Value of 20-mo pregnant heifer ($)	1,200	
Interest rate (%/yr)	12	

Reproductive Program	Low Conventional CR (34%)	Average Conventional CR (56%)	High Conventional CR (83%)	Required Conventional CR to Justify the Number of Sexed Semen Service(s)
	$/heifer			%
1 service with sexed semen	6.5	49.3	100.0	31
2 first services with sexed semen	-3.4	57.8	111.6	36
3 first services with sexed semen	-23.1	46.4	96.1	41
4 first services with sexed semen	-48.9	24.7	71.7	48
All 5 services with sexed semen	-78.5	-2.7	43.9	58

http://www.uwex.edu/ces/dairymgt/tools/EV_SexedSemen.swf

Scenario	Overall Expected Value (EV) ($/heifer)	Conventional CR to Justify 1 Sexed Semen Service (%)	Number of Consecutive Services with Positive Expected Value (EV)		
			Low Conventional CR (34%)	Average Conventional CR (56%)	High Conventional CR (83%)
Baseline	30.10	31	1	4	5
Sexed Semen CR at 85% of conventional CR	46.40	31	2	5	5
Sexed Semen CR at 75% of Conventional CR	12.50	36	0	4	5
Sexed Semen to Have 95% Heifer Calves	52.40	27	2	5	5
Sexed Semen to Have 78% Heifer Calves	-10.90	41	0	3	4
Male Calf value at $0	45.20	28	2	5	5
Female Calf value at $700	69.30	25	3	5	5
Dystocia Cost at $42.8	32.40	30	1	5	5
Dystocia Cost at $14.27	27.70	31	1	4	5

http://www.uwex.edu/ces/dairymgt/tools/EV_SexedSemen.swf

	CON	OPT
Ingredient	% of DM	
Forages	55.5	56.0
Corn Silage	23.1	24.2
Alfalfa Silage	28.0	27.3
Other Forage	4.4	4.5
Concentrates	44.5	44.0
Dry Ground Shelled Corn	9.0	8.5
High Moisture Corn	13.3	14.6
Soybean Meal 48%	3.5	1.7
Other Plant Proteins	3.5	3.5
Animal Proteins	0.8	0.8
High Fiber By-Products	9.4	9.2
Mineral/Vitamin/Additive	5.0	5.7
Mixes		

Item	CON	OPT	SEM	P-Value
Milk Yield, kg/d	35.4	35.9	0.2	< 0.01
Fat, %	3.72	3.69	0.02	0.07
g/d	1317	1322	8	NS
Protein, %	2.98	2.97	0.01	NS
g/d	1055	1065	6	0.13
MUN, mg/dl	12.4	13.2	0.3	< 0.01

Optigen® Evaluator

Inostroza, F., Cabrera, V.E., Shaver, R., Tricarico, J.

			Milk ($/kg)								
			0.22			0.33			0.44		
			SBM-48 ($/kg DM)			SBM-48 ($/kg DM)			SBM-48 ($/kg DM)		
			0.220	0.403	0.587	0.220	0.403	0.587	0.220	0.403	0.587
	$/kg DM	Optigen ($/kg DM)	Change in IOFC ($/cow/day)								
Corn	0.079	1.63	0.022	0.138	0.254	0.077	0.193	0.309	0.132	0.248	0.364
	0.079	2.01	-0.021	0.095	0.211	0.034	0.150	0.266	0.089	0.205	0.321
	0.157	1.63	-0.018	0.098	0.214	0.037	0.153	0.269	0.092	0.208	0.324
	0.157	2.01	-0.061	0.055	0.171	-0.006	0.110	0.226	0.049	0.165	0.281
	0.236	1.63	-0.058	0.058	0.174	-0.003	0.113	0.229	0.052	0.168	0.284
	0.236	2.01	-0.101	0.015	0.131	-0.046	0.070	0.186	0.009	0.125	0.241
Average			-0.040	0.077	0.193	0.016	0.132	0.248	0.071	0.187	0.303
SD			0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Minimum			-0.101	0.015	0.131	-0.046	0.070	0.186	0.009	0.125	0.241
Maximum			0.022	0.138	0.254	0.077	0.193	0.309	0.132	0.248	0.364
Corn Silage	0.050	1.63	0.037	0.149	0.262	0.092	0.204	0.317	0.147	0.259	0.372
	0.050	2.01	-0.006	0.106	0.219	0.049	0.161	0.274	0.104	0.216	0.329
	0.101	1.63	0.015	0.127	0.240	0.070	0.182	0.295	0.125	0.237	0.350
	0.101	2.01	-0.028	0.084	0.197	0.027	0.139	0.252	0.082	0.194	0.307
	0.151	1.63	-0.007	0.105	0.218	0.048	0.160	0.273	0.103	0.215	0.328
	0.151	2.01	-0.050	0.062	0.175	0.005	0.117	0.230	0.060	0.172	0.285
Average			-0.007	0.106	0.219	0.049	0.161	0.274	0.104	0.216	0.329
SD			0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
Minimum			-0.050	0.062	0.175	0.005	0.117	0.230	0.060	0.172	0.285
Maximum			0.037	0.149	0.262	0.092	0.204	0.317	0.147	0.259	0.372

http://www.uwex.edu/ces/dairymgt/tools/optigen.html

Feed Stuff	A (%)	B (%)	C (%)	Kd	Calculated Kp	Calculated RUP (%)	Calculated RDP (%)	Calculated CP (%)
Forages								
35-Corn silage	51.00	30.20	18.80	4.40	5.93	3.15	5.62	8.80
74-Mixed silage	58.10	34.20	7.70	10.40	5.93	3.82	15.18	19.00
83-Alfalfa silage	57.30	35.30	7.40	12.20	5.93	4.15	17.75	21.90
Energy Supplements								
27-Corn grain	23.90	72.5	3.60	4.90	8.34	4.63	4.77	9.40
8-Barley grain	30.20	61.20	8.60	22.70	8.34	3.11	9.29	12.40
Protein Supplements								
106-Soybean meal	22.50	76.80	0.70	9.40	8.34	18.37	31.53	49.90
25-Corn gluten meal	3.90	90.90	5.20	2.30	8.34	49.69	15.31	65.00
23-Corn distiller grains	28.50	63.30	8.20	3.60	8.34	15.57	14.13	29.70
104-Soybean meal expellers	8.70	91.30	0.00	2.40	8.34	32.83	13.47	46.30

Optimizing Income Over Feed Supplement Cost

Cabrera, V.E., Shaver, R., Wattiaux, M.

Feed Stuff	Price		Upper Limit		Current in Diet	
Energy Supplements	**$/kg**	**$/bu**	**kg**	**lb**	**kg**	**lb**
27-Corn grain	0.16	4.0	6.81	15	4.54	10
Wheat grain	0.27	7.4	4.54	10	0.68	1.5
Protein Supplements	**$/kg**	**$/ton**	**kg**	**lb**	**kg**	**lb**
106-Soybean meal	0.28	250	6.81	15	2.27	5
25-Corn gluten meal	0.61	550	0.91	2		
24-Corn gluten feed	0.18	160	4.54	10	2.27	5
23-Corn distiller grains	0.22	200	4.54	10	2.27	5
104-Soybean meal expellers	0.20	402	6.81	15		
14-Blood meal ring dried	0.99	900	0.45	1		
Urea	0.70	635	0.45	1		

Optimizing Income Over Feed Supplement Cost

Cabrera, V.E., Shaver, R., Wattiaux, M.

3	Set Source of Energy Supplements and Prices				
		Price ($/bu)	Current Diet (lb)	Upper Limit (lb)	Optimal (lb)
3.1	27-Corn-CGG	4	10	15	**11.50**
3.2	8-Barley-BGR	4.8		0	**0.00**
3.3	116-Wheat-WGR	7.4	1.5	10	**0.00**

4	Set the Source of Protein, Byproduct Supplements and Prices				
		Price ($/ton)	Current Diet (lb)	Upper Limit (lb)	Optimal (lb)
4.1	106-Soybean Meal-SBM	250.00	5	15	**0.00**
4.2	25-Corn Gluten Meal-CGM	550.00		2	**0.38**
4.3	24-Corn Gluten Feed-CGF	160.00	5	10	**7.05**
4.4	23-Corn Distiller Grains-CDG	200.00	5	10	**10.00**
4.5	109-Soybean Whole Roasted- HSB	318.00		7	**0.00**
4.6	104-Soybean Meal Expellers-SBMx	402.00		15	**0.00**
4.7	14-Blood Meal Ring Dried-BMRD	900.00		1	**0.00**
4.8	Urea	635.00		1	**0.00**

5	Set the Upper Limits for RUP and RDP, and Milk Price					
					Upper Limit	Amount in Diet
5.1	RUP	Rumen Undegradable Protein		% of Diet DM	6.50%	**6.50%**
5.2	RDP	Rumen Degradable Protein		% of Diet DM	11.50%	**11.49%**
5.3	CP	Crude Protein		% of Diet DM	**18.00%**	**18.00%**
5.4	Milk Price		$/cwt	16		

6	Perform Optimization, Maximize IOFSC			
6.1	Click the button to maximize the Income Over Feed Supplement Cost (IOFSC)	→	Maximize IOFSC	
			Current	Optimal
6.2	Expected Milk Producion (E-MP)	lb/cow/day	84.26	**88.32**
6.3	Maximum Income Over Feed Supplement Cost (IOFSC)	$/cow/day	11.06	**11.64**

Print this Page

http://www.uwex.edu/ces/dairymgt/tools/IOFSC.exe

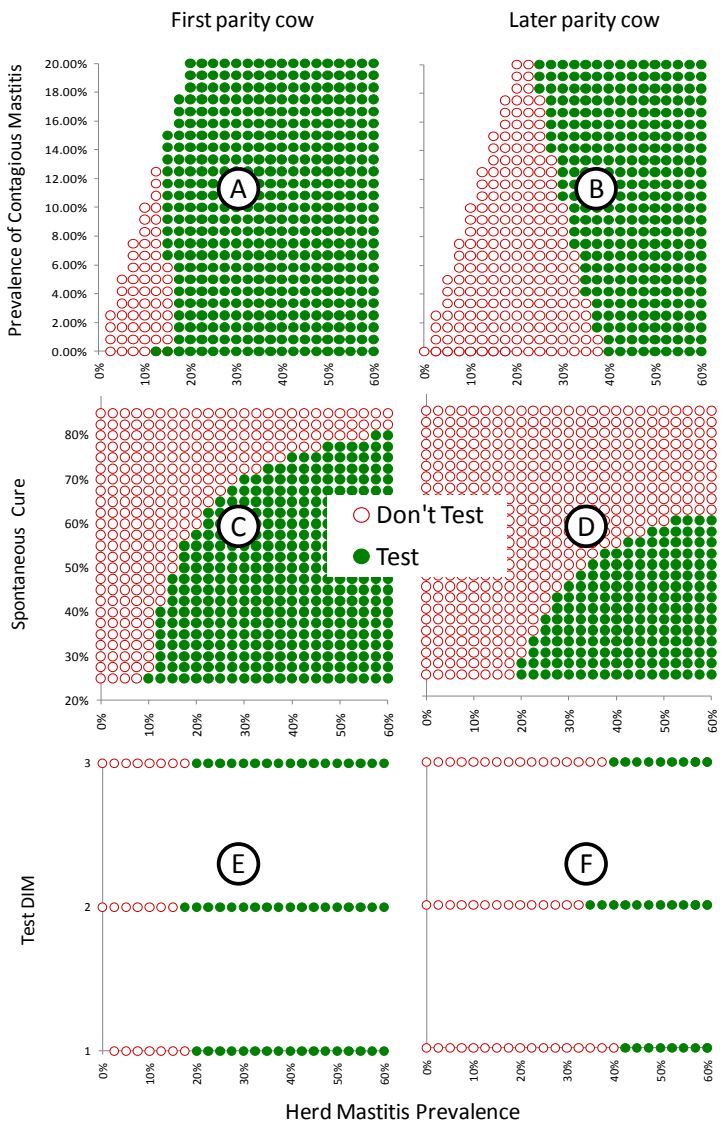
Variable	Base value	Range of values
Cost of a California Mastitis Test ($/cow)	0.8	0.5 - 2.0
Parity	---	First - Later
Test DIM	2	1 - 3
Herd mastitis prevalence (%)	30	0 - 60
Contagious pathogens prevalence (%)	5	0 - 20
Transmission factor (cow/d)	0.0244	0.0244 - 0.46
Antibiotic treatment cure first parity (%)	60	40 - 80
Antibiotic treatment cure later parity (%)	35	20 - 50
Spontaneous cure (%)	50	25-85
Value of antibiotic contaminated milk recovered after (%)	0	0 - 70
Segregation cost ($/d)	0.094	0 - 1
Value of milk quality premium ($/kg)	0.024	0.01 - 0.38
Premature culling because of mastitis (%)	5.3	1.78 - 8.52
Clinical flare up (%)	19	17 - 21
Expected production first parity (kg/cow/305-d lactation)	8,172	6,129 - 10,215
Expected production later parity (kg/cow/305-d lactation)	9,080	6,810 - 11,350
Milk price ($/kg)	0.35	0.2 - 0.55
Feed cost ($/kg milk)	0.1847	0.14 - 0.26
Salvage value ($/kg BW)	1.10	0.88 - 1.32
Cow BW first parity (kg)	575	---
Cow BW later parity (kg)	681	---
Heifer replacement cost ($)	2,000	1,000 - 2,500
New born value ($)	275	200 - 400

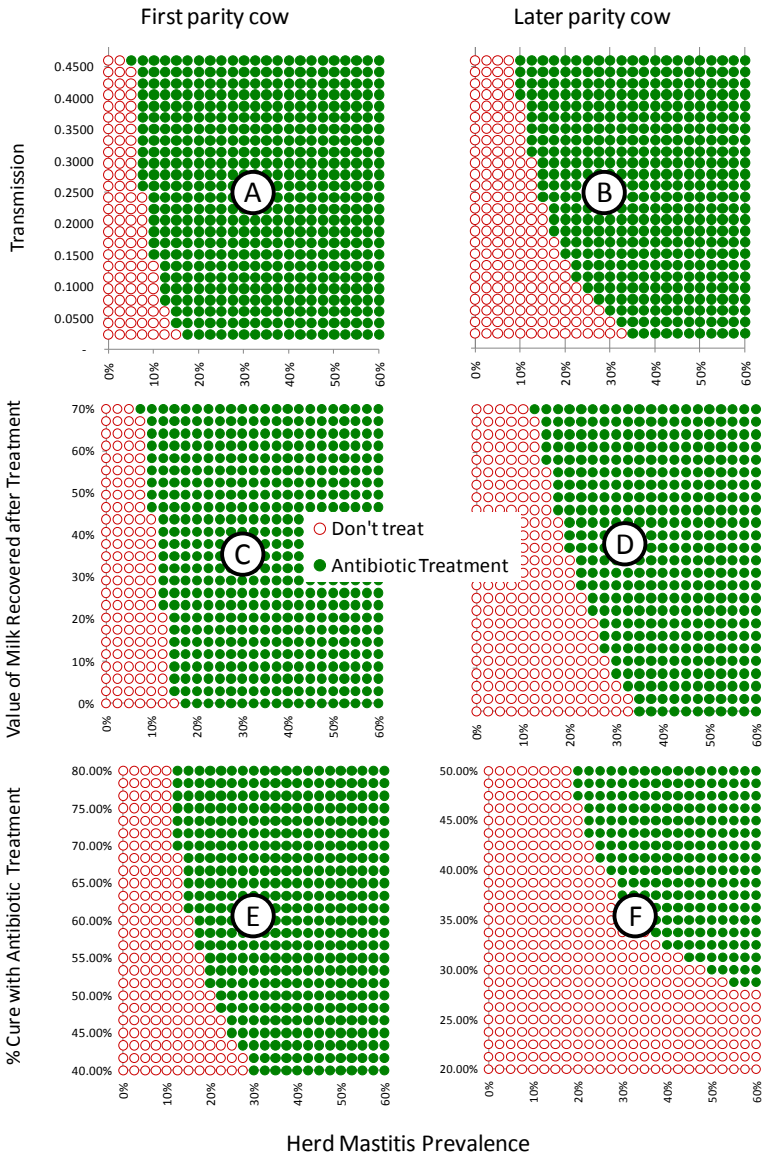
Decision option		Lactation number	
Optimal	**Non-optimal**	**First**	**Later**
CMT test	No CMT test	$2.07	---
No CMT test	CMT test	---	$0.27
CMT-3	CMT-1	2.88	$0.53
CMT-3	CMT-2	$0.82	$0.53
Antibiotic (positive cow)	Segregate (positive cow)	$76.1	$37.4
Antibiotic (positive cow)	Cull (positive cow)	$1038	$348
Antibiotic (positive cow)	No action (positive cow)	$47.5	$8.8

Optimizing Income Over Feed Supplement Cost

Cabrera, V.E., Shaver, R., Wattiaux, M.

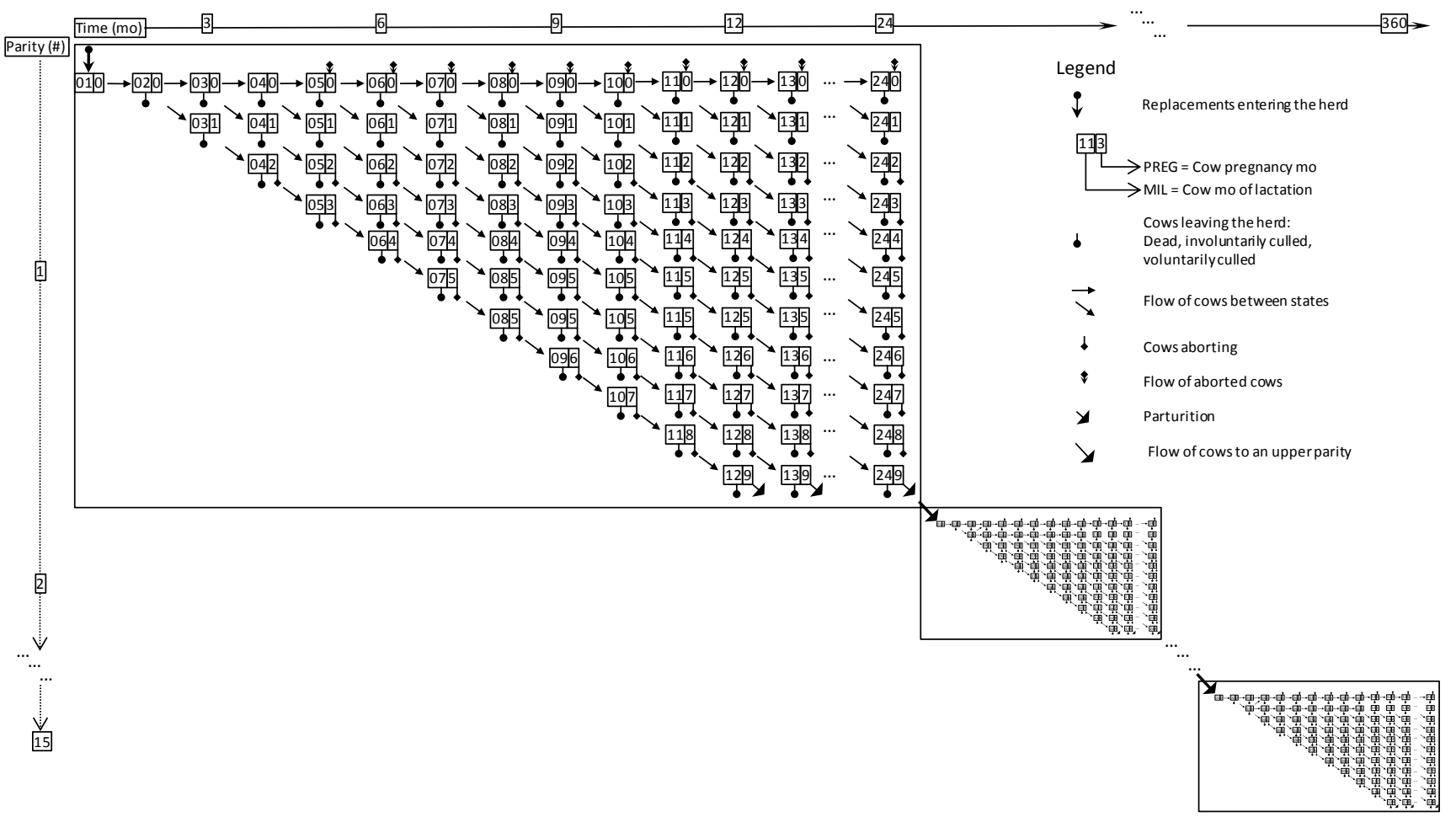
16 Victor E. Cabrera, Wisconsin, UBC NC-1042, October 14-16, 2009





Markovian Linear Programming for Decision-Making

Cabrera, V.E.



Market and Constraint Conditions	Diet[1]	MIL Replacement[2]	N excretion (kg/cow/mo)	Net Revenue ($/cow/mo)
2008 Favorable	1	11	12.56	132.16
Milk $0.40/kg	2	11	12.47	131.79
Corn $0.19/kg	3	11	12.55	116.92
Replacement $2,000	4	11	12.09	105.49
No N constraint	5	12	11.35	79.84
2008 Unfavorable	1	9	12.38	15.06
Milk $0.22/kg	2	9	12.35	21.04
Corn $0.24/kg	3	9	12.46	18.71
Replacement $1,500	4	9	11.99	21.97
No N constraint	5	10	11.18	18.38
2008 Favorable	1	9[3]	12.00	119.84
Milk $0.40/kg	2	9[3]	12.00	126.36
Corn $0.19/kg	3	9[3]	12.00	104.86
Replacement $2,000	4	10	12.00	104.94
N ≤ 12 kg/mo constraint	5	12	11.35	79.84
2008 Unfavorable	1	7[3]	12.00	10.98
Milk $0.22/kg	2	9[3]	12.00	19.88
Corn $0.24/kg	3	8[3]	12.00	14.84
Replacement $1,500	4	9	11.99	21.97
N ≤ 12 kg/mo constraint	5	10	11.18	18.38

Coverage month	MQ[1] (kg)	CF[2] (kg)	SBM[3](kg)
September 2009	86,129	24,116	3,445
October 2009	87,780	24,578	3,511
November 2009	84,773	23,737	3,391
December 2009	88,959	24,909	3,558
January 2010	89,224	24,983	3,569
February 2010	82,562	23,118	3,303
March 2010	91,287	25,561	3,652
April 2010	89,254	24,991	3,570
May 2010	93,469	26,171	3,739
June 2010	89,843	25,156	3,594
Total	**883,280**	**247,319**	**35,331**

	Expected prices ($ per Mg)		
Coverage month	Class III milk	Corn price	SBM[1] price
September 2009	267	130	354
October 2009	280	131	330
November 2009	297	133	326
December 2009	305	134	323
January 2010	312	135	318
February 2010	314	137	317
March 2010	323	139	316
April 2010	332	141	314
May 2010	332	143	312
June 2010	345	144	312
		Price volatilities[2]	
Coverage month	Class III Milk	Corn	SBM
September 2009	0.09	0.12	0.14
October 2009	0.11	-	0.17
November 2009	0.13	-	-
December 2009	0.14	0.21	0.21
January 2010	0.16	-	0.22
February 2010	0.17	-	-
March 2010	0.18	0.27	0.26
April 2010	0.19	-	-
May 2010	0.20	-	0.28
June 2010	0.21	0.30	-

Coverage month	TGIOFC ($/Mg milk) 66.14	88.19	110.23	132.28	154.32	176.37	198.42	220.46	Average monthly optimal coverage
September 2009	100%	100%	100%	100%	100%	100%	100%	100%	100%
October 2009	100%	100%	100%	100%	100%	100%	100%	100%	100%
November 2009	60%	100%	100%	100%	100%	100%	100%	100%	84%
December 2009	27%	63%	100%	100%	100%	100%	100%	100%	77%
January 2010	0%	0%	26%	91%	100%	100%	100%	100%	58%
February 2010	6%	10%	5%	18%	70%	100%	100%	100%	45%
March 2010	12%	13%	26%	13%	25%	52%	100%	100%	39%
April 2010	0%	4%	8%	8%	11%	27%	42%	100%	22%
May 2010	10%	15%	15%	30%	33%	38%	59%	91%	33%
June 2010	16%	25%	44%	60%	78%	94%	100%	100%	58%
Optimal total coverage	33%	43%	52%	62%	72%	81%	90%	99%	------
Optimal program costs and guarantee ($/Mg milk)									
FARMPREM[1]	0.53	0.84	1.22	1.68	2.20	2.79	3.45	4.17	
LGMPREM[2]	1.64	1.99	2.34	2.73	3.10	3.46	3.84	4.21	
Total Insurance Cost	471	745	1,075	1,486	1,947	2,463	3,044	3,686	
NGIOFC [3]	203.20	207.66	211.76	214.61	216.97	219.11	220.90	222.59	
FARMPREM as % of TGIOFC	0.81%	0.96%	1.10%	1.27%	1.43%	1.58%	1.74%	1.89%	

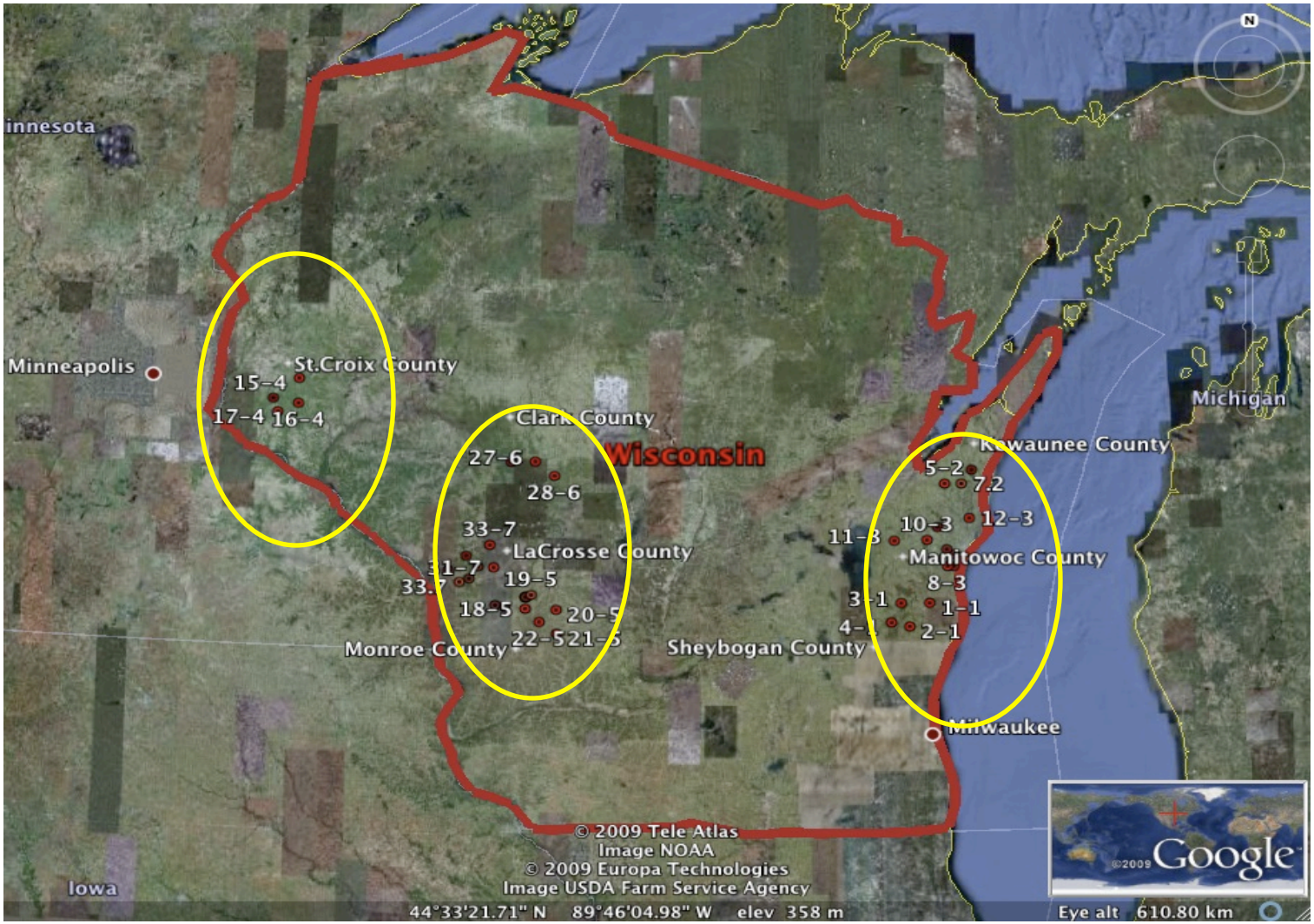
http://future.aae.wisc.edu/lgm_dairy.html

Variable (unit)	Mean	CV	Min.	Max.
Milk (kg)	1,335,408	1.31	171,172	12,185,328
Cow (n)	133	1.16	23	998
Feed ($)	122,917	1.53	2,650	1,249,075
Capital ($)	90,848	0.90	11,833	541,322
Crop ($)	159,759	1.02	4,977	1,115,004
Labor ($)	74,315	1.35	3,377	649,892
Livestock ($)	56,314	1.95	559	788,063
bST (%)	14	1.82	0	100
TMR (dummy)[1]	0.53	0.95	0	1
Pasture (dummy)[2]	0.24	1.77	0	1
Milking system (dummy)[3]				
Pipeline	0.67	0.70	0	1
Flat Barn	0.08	3.47	0	1
Pit Parlor	0.25	1.74	0	1
Milking frequency (dummy)[4]	0.92	0.30	0	1
Family labor (%)	37	1.01	0	100
Housing (dummy)[5]	0.38	1.28	0	1
Feed/cow (ratio)	777	0.46	96	2,027

Variables[1]	Coefficient	St. Dev.
Frontier		
Constant	7.829***	0.225
Cow (n)	0.779***	0.036
Feed ($)	0.059***	0.020
Capital ($)	-0.007	0.018
Crop ($)	0.082***	0.019
Labor ($)	0.024**	0.011
Livestock ($)	0.062***	0.013
bST (%)	0.001***	0.000
Inefficiency model		
TMR (dummy)[2]	-0.513*	0.275
Pasture (dummy)[3]	0.393	0.246
Milking system (dummy)[4]		
Flat barn	0.293	0.553
Pit parlor	0.528	0.404
Milking frequency (dummy)[5]	0.928*	0.564
Family labor (%)	-0.008**	0.003
Feed/cow (ratio)	-0.002***	0.000
Housing (dummy)[6]	0.172	0.386
Constant	-3.113***	0.708
$\lambda = \sigma_u/\sigma_v$	1.28	
σ_v	0.09	
Log-likelihood	191	

Economic Impact of Diseases

Kohlman, T., Gunderson, S., Milligan, L., Huntzicker, S.,
Bendixen, M., Opatik, A., Halfman, B., Cabrera, V.E.



Economic Impact of Diseases

Kohlman, T., Gunderson, S., Milligan, L., Huntzicker, S.,
Bendixen, M., Opatik, A., Halfman, B., Cabrera, V.E.

Study	# herds	# cows	CK	LDA	MF	RP
Jordan, 1993	61	14,823	3.7	3.3	7.2	9
Dyk, 1995	100	2,260	12	11	8	12
Bigras-Poulin, 1990	34	2,204	3.3	NR	5.6	7.7
Scott, 1995	5	443	8.5	6.3	8.5	9
Grohn, 1995	25	8,070	4.6	6.3	1.6	7.4
Gearhart, 1990	9	561	NR	NR	9.1	10.3
Kelton, 1996	110	NR	3	2	NR	9
Crill, 1998	10	3,884	NR	1.4	3.3	11.9

Economic Impact of Diseases

Kohlman, T., Gunderson, S., Milligan, L., Huntzicker, S., Bendixen, M., Opatik, A., Halfman, B., Cabrera, V.E.

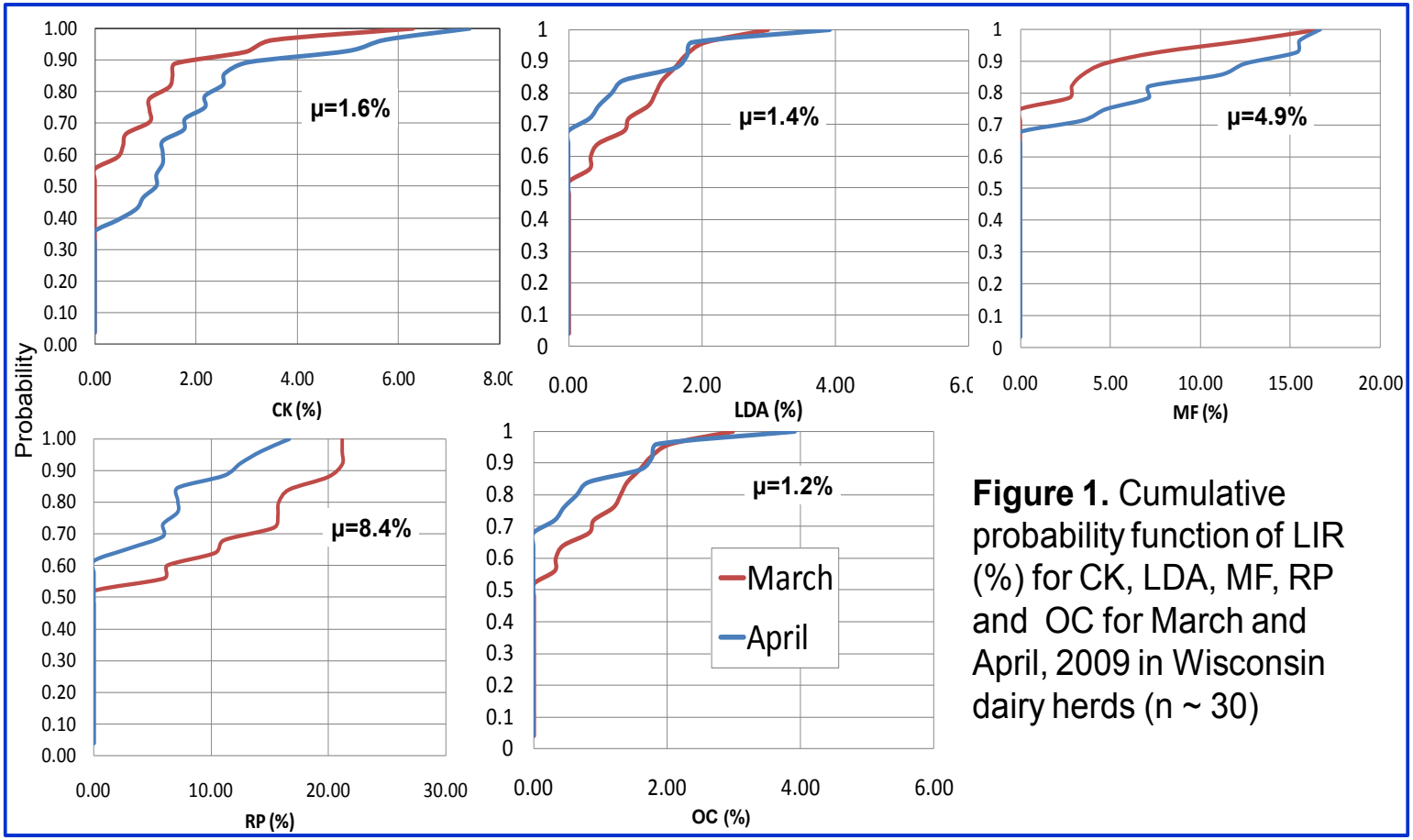


Figure 1. Cumulative probability function of LIR (%) for CK, LDA, MF, RP and OC for March and April, 2009 in Wisconsin dairy herds (n ~ 30)

IOFC = f(LIR)

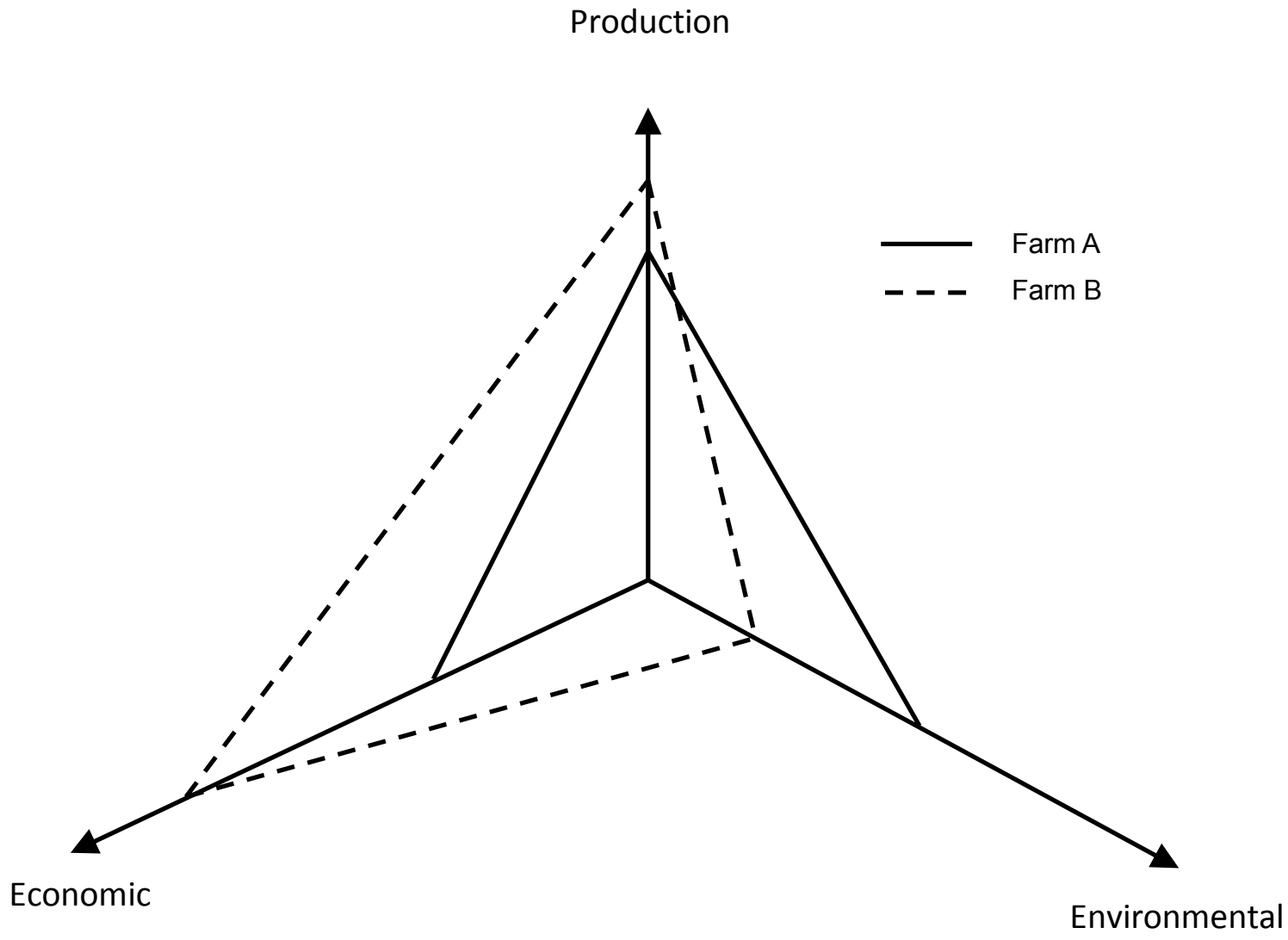
IOFC = Milk Value – Feed Cost

LIR = Sick Cow / Cows at Risk

Challenges:

IOFC
- Home-grown pasture (quantity and price)
- Home-grown feed (price)

LIR
- Protocol to report a sick cow
  - Farm management (substantially ↓ or ↑ LIR)
  - Small number of cows at risk (↑ variation LIR)


Production
Farm A
Farm B
Economic
Environmental

On-farm research, 50 ORG and 50 GRAZ farms, 2009 - 2013

1. Farm factors contributing to supplementation decisions
2. Evaluate economic, production and environmental outcomes of supplementation schemes
3. Develop sustainability indexes
4. Develop decision support aids
5. Disseminate extension information and document impact of extension activities

Challenges:

Meaningful and Consistent Data Farm Collection

- Survey framework
- Statistical design
- Farm recruitment
- Involve key stakeholders

Recruitment of students and other personnel

- France, Brazil,…

Thanks!