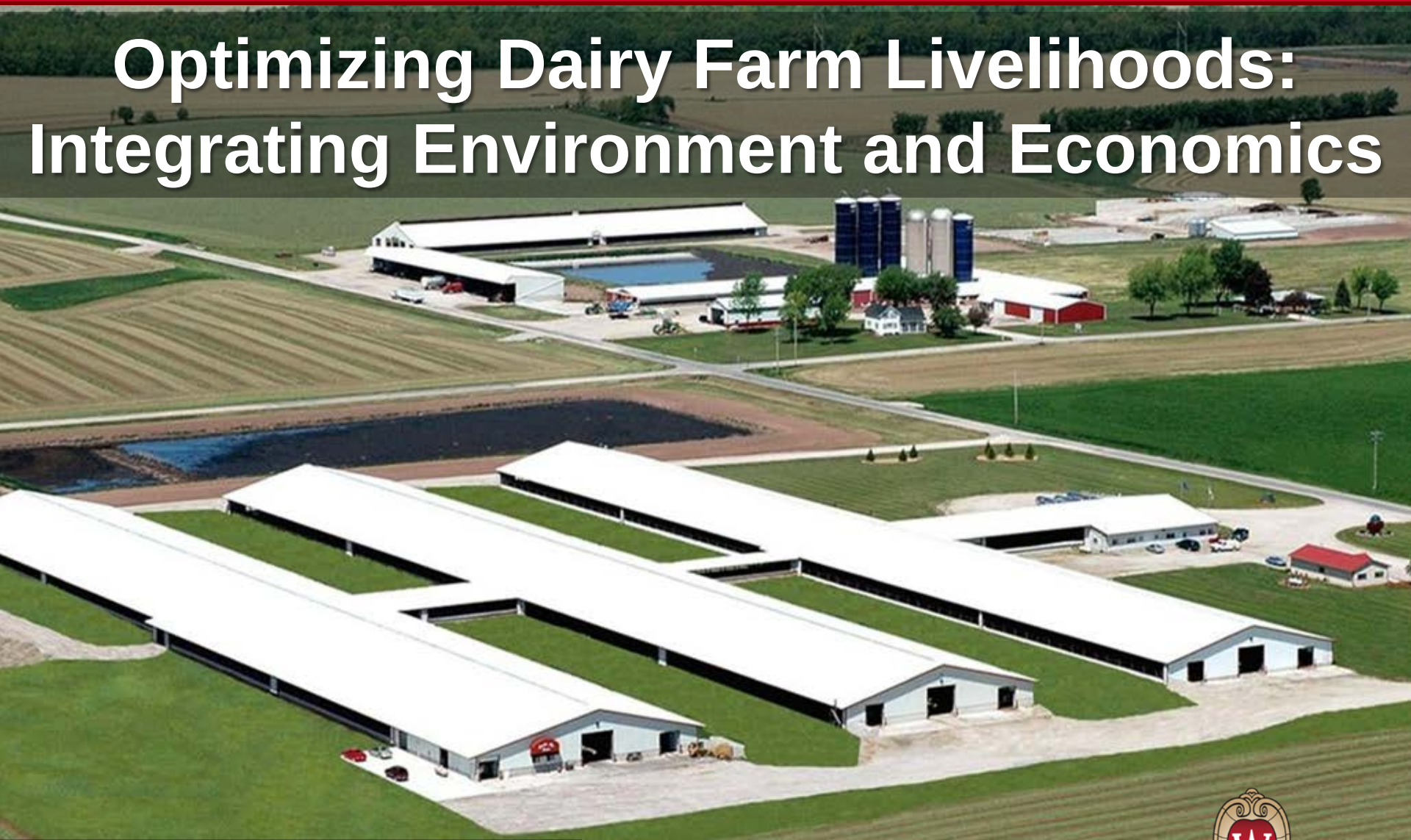
Optimizing Dairy Farm Livelihoods: Integrating Environment and Economics



Victor E. Cabrera, PhD
Assist. Professor
Extension Dairy Specialist

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

Thanks!

Go Gators!

Outline

- **Background & Goal**
- **Dissertation Work in Florida**
  - Conceptual Frameworks
  - The Dynamic North Florida Dairy Model
  - Some Results
- **Wisconsin Work**
  - Replacement, Profit, and N Excretion
  - Price Risk Management
  - Reproductive Management
  - Integrated Farm System Model

Professional Background (my life in one minute)

UNIVERSIDAD NACIONAL AGRARIA LA MOLINA

93’ BS & Engineer

VALLE GRANDE INSTITUTO RURAL

97’ Teacher

UF UNIVERSITY of FLORIDA

99’ MS

IDB Inter-American Development Bank

01’ Consultant

UF UNIVERSITY of FLORIDA

04’ PhD

Southeast Climate Consortium

06’ Postdoc

NM STATE New Mexico State University

08’ Ass Prof

WISCONSIN UNIVERSITY OF WISCONSIN–MADISON

Assistant Professor & Extension Specialist

UW Extension University of Wisconsin–Extension

Dairy Management

WISCONSIN UNIVERSITY OF WISCONSIN–MADISON

Goal

…help rural people to improve their quality of life through applied biophysical, socio-economic, environmental research and extension…

What Seemed to be the Problem in Florida

PUTTING THE NIX ON NITRATES
Suwannee River Partnership and Project 319
Chuck Woods
IMPACT Winter, 2001

GILCHRIST DAIRIES SEEKI LEEWAY
Dairymen are asking for changes to the county's operating requirements
Karen Voyles
Gainesville Sun 0

WATER WORRIES
Ailments take toll on Suwannee Cour Neighborhood
Karen Voyles
Gainesville Sun 11/05/02

POLLUTION RUL TO IMPACT FACTORY-STYLE FARMS
The Associated Press
Gainesville Sun 12/17/02

A WATERSHED FORT
tudy to track nitrogen in Santa Fe
J C. Bruno
esville Sun 12/06/02

COURT UPHOLDS DAIRY WASTE RULING
Groups demand more strict protection
The Associated Press
Gainesville Sun 04/03/05

THE SUWANNEE SEWER
Editorial
Gainesville Sun 04/23/04

SUWANNEE RIVER IS NOT SEWER
Letter
Del Bottcher
Gainesville Sun 05/10/04

NITRATE LEVELS N SUWANNEE SOAR
Nutrient load a threat to water
Greg C. Bruno
Gainesville Sun 05/14/200

STATE WATERWAYS STILL POLLUTED
Judge: DEP failing to protect rivers from dairy farms
Bruce Ritchie
Tallahassee Democrat 03/09/04

3 GROUPS SUE EPA OVER FL WATERWAYS
The lawsuit claims that EPA has failed to protect state waters from pollution
Greg C. Bruno
Gainesville Sun 04/23/04

WATER EFFORTS FEELING STRAIN
State farmers, DEP work together to improve water management partnership
Greg C. Bruno
Gainesville Sun 04/10/04

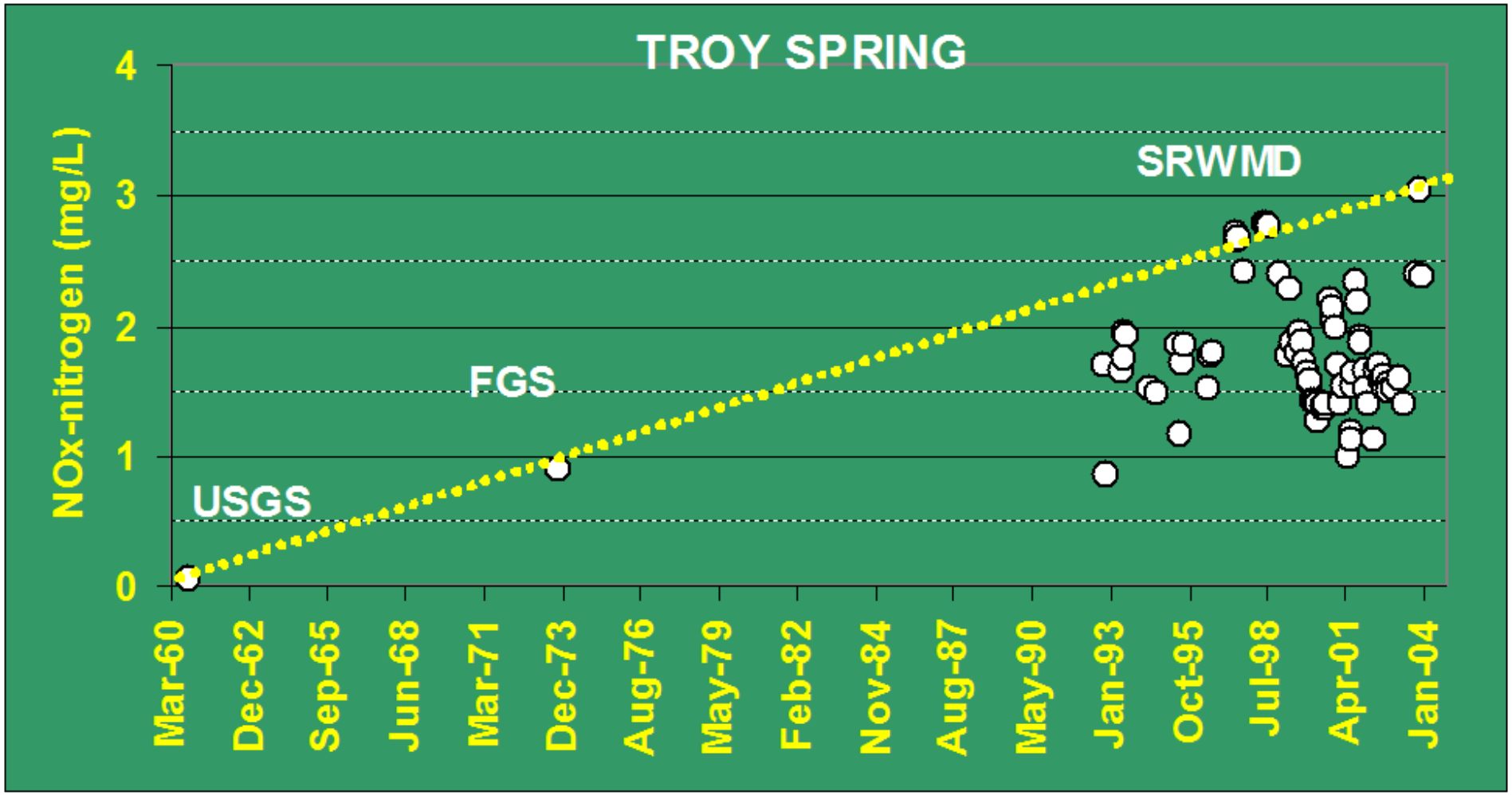
DEP STRIVING TO PROTECT FLORIDA'S WATER QUALITY
Letter
Colleen M. Castille
Gainesville Sun 05/11/04

THE SUWANNEE RIVER WILL BECOME NOBODY'S SEWER
Letter
Charles Bronson
Gainesville Sun 05/14/04

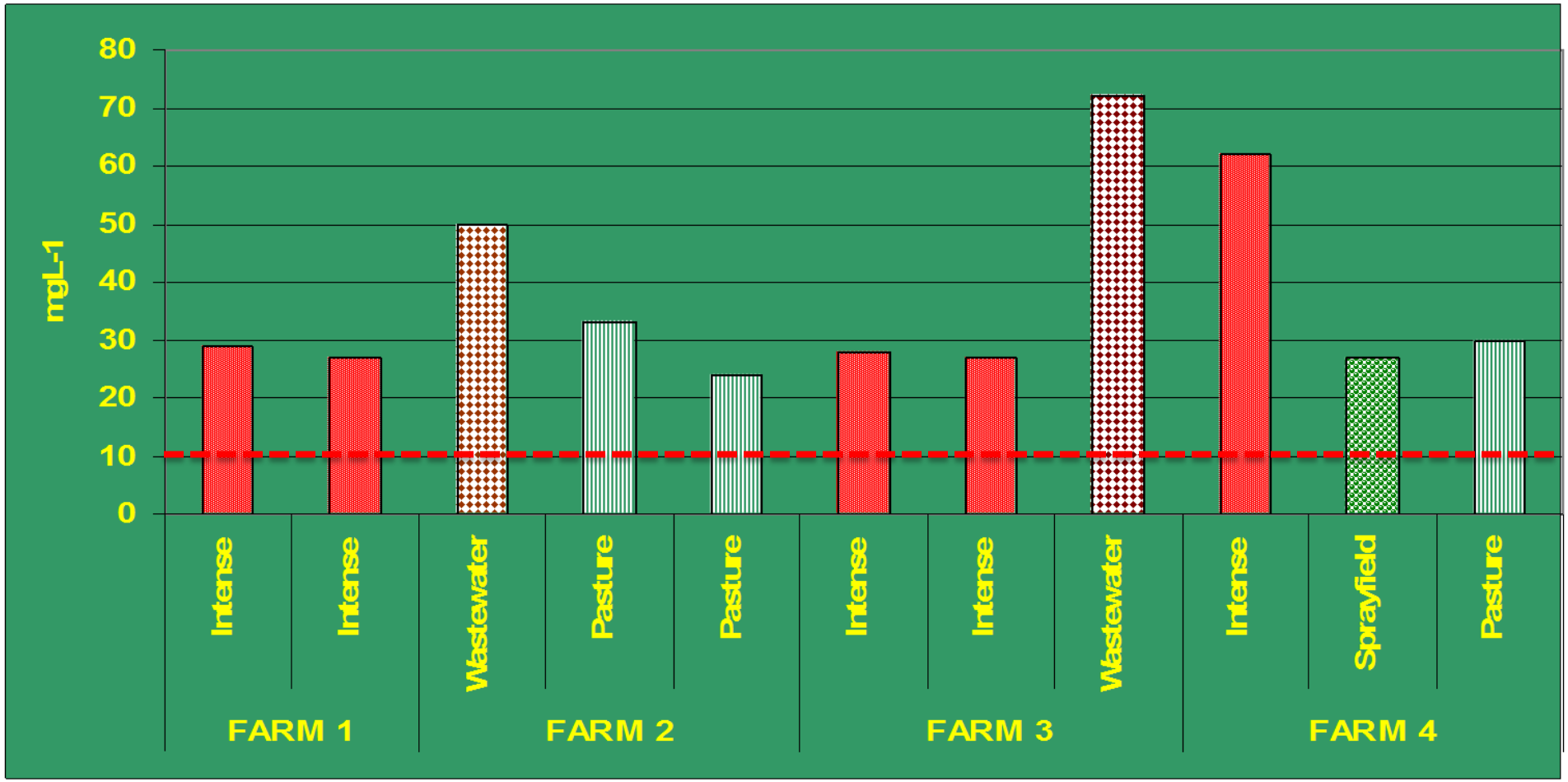
Dairy

WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

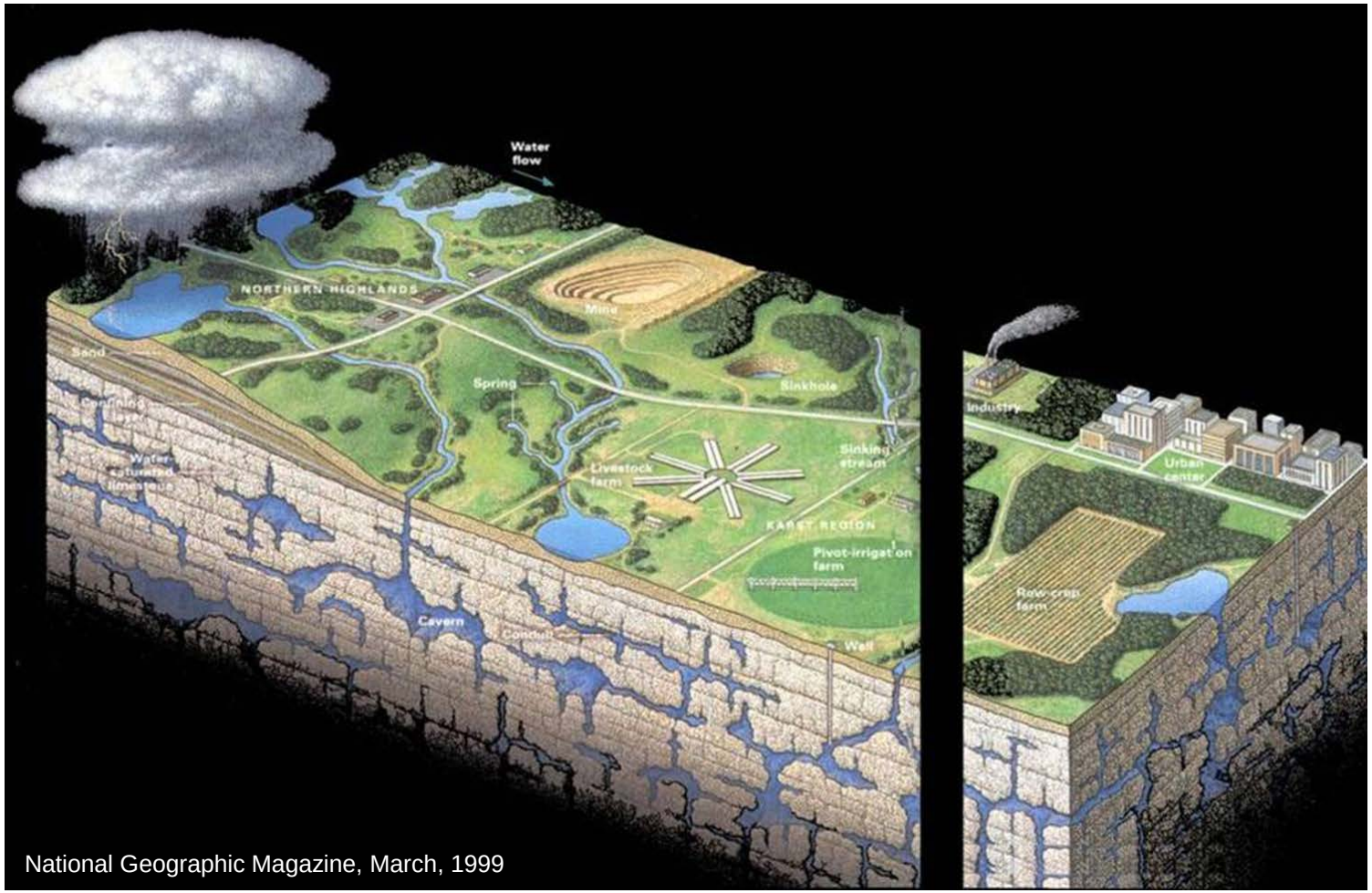
N in Water: Suwannee River Basin



N in Dairy Farms in the SRB

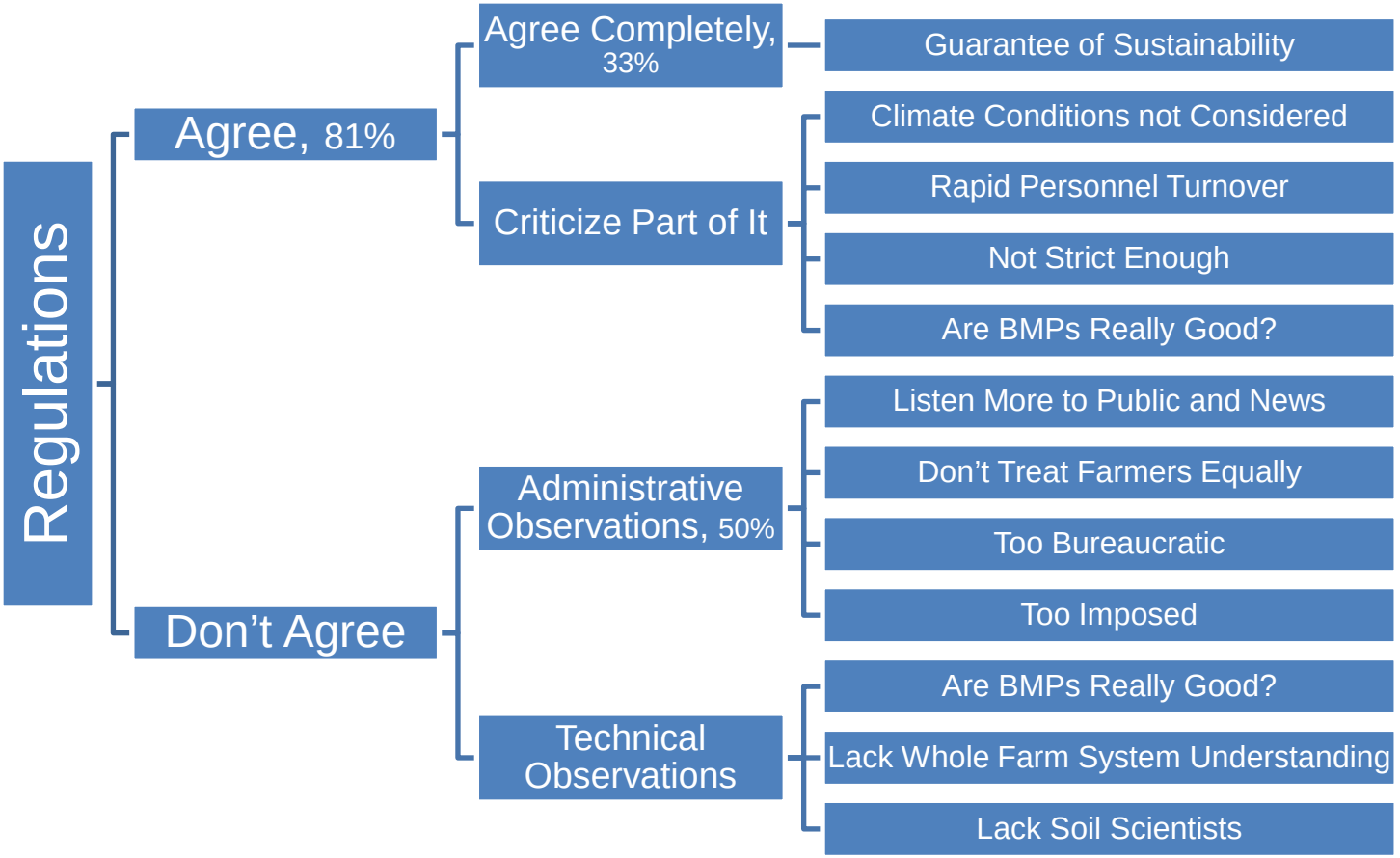


Suwannee River Basin Landscape



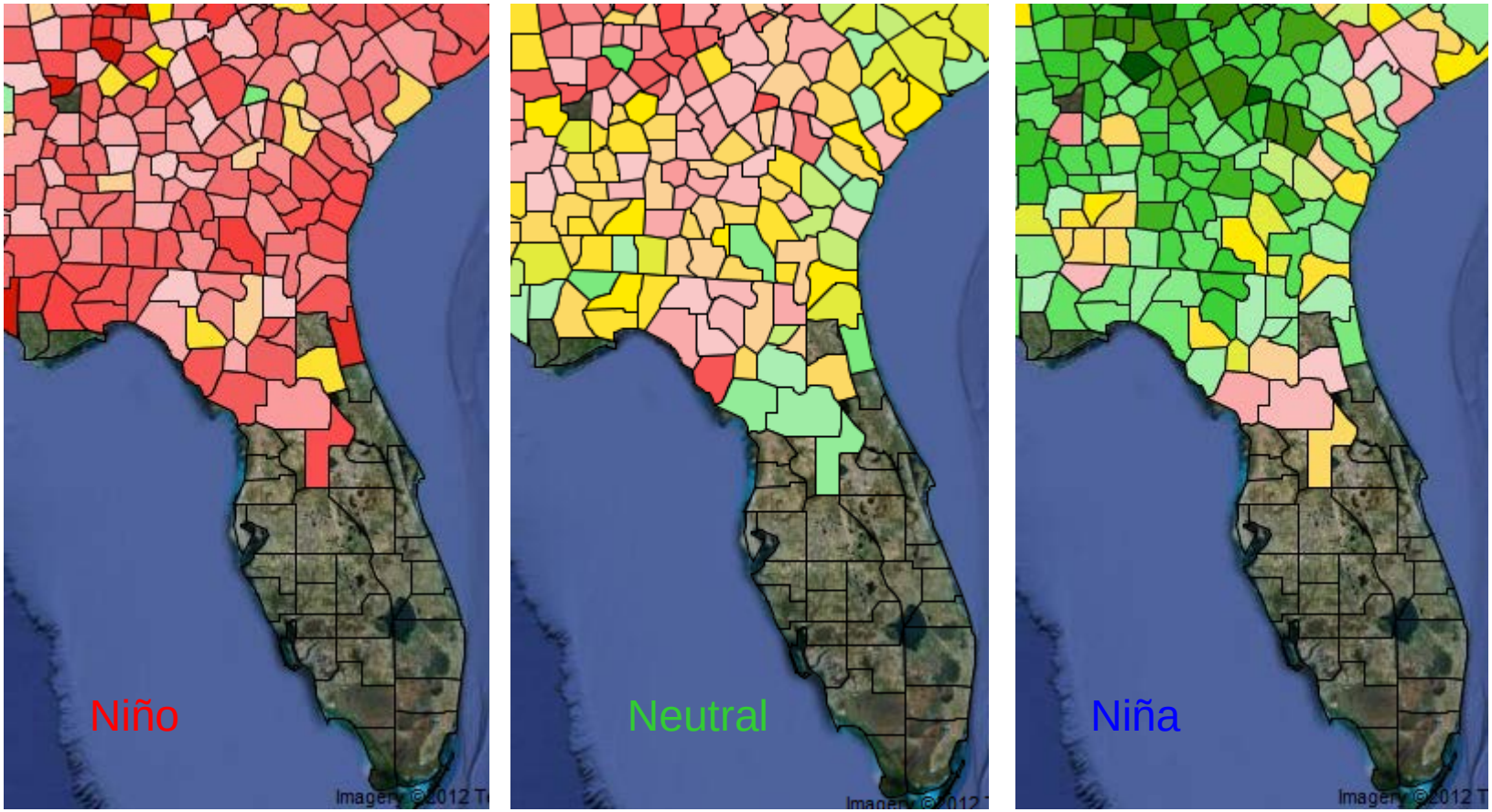
National Geographic Magazine, March, 1999

Farmers' Perceptions



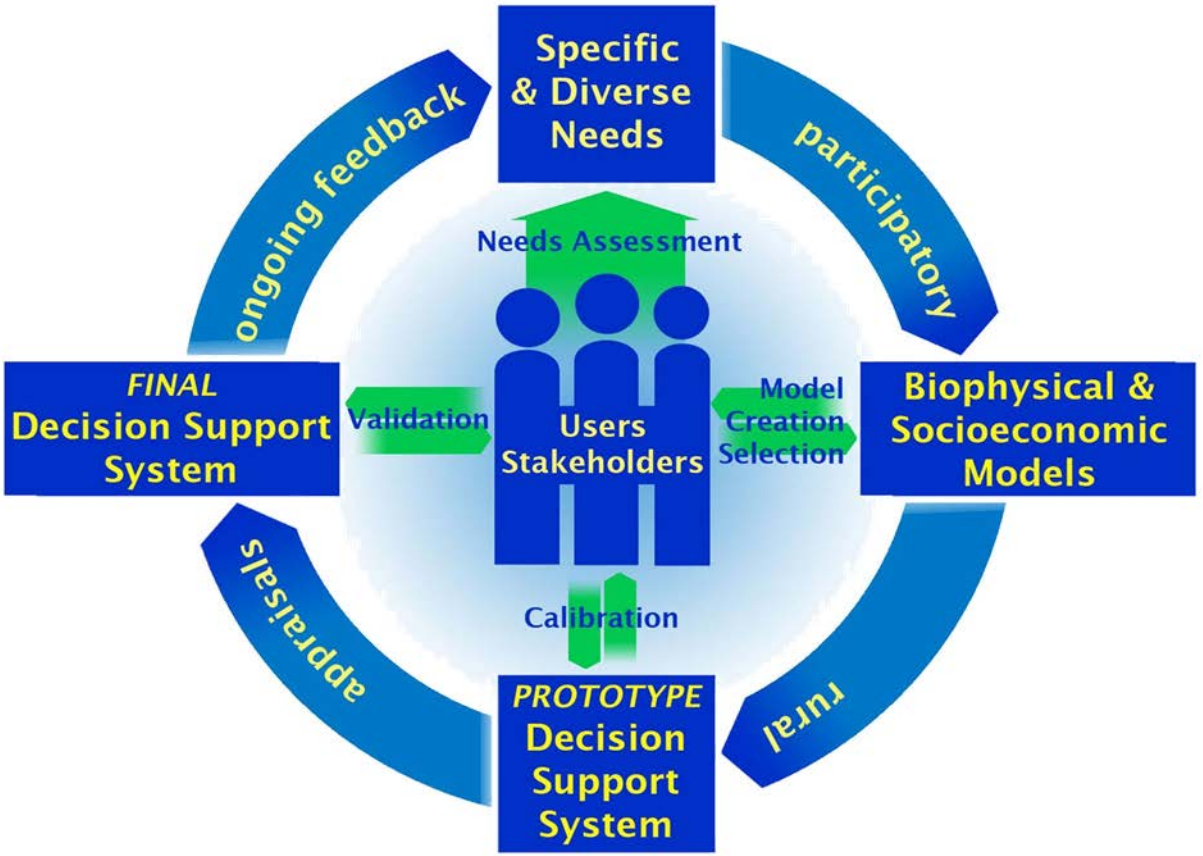
Cabrera, V. E., N. E. Breuer, and P. E. Hildebrand. 2006. North Florida dairy farmer perception toward the use of seasonal climate forecast technology. Climatic Change 78:479-491.

North Florida ENSO Climate Phases



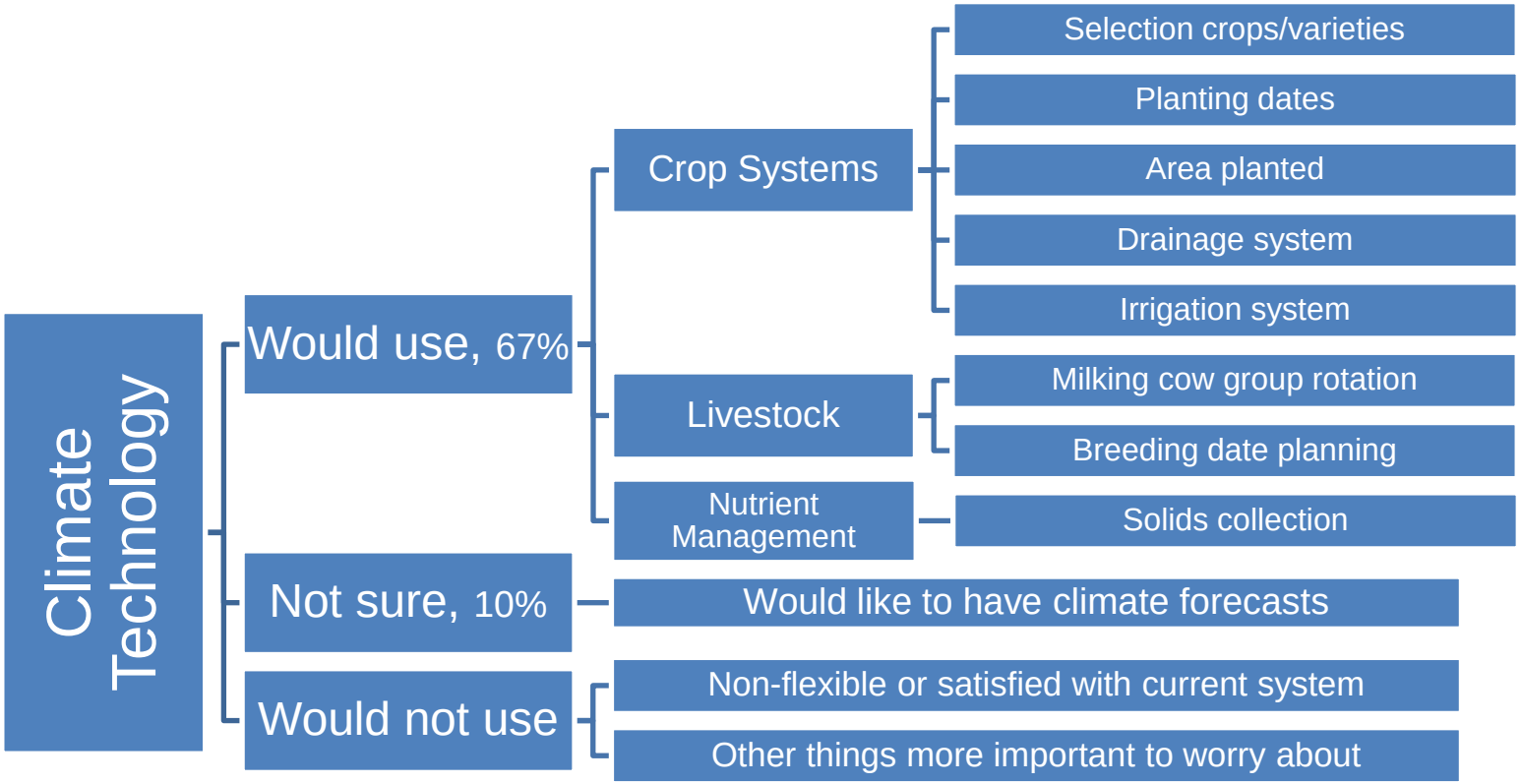
AgroClimate.org

Participatory Problem Solving



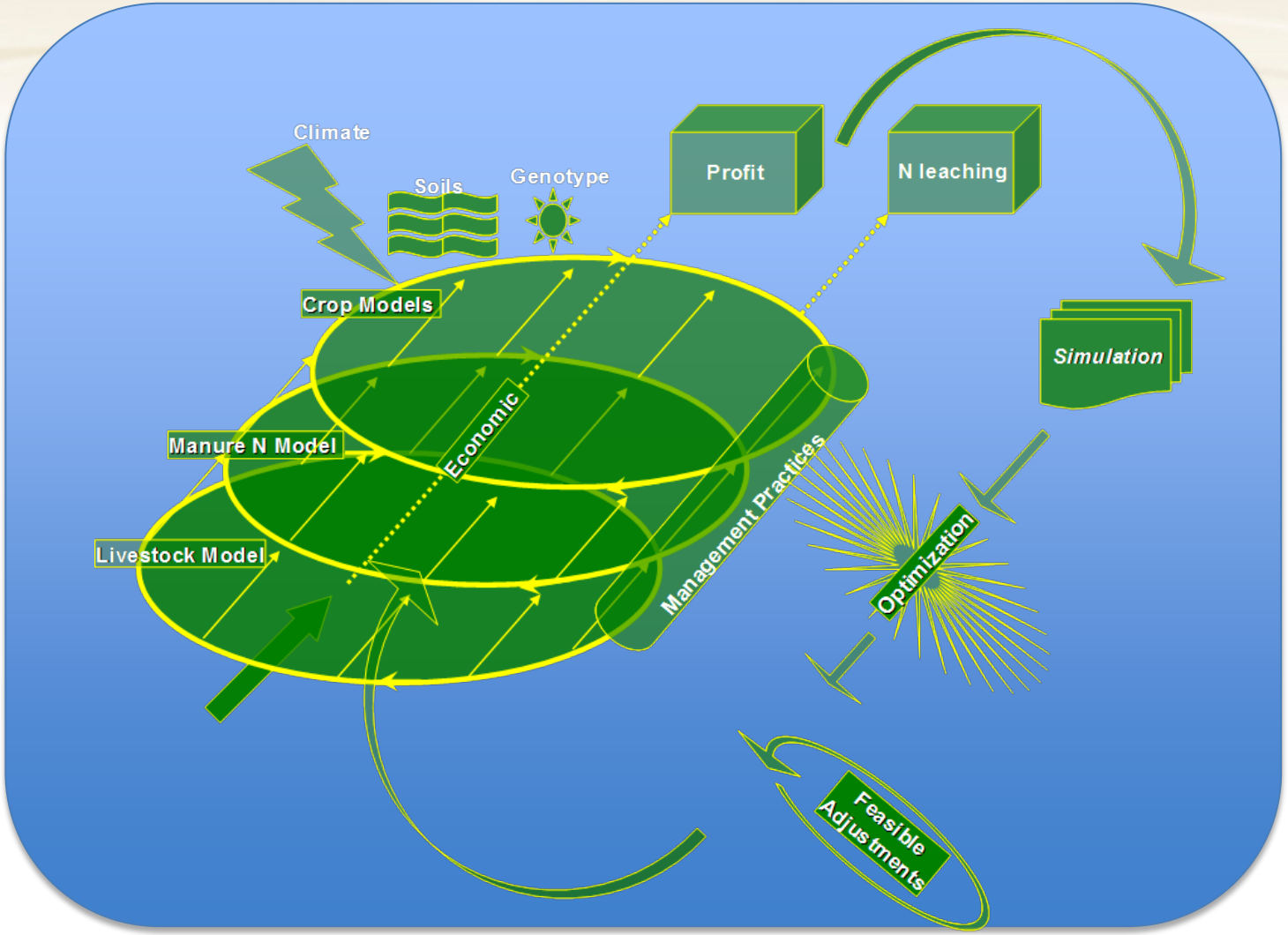
Cabrera, V. E., N. E. Breuer, and P. E. Hildebrand. 2008. Participatory modeling in dairy farm systems: a method for building consensual environmental sustainability using seasonal climate forecasts. Climatic Change 89:395-409.

Respond to Farmers' Needs

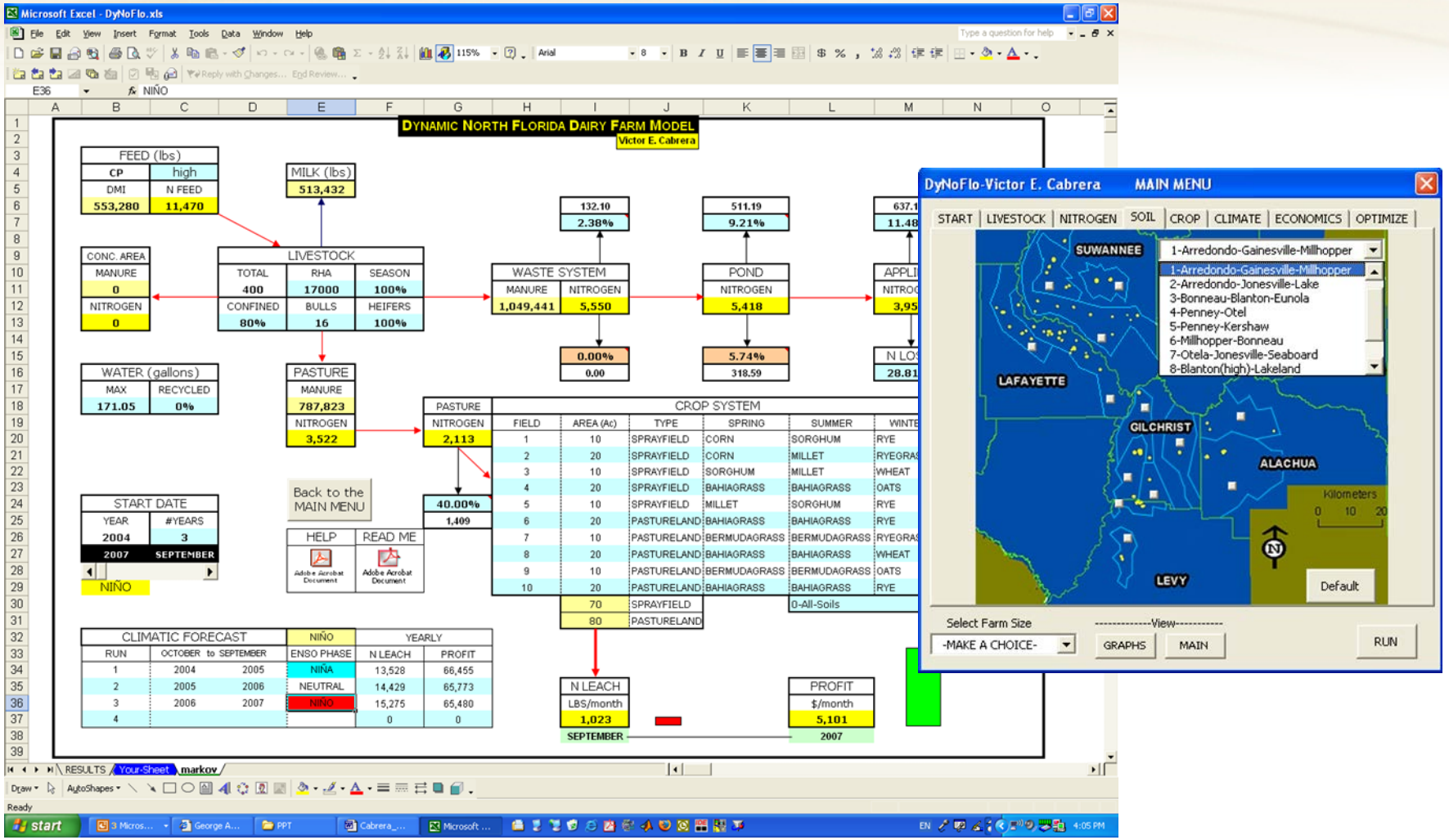


Cabrera, V. E., N. E. Breuer, and P. E. Hildebrand. 2006. North Florida dairy farmer perception toward the use of seasonal climate forecast technology. Climatic Change 78:479-491.

The Dynamic North Florida Dairy Farm Model (DyNoFlo)

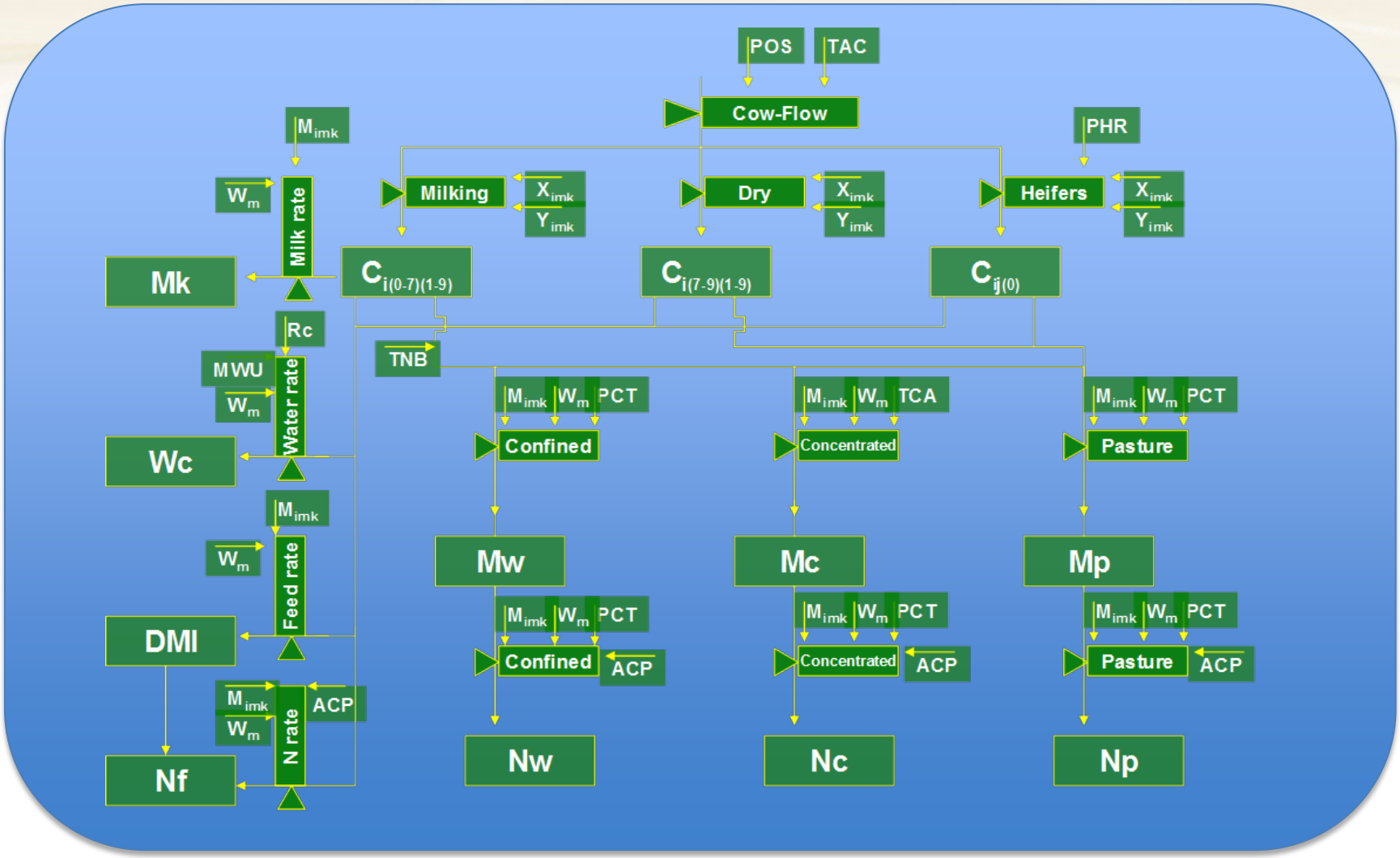


Cabrera, V. E., P. E. Hildebrand, J. W. Jones, D. Letson, and A. de Vries. 2006. An integrated North Florida dairy farm model to reduce environmental impacts under seasonal climate variability. Agriculture, Ecosystems, and Environment 113:82-97.



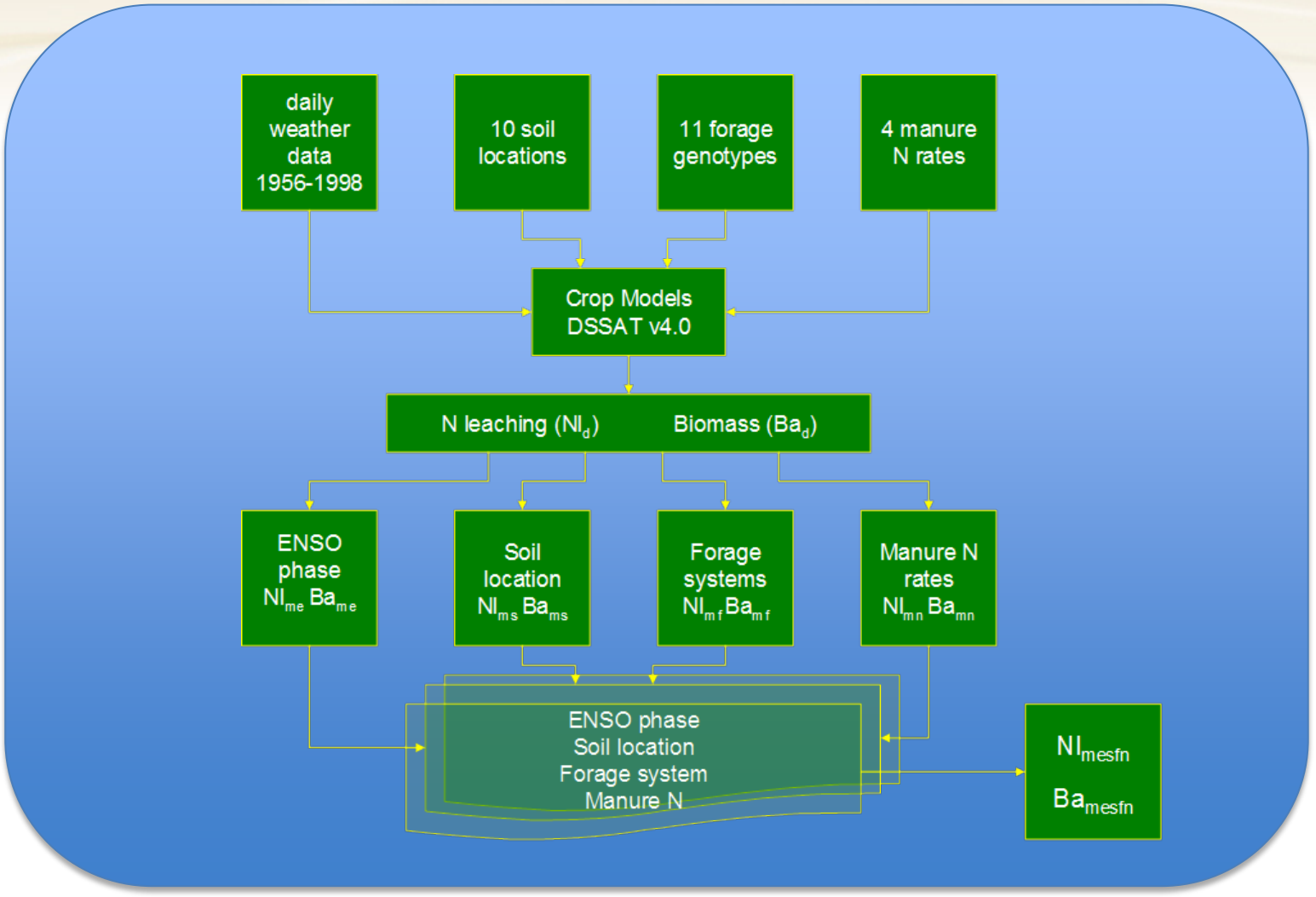
Cabrera, V. E., N. E. Breuer, P. E. Hildebrand, and D. Letson. 2005. The dynamic north-Florida dairy farm model: a user-friendly computerized tool for increasing profits while minimizing environmental impacts. Computers and Electronics in Agriculture 49:286-308.

The Livestock Module



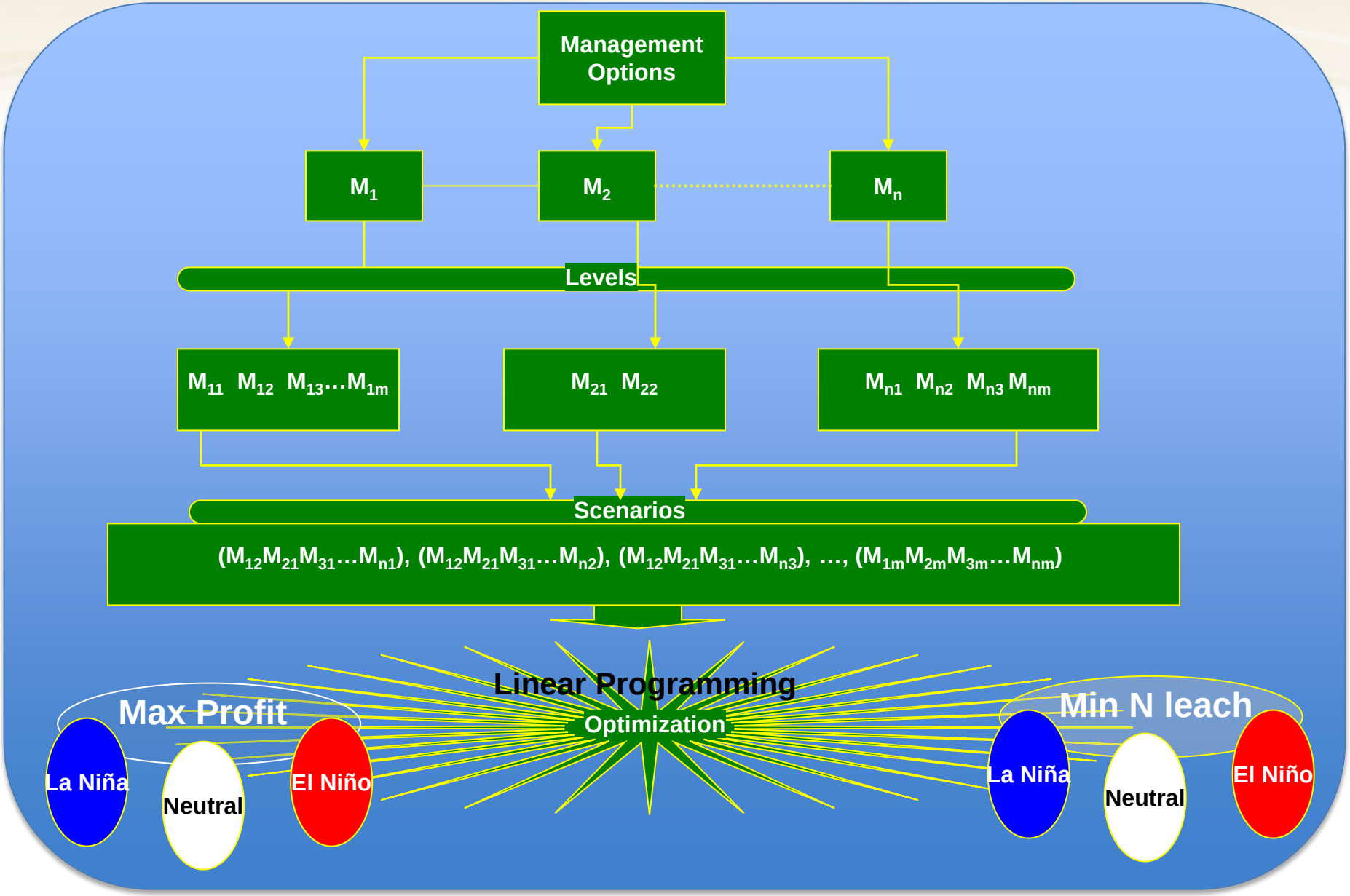
Cabrera, V. E., A. de Vries., and P. E. Hildebrand. 2006. Manure nitrogen production in North Florida dairy farms: A comparison of three models. Journal of Dairy Science 89:1830-1841.

The Crops Module

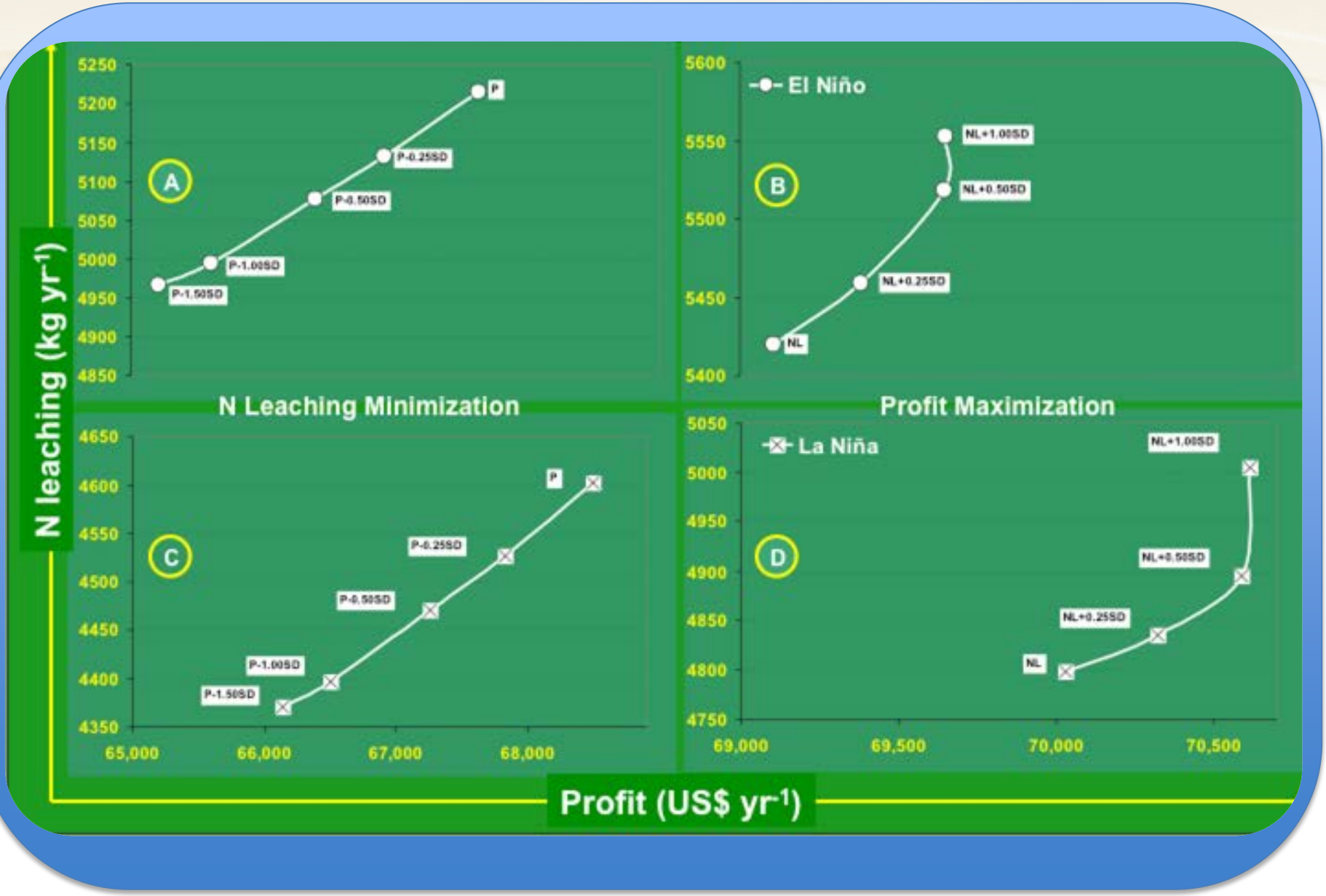


Cabrera, V. E., S. Jagtap, and P. E. Hildebrand. 2007. Strategies to limit (minimize) nitrogen leaching on dairy farms driven by seasonal climate forecasts. Agriculture, Ecosystems, and Environment 122:479-489.

The Optimization Module


Management Options
M_1
M_2
M_n
Levels
M_{11} M_{12} M_{13}…M_{1m}
M_{21} M_{22}
M_{n1} M_{n2} M_{n3} M_{nm}
Scenarios
($M_{12}M_{21}M_{31}…M_{n1}$), ($M_{12}M_{21}M_{31}…M_{n2}$), ($M_{12}M_{21}M_{31}…M_{n3}$), …, ($M_{1m}M_{2m}M_{3m}…M_{nm}$)
Linear Programming
Optimization
Max Profit
La Niña
Neutral
El Niño
Min N leach
La Niña
Neutral
El Niño

Some Important Results


N leaching (kg yr-1)
A
P
P-0.25SD
P-0.50SD
P-1.00SD
P-1.50SD
N Leaching Minimization
B
El Niño
NL+1.00SD
NL+0.50SD
NL+0.25SD
NL
Profit Maximization
C
P
P-0.25SD
P-0.50SD
P-1.00SD
P-1.50SD
D
La Niña
NL+1.00SD
NL+0.50SD
NL+0.25SD
NL
Profit (US$ yr-1)

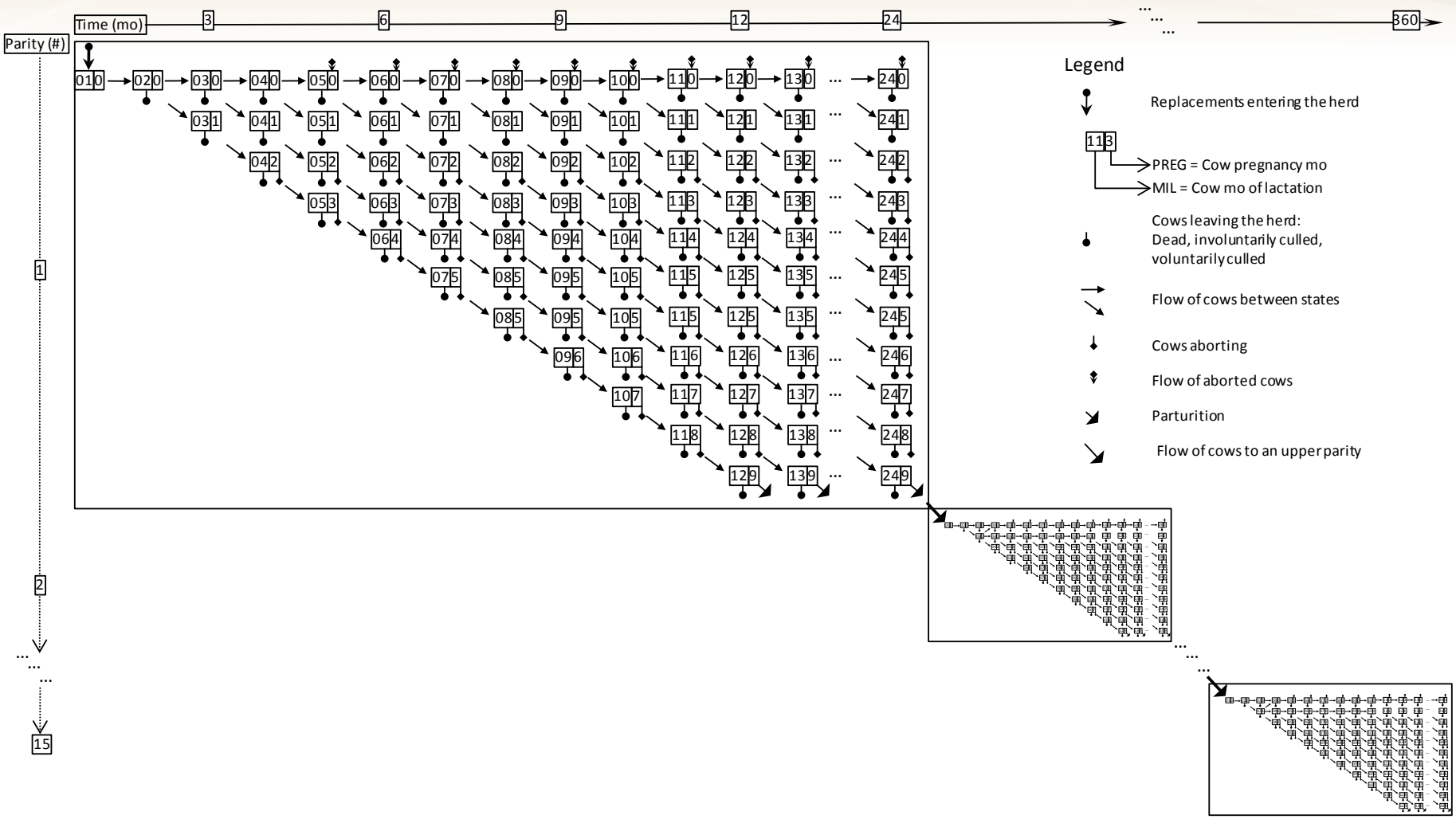
$54,532. 07/01/08 to 06/30/2010. USDA Hatch Funding. Development of a dairy economic decision support system for Wisconsin. Cabrera, V.E.

Wisconsin: Dairy Cow Replacement, Profit, and Nitrogen Excretion

Cabrera, V. E. 2010. A large Markovian linear program for replacement policies to optimize dairy herd net income for diets and nitrogen excretion. Journal of Dairy Science 93:394-406.

Cabrera, V. E. 2011. The economic value of a dairy cow. Dairy Management Decision Support Tool.

Cabrera, V. E. *Under Review*. A simpler formulation of the replacement problem: A practical tool to assess the economic value of a cow, the value of a new pregnancy, and the cost of a pregnancy loss. Journal of Dairy Science.


Time (mo)
3
6
9
12
24
360
Parity (#)
1
2
15
010
020
030
040
050
060
070
080
090
100
110
120
130
240
031
041
051
061
071
081
091
101
111
121
131
241
042
052
062
072
082
092
102
112
122
132
242
053
063
073
083
093
103
113
123
133
243
064
074
084
094
104
114
124
134
244
075
085
095
105
115
125
135
245
085
095
105
115
125
135
245
096
106
116
126
136
246
107
117
127
137
247
118
128
138
248
129
139
249
Legend
Replacements entering the herd
1113
PREG = Cow pregnancy mo
MIL = Cow mo of lactation
Cows leaving the herd:
Dead, involuntarily culled,
voluntarily culled
Flow of cows between states
Cows aborting
Flow of aborted cows
Parturition
Flow of cows to an upper parity

Market and Constraint Conditions	Diet	Month of Replacement	N excretion (kg/cow/mo)	Net Revenue ($/cow/mo)
2008 Favorable	1	11	12.56	**132**
Milk $0.40/kg	2	11	12.47	**132**
Corn $0.19/kg	3	11	12.55	**117**
Replacement $2,000	4	11	12.09	**105**
No N constraint	5	12	11.35	**80**
2008 Unfavorable	1	9	12.38	**15**
Milk $0.22/kg	2	9	12.35	**21**
Corn $0.24/kg	3	9	12.46	**19**
Replacement $1,500	4	9	11.99	**22**
No N constraint	5	10	11.18	**18**
2008 Favorable	1	9	12.00	**120**
Milk $0.40/kg	2	9	12.00	**126**
Corn $0.19/kg	3	9	12.00	**105**
Replacement $2,000	4	10	12.00	**105**
N ≤ 12 kg/mo constraint	5	12	11.35	**80**
2008 Unfavorable	1	7	12.00	**11**
Milk $0.22/kg	2	9	12.00	**20**
Corn $0.24/kg	3	8	12.00	**15**
Replacement $1,500	4	9	11.99	**22**
N ≤ 12 kg/mo constraint	5	10	11.18	**18**

The Economic Value of a Dairy Cow

Victor E. Cabrera, Department of Dairy Science

WISCONSIN UNIVERSITY OF WISCONSIN–MADISON

UW Extension University of Wisconsin–Extension

INPUTS - Edit Values in This Block

Evaluated Cow Variables	
Current Lactation	3
Current Months after Calving	5
Current Months in Pregnancy	1
Expected Milk Production Rest of Lactation, %	100
Expected Milk Production Next Lactations, %	100
Replacement Cow Variable	
Expected genetic improvement, % additional milk	0
Herd Production and Reproduction Variables	
Herd Turnover Ratio, %/year	35
Rolling Herd Average, lb/cow per year	24,000
21-d Pregnancy Rate, %	18
Reproduction Cost, $/cow per month	20
Last Month After Calving to Breed a Cow	10
Do-not-Breed Cow Minimum Milk, lb/day	50
Pregnancy Loss after 35 Days Pregnant, %	22.6
Average Cow Body Weight, lb	1306
Herd Economic Variables	
Replacement Cost, $/cow	1300
Salvage Value, $/lb live weight	0.38
Calf Value, $/calf	100
Milk Price, $/cwt	16
Milk Butterfat, %	3.5
Feed Cost Lactating Cows, $/lb dry matter	0.1
Feed Cost Dry Cows, $/lb dry matter	0.08
Interest Rate, %/year	6

Analyze

OUTPUTS - Interactive Results

Value of the Cow, $	**625**
Compared Against a Replacement, $	
Milk Sales, $	148
Feed Cost, $	-157
Calf Value, $	26
Non-reproductive Cull, $	-125
Mortality Cost, $	-24
Reproductive Cull, $	12
Reproduction Costs, $	45
Replacement Transaction, $	700
Herd Structure at Steady State	
Days in milk	224
Days to Conception	122
Percent of Pregnant	52
Reproductive Culling, %	8
Mortality, %	3
1st Lactation, %	43
2nd Lactation, %	27
> 3rd Lactation, %	30
Economics of an Average Cow, $/year	
Net Return, $	1999
Milk Sales, $	3834
Feed Cost, $	-1522
Calf Sales, $	60
Non-Reprod. Culling Cost, $	-197
Mortality Cost, $	-38
Reproductive Culling Cost, $	-58
Reproductive Cost, $	-80

$86,000. 09/26/11-09/25/12. USDA Risk Management Agency. Delivery of Educational Materials to Increase LGM-Dairy Utilization by Dairy Farm Operators in General and Limited Resource Operators. Gould, B.W., Cabrera, V.E.

$50,000. 07/01/11-06/30/12. USDA NC Risk Management and Education Center. Training in the Use and Utilization of an Integrated Dairy Price and Margin Risk Management System for Planning Purposes. Gould, B.W., Cabrera, V.E.

$58,430. 10/01/09 to 09/30/11. USDA Hatch Funding. Assessment of gross margin insurance versus traditional price risk management strategies under alternative biofuels and predicted climatic conditions: implications for Wisconsin dairy farms. Cabrera,V.E., Gould, B.W.

Wisconsin: Price Risk Management

Valvekar, M., V. E. Cabrera, and B. W. Gould. 2010. Identifying cost-minimizing strategies for guaranteeing target dairy income over feed cost via use of the Livestock Gross Margin dairy insurance program. Journal of Dairy Science 93:3350-3357.

Valvekar, M., J. P. Chavas, B. W. Gould, and V. E. Cabrera. 2011. Revenue risk management, risk aversion and the use of LGM-Dairy insurance. Agricultural Systems 104:671-678.

Gould, B. W., and V. E. Cabrera. 2011. The LGM-Dairy Analyzer decision support tool.

	Optimal Solution		Non-Optimal Strategy		NET GAIN
Total Production Covered	Target guarantee income over feed costs	Premium paid	Target guarantee income over feed costs	Premium paid	
(%)	($/Mg milk)	($/Mg milk)	($/Mg milk)	($/Mg milk)	($/Mg milk)
33	66.14	0.53	73.51	1.40	**0.87**
43	88.19	0.84	95.83	1.83	**0.99**
52	110.23	1.22	116.83	2.23	**1.01**
62	132.28	1.68	138.04	2.64	**0.96**
72	154.23	2.20	159.73	3.05	**0.85**
81	176.37	2.79	180.65	3.45	**0.66**
90	198.42	3.45	200.74	3.83	**0.38**
99	220.46	4.17	220.74	4.21	**0.04**

LGM Analyzer

If you have saved CSV data from a previous run, you can upload it instead of typing in your farm's data again

Upload a file

Input

Insurance contract month: 2012 Jan

Choose your deductible level $ 1.0 /cwt

Feed Values: Enter Manually | Lowest Allowed | Default | Highest Allowed

Target NIOFC: $ **5.0** /cwt

The prices we use for the Gross Margin Calculation correspond to future and option prices retrieved on the trade dates: **2012-01-18, 2012-01-19, 2012-01-20**

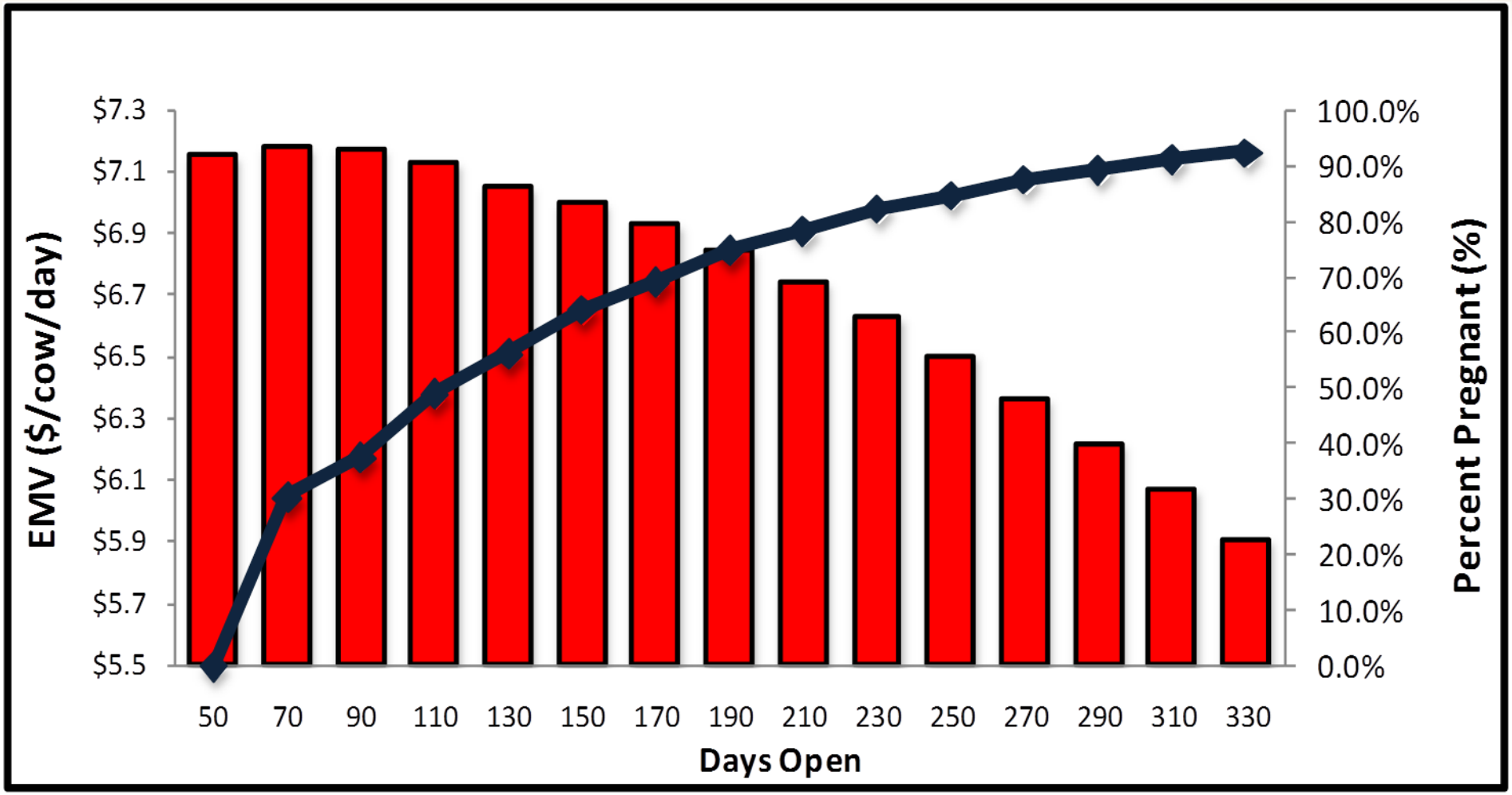
Coverage Month	Production (cwt)	Corn Equiv (tons)	Soybean Meal Equiv (tons)
Month Year	Milk Qty.	Corn Qty.	SBM Qty.
Mar 2012	**4113**	**95.8**	**21.1**
Apr 2012	**4340**	**101.1**	**22.3**
May 2012	**4188**	**97.6**	**21.5**
Jun 2012	**4240**	**98.8**	**21.8**
Jul 2012	**4188**	**97.6**	**21.5**
Aug 2012	**4023**	**93.7**	**20.7**
Sep 2012	**4075**	**94.9**	**20.9**
Oct 2012	**4038**	**94.1**	**20.8**
Nov 2012	**4063**	**94.7**	**20.9**
Dec 2012	**4149**	**96.7**	**21.3**
Total	41,417 cwt	965 tons	213 tons

Save Input | Optimize Coverages for Least Cost Premium

$1,000,000. 01/15/10-01/14/14. USDA Agriculture and Food Research Initiative. An integrated approach to improving dairy cow fertility. Cabrera, V.E. (PI), Fricke, P.M., Ruegg, P.L., Shaver, R.D., Weigel, K.A., Wiltbank, M.C.
$83,000. 10/01/11-09/30/13. USDA Hatch Funding. Development of a Suite of Dairy Reproduction Decision Support Tools.

Wisconsin: Evaluation of Reproductive Programs

Giordano, J. O., P. M. Fricke, M. C. Wiltbank, and V. E. Cabrera. 2011. An economic decision-making decision support system for selection of reproductive management programs on dairy farms. Journal of Dairy Science 94:6216-6232.
Cabrera, V.E. 2010. Economic decision making for reproduction. Dairy Cattle Reproductive Council Annual Convention. St. Paul, MN, 11-12 November 2010.
Giordano, J. O., A. Kalantari, P. M. Fricke, M. C. Wiltbank, and V. E. Cabrera. *Under Review*. A daily herd Markov-chain model to study the reproductive and economic impact of reproductive programs combining timed artificial insemination and estrous detection. Journal of Dairy Science.


EMV ($/cow/day)
$7.3
$7.1
$6.9
$6.7
$6.5
$6.3
$6.1
$5.9
$5.7
$5.5
Percent Pregnant (%)
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
50
70
90
110
130
150
170
190
210
230
250
270
290
310
330
Days Open

UW-Dairy Management
DairyMGT.info

UW-Dairy Repro$

Victor E. Cabrera & Julio O. Giordano
Department of Dairy Science

Farm Name: **Crave Brothers Farm** Location: **Waterloo, WI**

1. Productive Parameters

Lactating Cows	(#)	960
Rolling Herd Average (RHA)	(lb/cow/y)	24000
Involuntary Culling Rate	(%/y)	14.3%
Mortality Rate	(%/y)	8.00%
Stillbirth Rate	(%)	9.4%

2. Lactation Curves

		Lact. 1	Lact. 2	Lact. > 2
Cow Number		363	244	353
Body Weight (lb/cow)		1,350	1,400	1,450
Test	DIM	☑ Define Lactation Curves Below		
1	15	77	105	107
2	45	91	120	126
3	75	94	120	128
4	105	94	116	125
5	135	93	112	120
6	165	91	107	112
7	195	89	98	104
8	225	87	91	94
9	255	83	82	86
10	285	79	75	81
11	315	76	68	71
12	345	72	61	61
13	375	70	57	60
14	405	60	53	55
17	495	56	45	40
18	525	57	45	55
19	555	54	29	27

3. Economic Parameters

☐ Check if total breeding costs are known

Milk Price	($/cwt)	16.00
Cost Feed Lactating (DM)	($/lb)	0.10
Dry Period Fixed Cost	($/d)	2.20
Female Calf Value	($/calf)	300
Male Calf value	($/calf)	75
Heifer Replacement Value	($/heifer)	1,600
Salvage Value	($/cow)	780
Labor Cost for Injection	($/hr)	15.00
Heat Detection Cost	($/hr)	15.00
Artificial Insemination Cost	($/cow)	17.00
Interest Rate	(%/y)	6.5%

4. Pregnancy Diagnosis Cost

		Current	Alternative	100% HD
Palpation	($/hr)	90		90
Ultrasound	($/hr)		90	
Blood Test	($/cow)			

	Current	day	Alternative	day
1st Service Postpartum	Double-Ovsynch	Sat	Double-Ovsynch	Sat
2nd and Subsequent Services	Ovsynch	Tue	Ovsynch	Tue
Resynch before preg check	NO		YES	

5.b. Reproductive Program Parameters

		Current	Alternative	100% HD
Voluntary Waiting Period	(d)	85	85	50
Estrus Cycle Duration	(d)		22	
Maximum DIM for Breeding			330	
DIM to 1st TAI	(d)	85	85	
Interbreeding Interval	(d)	49	42	
Heat Bred Before 1st TAI	(%)	55%		55%
CR Heat Bred Before 1st TAI	(%)	33%		33%
Heat Bred After 1st TAI	(%)	55%		55%
CR Heat Bred After 1st TAI	(%)	30%		30%
CR 1st Service TAI	(%)	47%	47%	
CR 2nd+ Services TAI	(%)	32%	30%	
Calving Interval	(mo)		14.1	
Dry Period	(d)		62	

5.c. Hormones Cost

Hormone	Brand	Vial Cost	Doses / Vial
GnRH	Fertagyl	19	10
PGF	Lutalyse	40	20
CIDR			
hCG	Chorulon	17.4	5

5.d. Injections and Pregnancy Diagnosis Labor Cost: *Current Program*

		Mon	Tue	Wed	Thu	Fri	Sat	Sun
Inject.	Laborers		3		1		2	
	hr/d		3.5		1.5		1	
	Cows Treated		165		45		20	
Preg.	# Cows		45		0		0	
Diag.	hr/d		2.75		0		0	

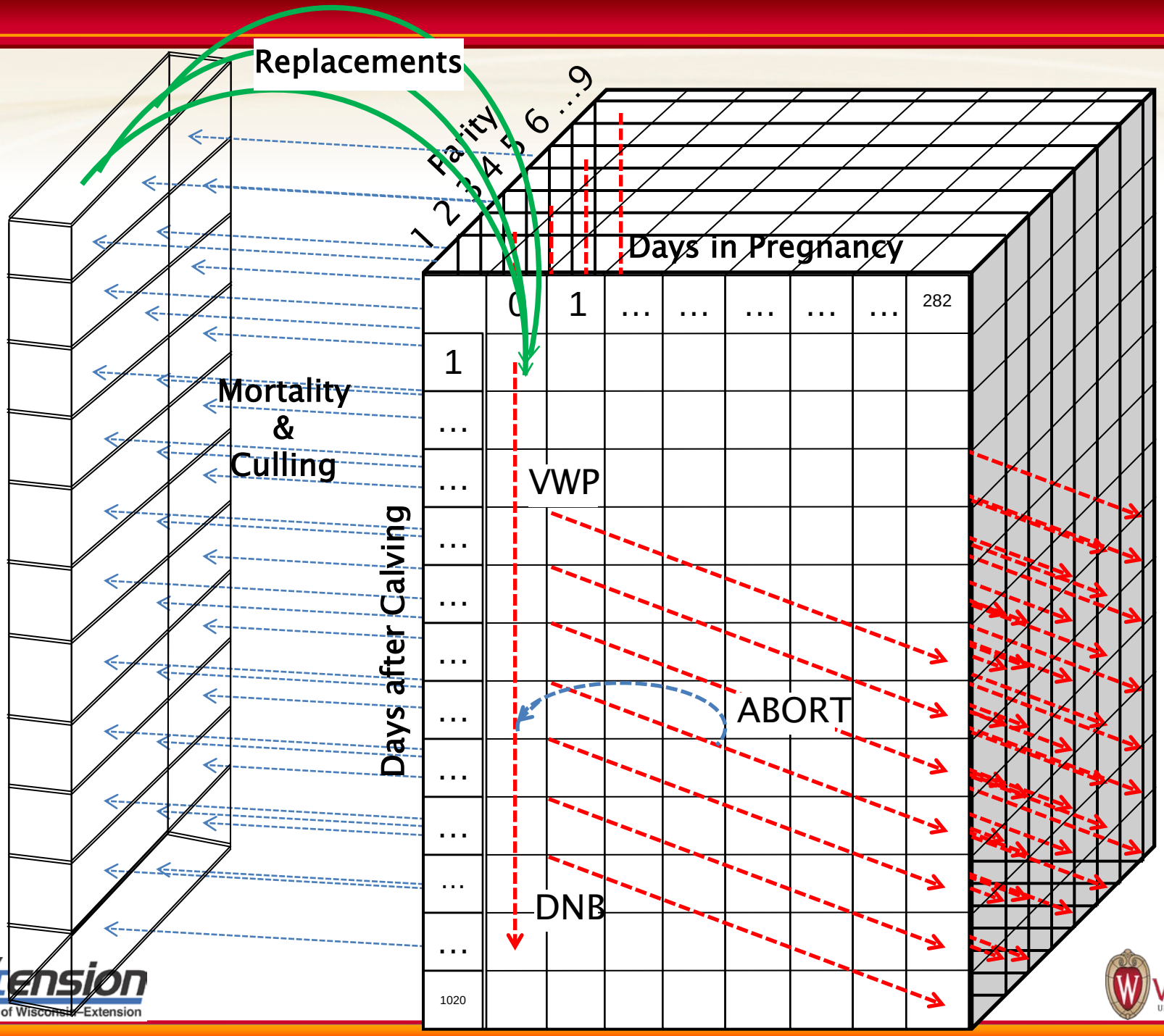
5.e. Injections and Pregnancy Diagnosis Labor Cost: *Alternative Program*

		Mon	Tue	Wed	Thu	Fri	Sat	Sun
Inject.	Laborers		3		1		2	
	hr/d		3.75		1.5		1	
	Cows Treated		195		40		20	
Preg.	# Cows		40		0		0	
Diag.	hr/d		2.75		0		0	

5.f. Heat Detection Labor Cost

		Mon	Tue	Wed	Thu	Fri	Sat	Sun
Heat	Laborers	1	1	1	1	1	1	1
Detect.	hr/d	3	3	3	3	3	3	3
Preg.	# Cows	30	0	0	0	0	0	0
Diag.	hr/d	2	0	0	0	0	0	0

Show Results for Parity: All


Replacements
Parity
1 2 3 4 5 6 …9
Days in Pregnancy
0
1
…
…
…
…
…
282
1
…
…
…
…
…
…
…
…
…
…
1020
Mortality
&
Culling
Days after Calving
VWP
ABORT
DNB

Dairy Reproductive Economic Analysis

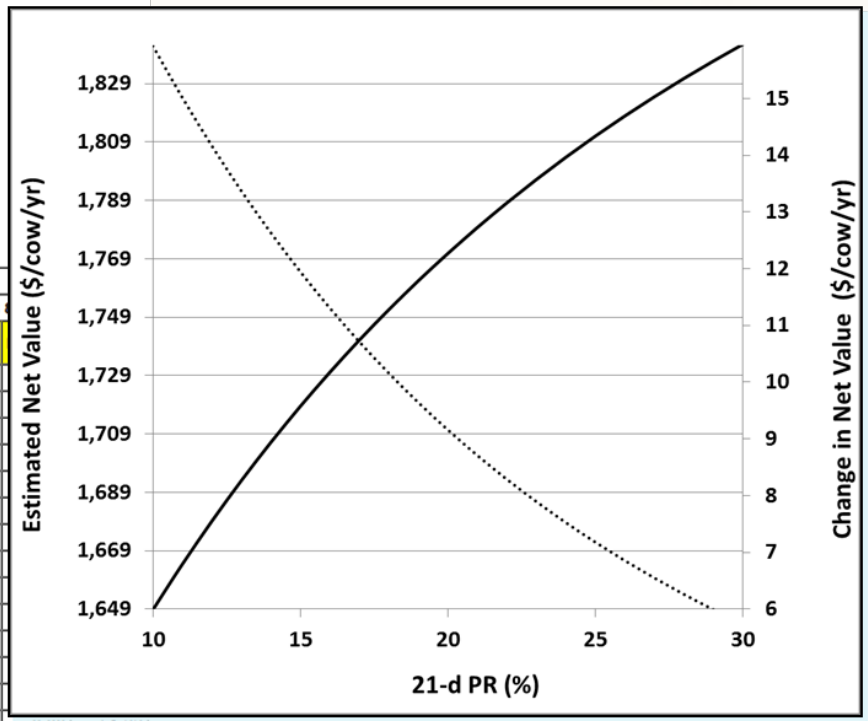
V.E. Cabrera

Overview | Upload | Repro | Abort | Cull | Milk | Economics | Run Model | Results | Analyze

Total Number of Cows	100
Iterations Performed	709
Reached Steady State	YES

	Total Revenues & Costs				
	IOFC	Cull	Repro	Calves	Net Return
$/herd/month	15795.47	-1405.18	-1021.92	1028.3	14396.67
$/herd/day	526.52	-46.84	-34.06	34.28	479.89
$/cow/year	1921.78	-170.96	-124.33	125.11	1751.6

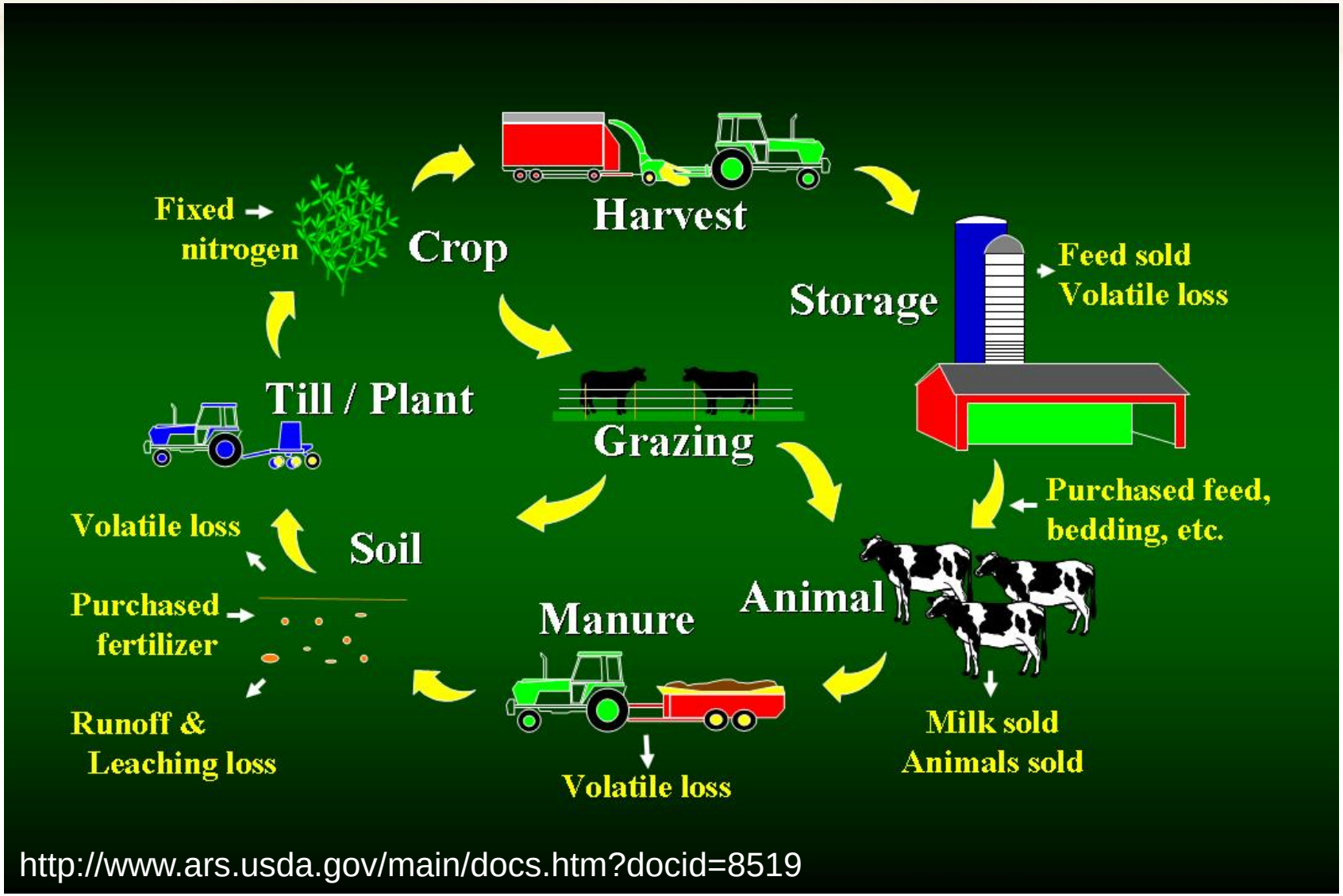
Month in Milk	Month in Pregnancy												Revenues			
	0	1	2	3	4	5	6	7	8	9						
	Lactation 1										Cull Cows		IOFC	Cull		
1	3.35										0.14		453.19	-66.23		
2	3.21										0.09		594.15	-43.03		
3	2.56	0.56									0.05		616.65	-26.48		
4	2.06	0.45	0.56								0.05		603.35	-22.81		
5	1.67	0.36	0.45	0.54							0.04		577.58	-19.77		
6	1.37	0.30	0.36	0.43	0.52						0.04		548.93	-18.17		
7	1.13	0.24	0.29	0.35	0.42	0.51					0.04		515.73	-17.44		
8	0.94	0.20	0.24	0.28	0.34	0.41	0.50				0.03		480.32	-16.79		
9	0.77	0.16	0.20	0.23	0.27	0.33	0.41	0.50			0.03		444.20	-16.82		
10	0.64	0.14	0.16	0.19	0.22	0.27	0.33	0.40	0.49		0.04		305.35	-17.70		
11	0.52	0.11	0.13	0.16	0.18	0.22	0.26	0.32	0.40	0.49	0.04		196.86	-19.31		
12	0.43	0.09	0.11	0.13	0.15	0.18	0.22	0.26	0.32	0.39	0.04		152.38	-17.76		
13	0.42		0.09	0.11	0.13	0.15	0.18	0.21	0.26	0.31	0.04		117.16	-17.53		
14	0.41			0.09	0.10	0.12	0.15	0.18	0.21	0.26	0.04		88.57	-18.74	0.00	31.22
15	0.38				0.08	0.10	0.12	0.15	0.18	0.21	0.04		65.09	-19.10	0.00	42.02
16	0.35					0.08	0.10	0.12	0.14	0.17	0.04		46.03	-18.82	0.00	34.63
17	0.32						0.08	0.10	0.12	0.14	0.04		31.13	-18.83	0.00	28.57
18	0.29							0.08	0.10	0.12	0.04		19.51	-18.95	0.00	23.54
19	0.25								0.08	0.10	0.26		10.50	-17.49	0.00	19.33
20	0.00									0.08	0.00		-6.62	-0.53	0.00	15.78
21											0.00		0.00	0.00	0.00	0.00
22											0.00		0.00	0.00	0.00	0.00
23											0.00		0.00	0.00	0.00	0.00
24											0.00		0.00	0.00	0.00	0.00
25											0.00		0.00	0.00	0.00	0.00
	Lactation 2										Cull Cows		IOFC	Cull	Repro	Calves
1	2.24										0.05		501.84	-25.02	0.00	0.00



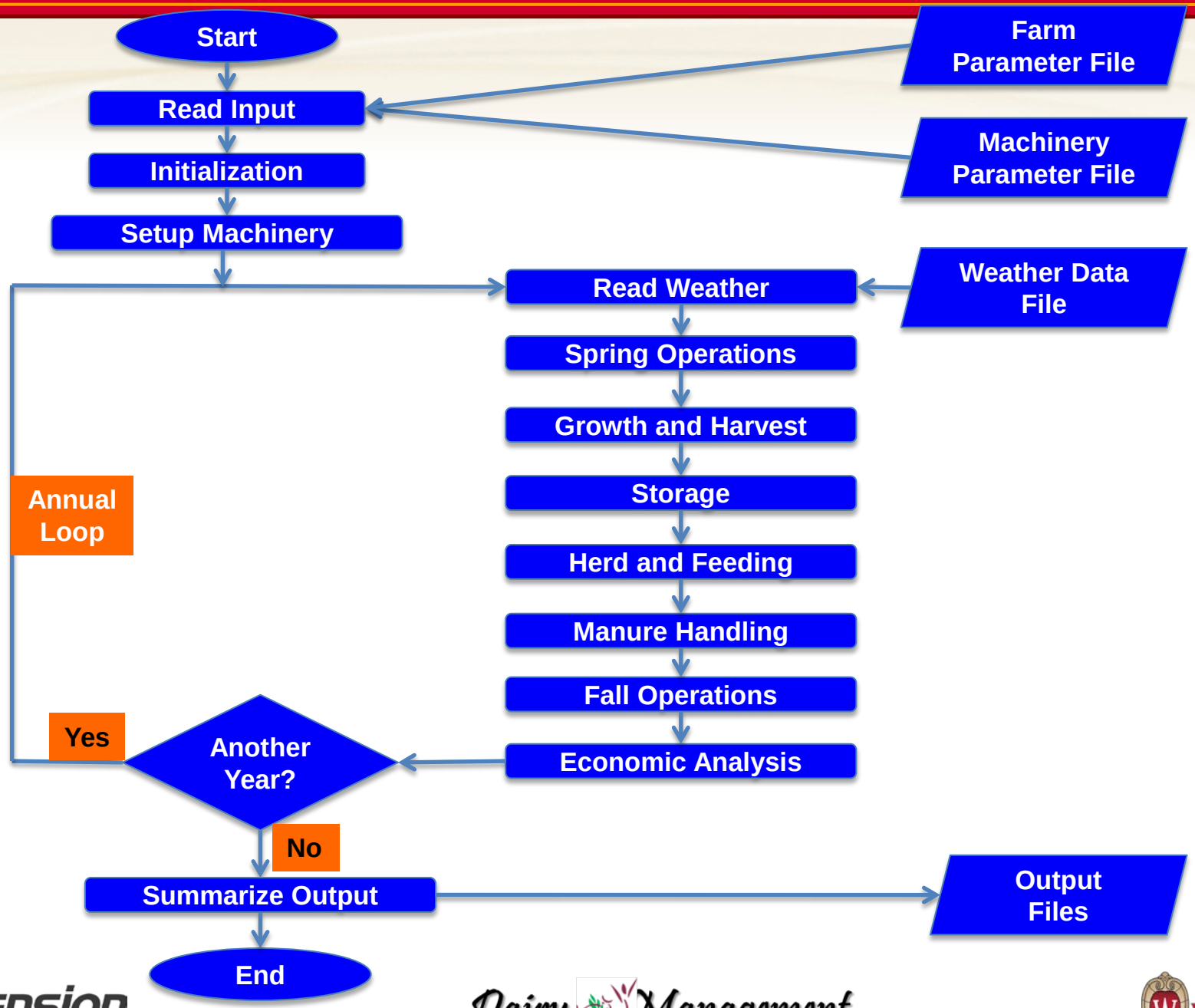
$575,000. 10/15/09-10/14/13. USDA Organic Research and Education Initiative. Strategies of Pasture Supplementation on Organic and Conventional Grazing Dairies: Assessment of Economic, Production and Environmental Outcomes. Cabrera, V.E. (PI), Gildersleeve, R., Wattiaux, M., Combs, D.

Wisconsin: Integrated Farm System Model

Dutreuil, M., Wattiaux, M., Gildersleeve, R., Barham, B., Cabrera, V.E. 2011. Impact of feeding strategies on milk production and income over feed cost: A case study of organic, grazing, and conventional Wisconsin dairy farms. J. Anim. Sci. 89 (E-Suppl. 1): 313.



http://www.ars.usda.gov/main/docs.htm?docid=8519


Start
Read Input
Initialization
Setup Machinery
Farm Parameter File
Machinery Parameter File
Read Weather
Weather Data File
Spring Operations
Growth and Harvest
Storage
Herd and Feeding
Manure Handling
Fall Operations
Economic Analysis
Annual Loop
Yes
Another Year?
No
Summarize Output
Output Files
End

Case Study


446 ac
(70 rented)
Shallow Clay Loam
Alfalfa
141
Oats
28
Soybeans
17
Grass
70
Corn
190
75 Holstein
Manure
Scrapped
5 Tractors
66 Heifers
Tie Stall
Milk @ $15.88

Some Additional Info

Crops and Soils

- **Alfalfa**: hay and silage.
  54 N and 138 P.
- **Grass**: hay and grazed.
- Corn: silage and grain.
  130 N, 13 P, 5 K, and manure.
- **Oats**: grain and bedding.
  100 N.
- **Soybeans**: grain.
  No fertilization.
- **Soil water holding**: 2.36 in
- **Soil evap. Coeff.**: 74.92 lb/ft^3
- **Soil pH**: 6.5

Herd & Manure

- 43% first lactation
- Grain and silage fed with loader and mixer
- Diet formulated to 100% NRC requirements
- Forage to grain ratio: low
- Bedding type: straw (5.4 lb/day)
- Manure hauling average distance 1 mile
- No exported or imported manure
- …

Average results

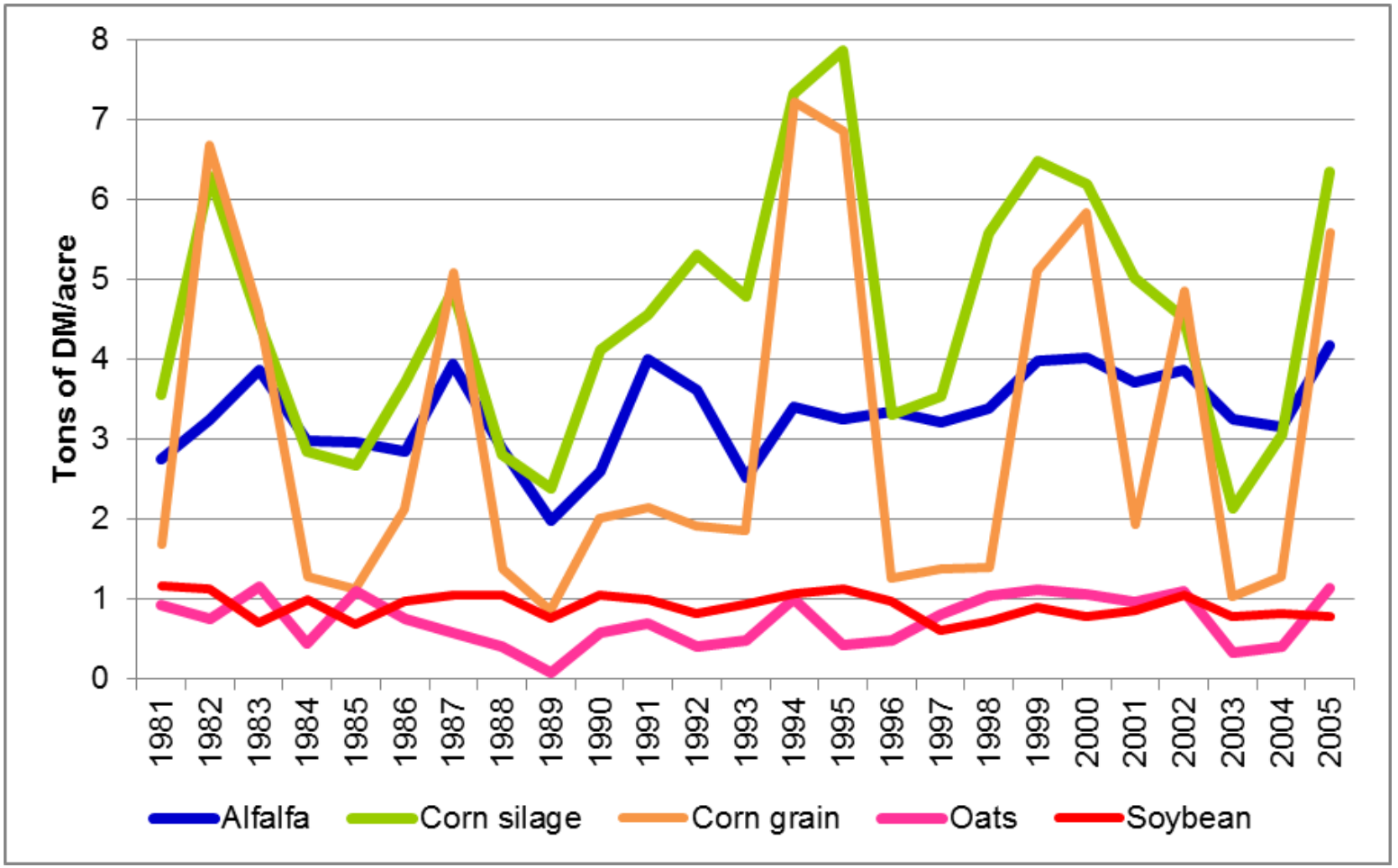
Crop and Milk Yield

- Crops (Ton DM/ac)
  - Alfalfa: 3.32
  - Corn silage: 4.56
  - Corn grain: 4.88
  - Oats: 0.73
  - Soybeans: 0.92
- Milk (lb/cow/year)
  - 22,825

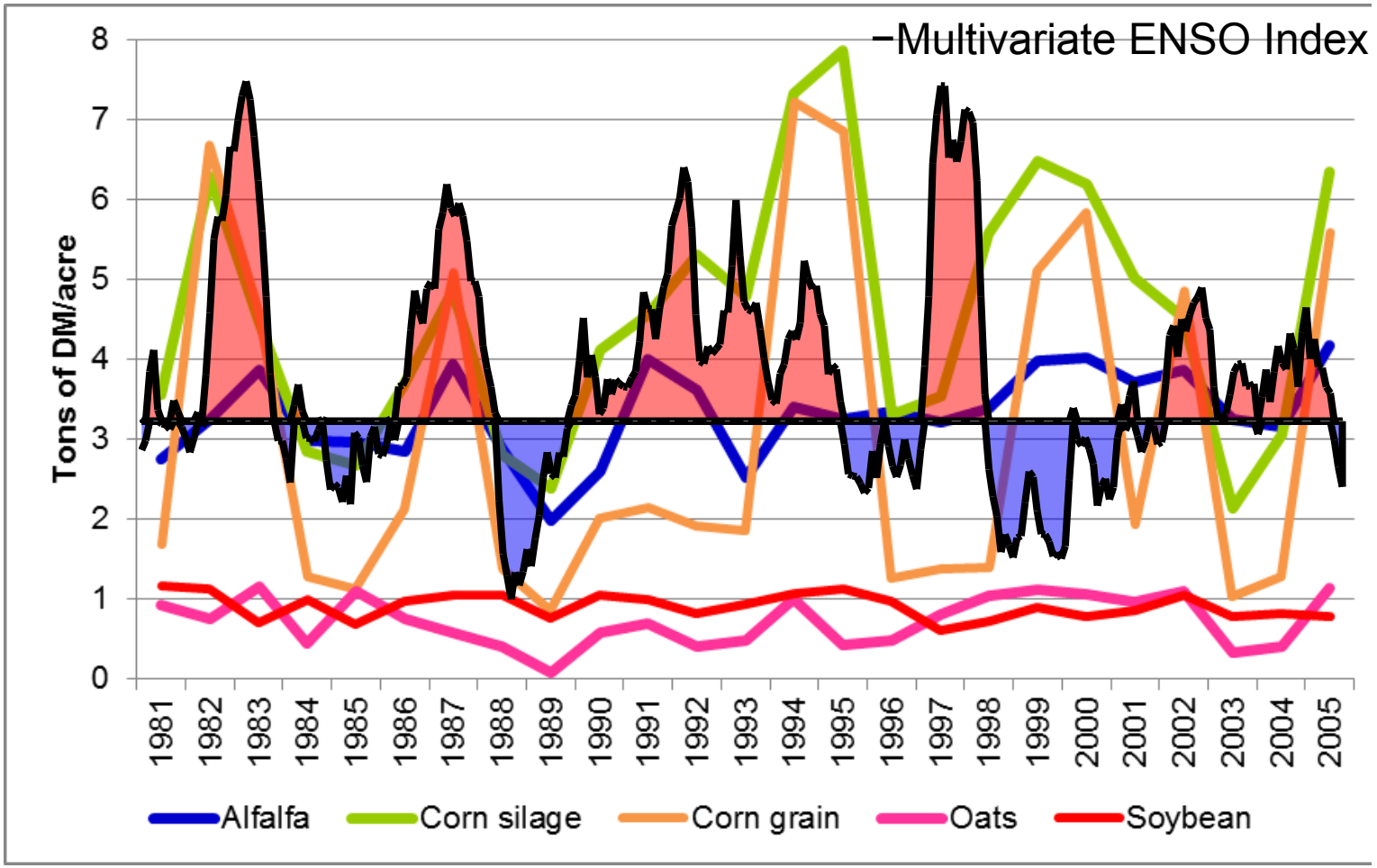
Economics and Environment

- Net income over feed and manure cost
  - $77,920/year
  - $1,039/cow/year
- N lost by leaching
  - 64.1 lb/ac
- Green House Gas Emission
  - 1,027,050 lb CO_2e/year
  - 13,694 lb CO_2e/cow/year

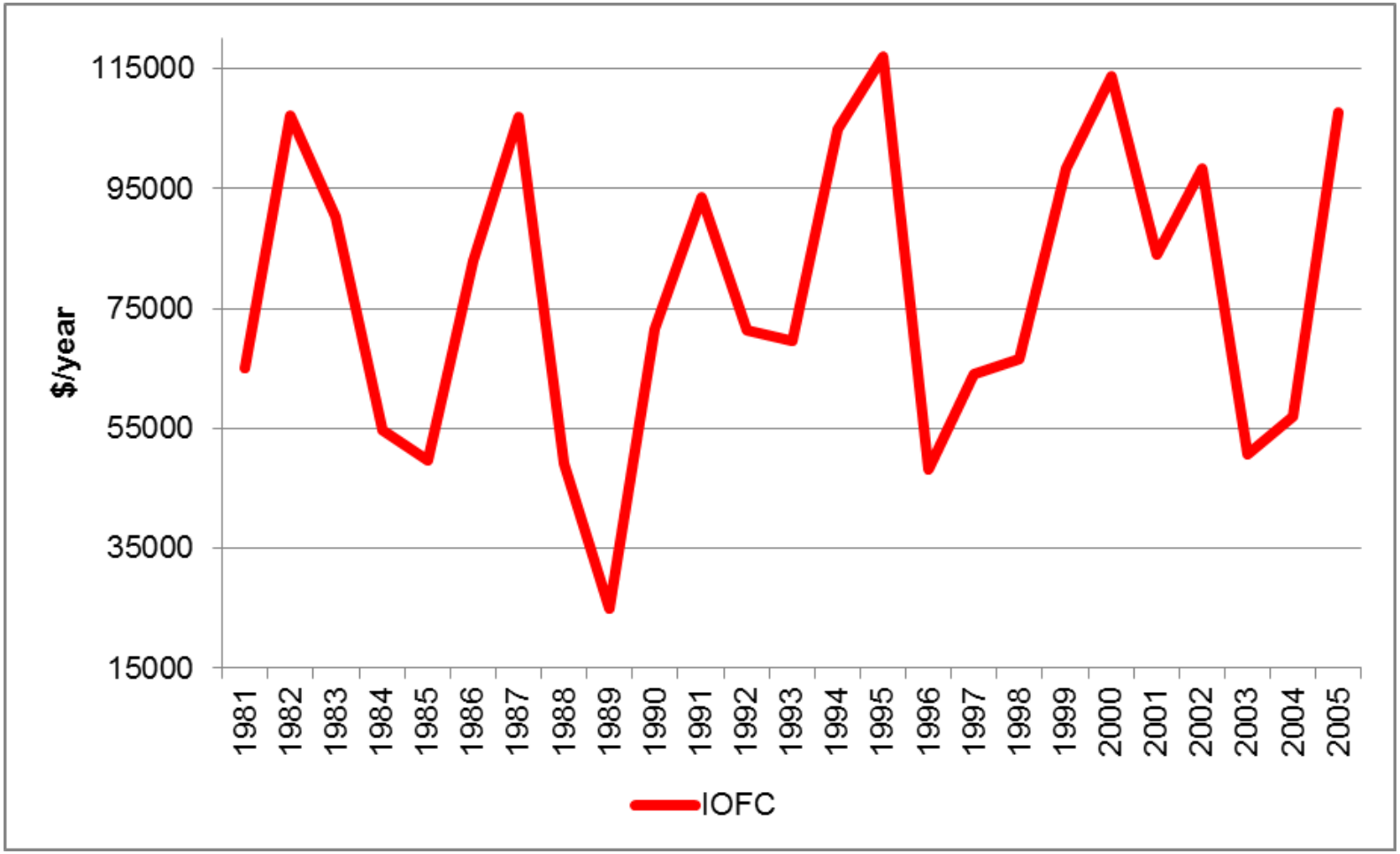
CROP PRODUCTION



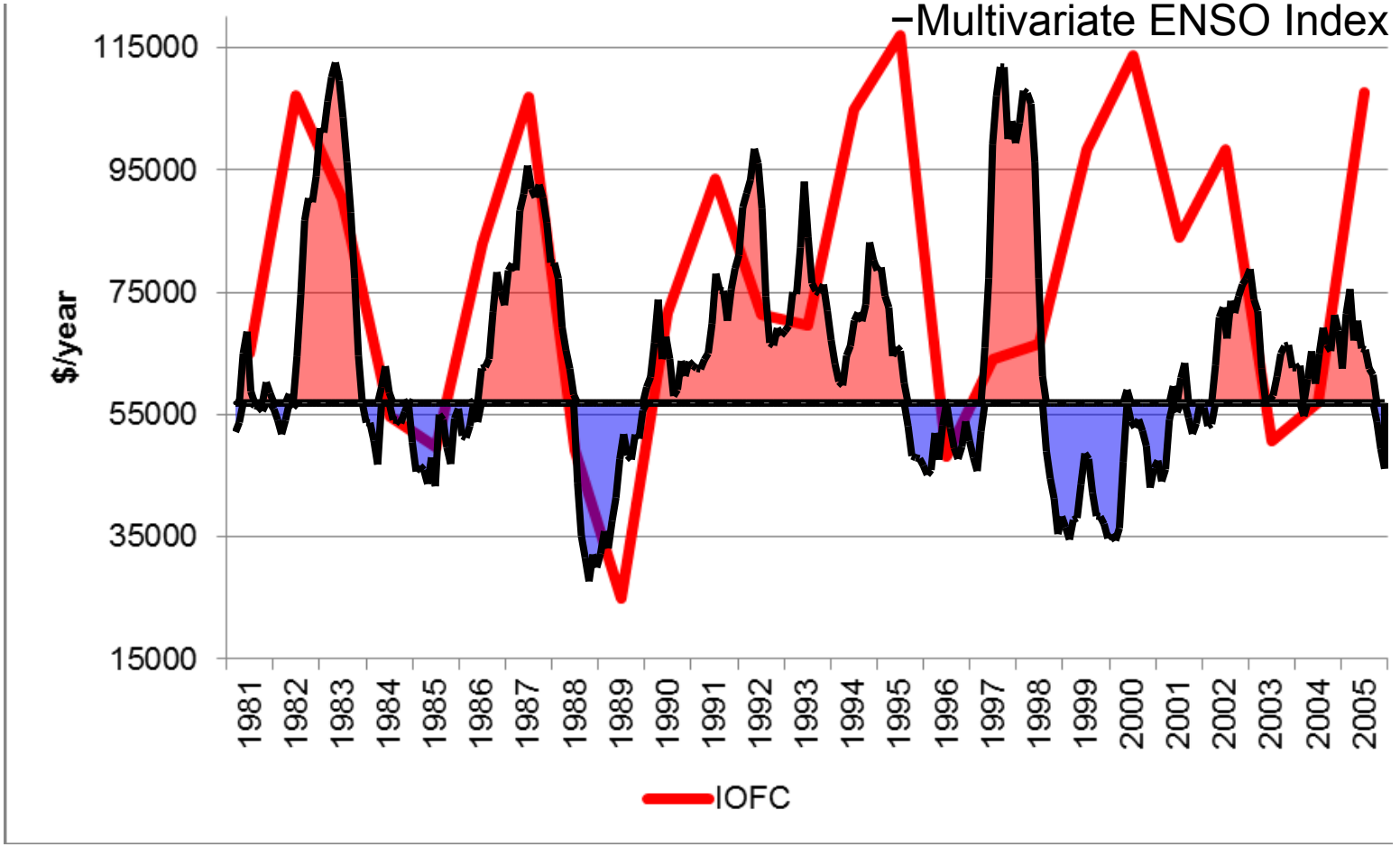
CROP PRODUCTION & ENSO



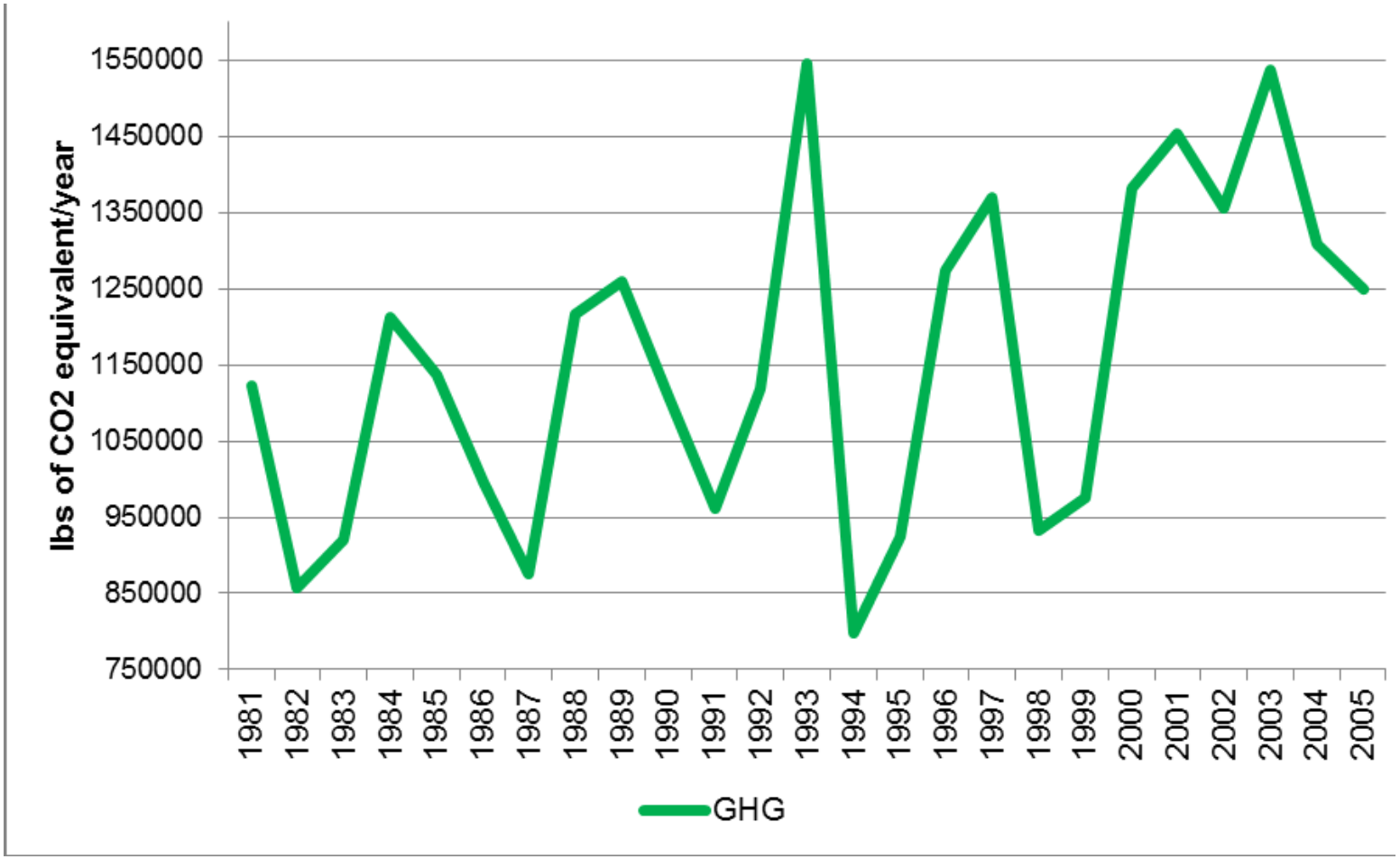
INCOME OVER FEED COST



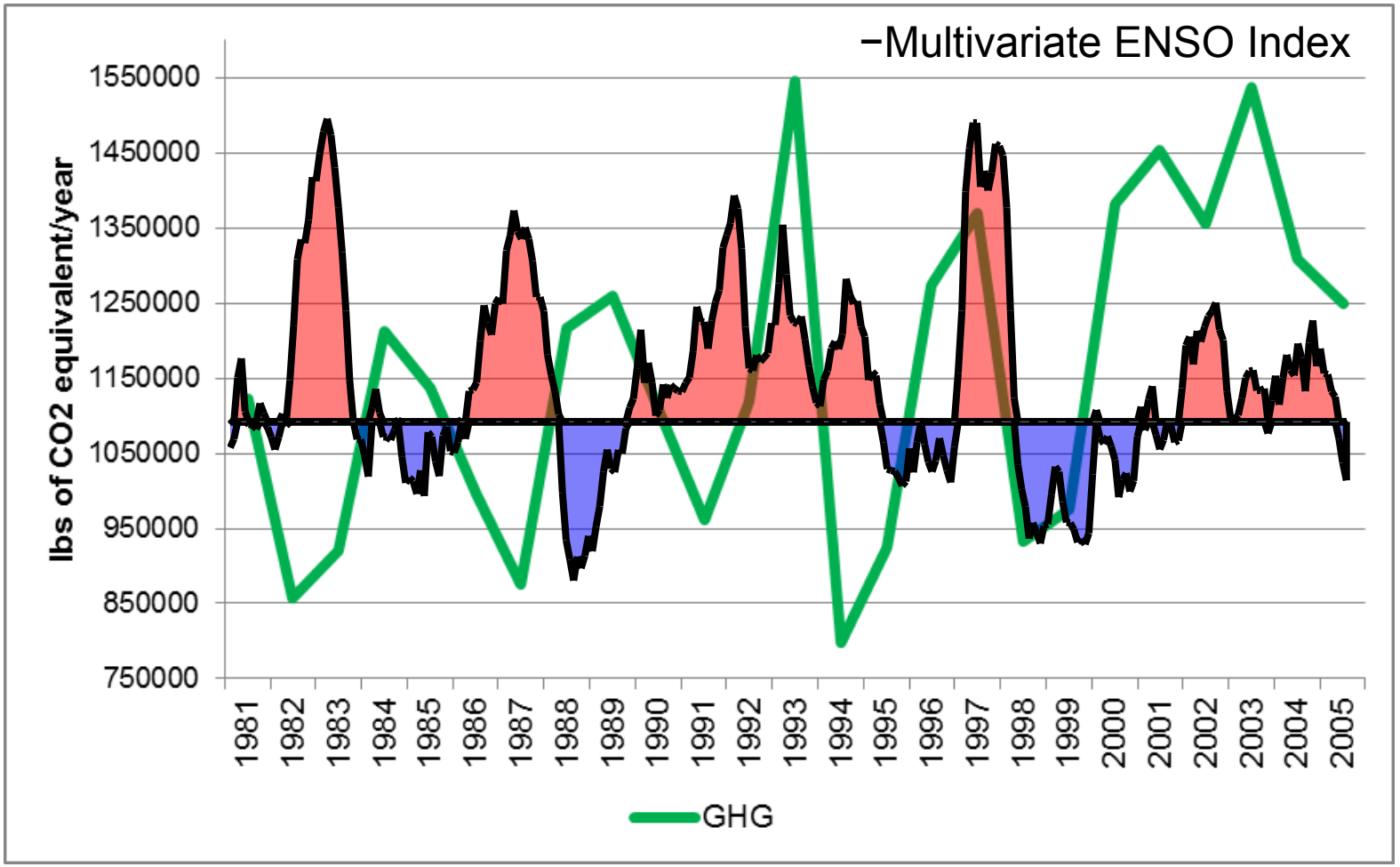
IOFC & ENSO


Multivariate ENSO Index
115000
95000
75000
55000
35000
15000
$/year
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
IOFC

GREEN HOUSE GAS



GHG & ENSO


−Multivariate ENSO Index
lbs of CO2 equivalent/year
1550000
1450000
1350000
1250000
1150000
1050000
950000
850000
750000
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
GHG

Wisconsin: Decision Support Tools

Dairy Management

Dairy Management site is designed to support dairy farming decision-making focusing on model-based scientific research. The ultimate goal is to provide user-friendly computerized decision support systems to help dairy farms improve their economic performance. Dr. Victor Cabrera focuses on model-based decision support in dairy cattle and in dairy farm production systems. Dr. Cabrera's primary interest is to improve cost-efficiency and profitability along with environmental stewardship in dairy farms using simulation techniques, artificial intelligence, and expert systems. Dr. Cabrera's research and Extension programs involve interdisciplinary and participatory approaches towards the creation of user-friendly decision support systems. As an Extension Specialist, Dr. Cabrera works in close relationships with county-based Extension faculty, dairy producers, consultants, and related industry.

Latest Projects

- Dairy Cow Fertility
- Strategies of Pasture Supplementation
- Success for Small Dairy Farmers
- LGM-Dairy
- Dairy Economic Decision Support System

UW

- University of Wisconsin - Madison
- UW - Cooperative Extension
- UW - Dairy Science
- Understanding Dairy Markets
- UW Dairy Nutrient
- UW Center for Dairy Profitability

Dairy News

- UW-Extension Dairy News

Important Announcement

- New Graduate Student Position

Contact

Assistant Professor Extension Specialist Dairy Management
279 Animal Sciences
1675 Observatory Dr.
Madison, WI 53706
(608) 265-8506
vcabrera@wisc.edu
Professional Page

Victor E. Cabrera, Ph.D.

Admin Portal

Click Above to reach the Administrator Portal.

TOOLS

★ Dairy Management Tools

Click to find out more about tools provided by DairyMGT

READ MORE

Thanks!