University of Wisconsin Dairy Management

The Economic Value of Improving Reproductive Efficiency

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USDA
United States Department of Agriculture
National Institute of Food and Agriculture

UW Extension
University of Wisconsin–Extension

Introduction

→ Producers do not know the economic value of reproductive efficiency

Introduction

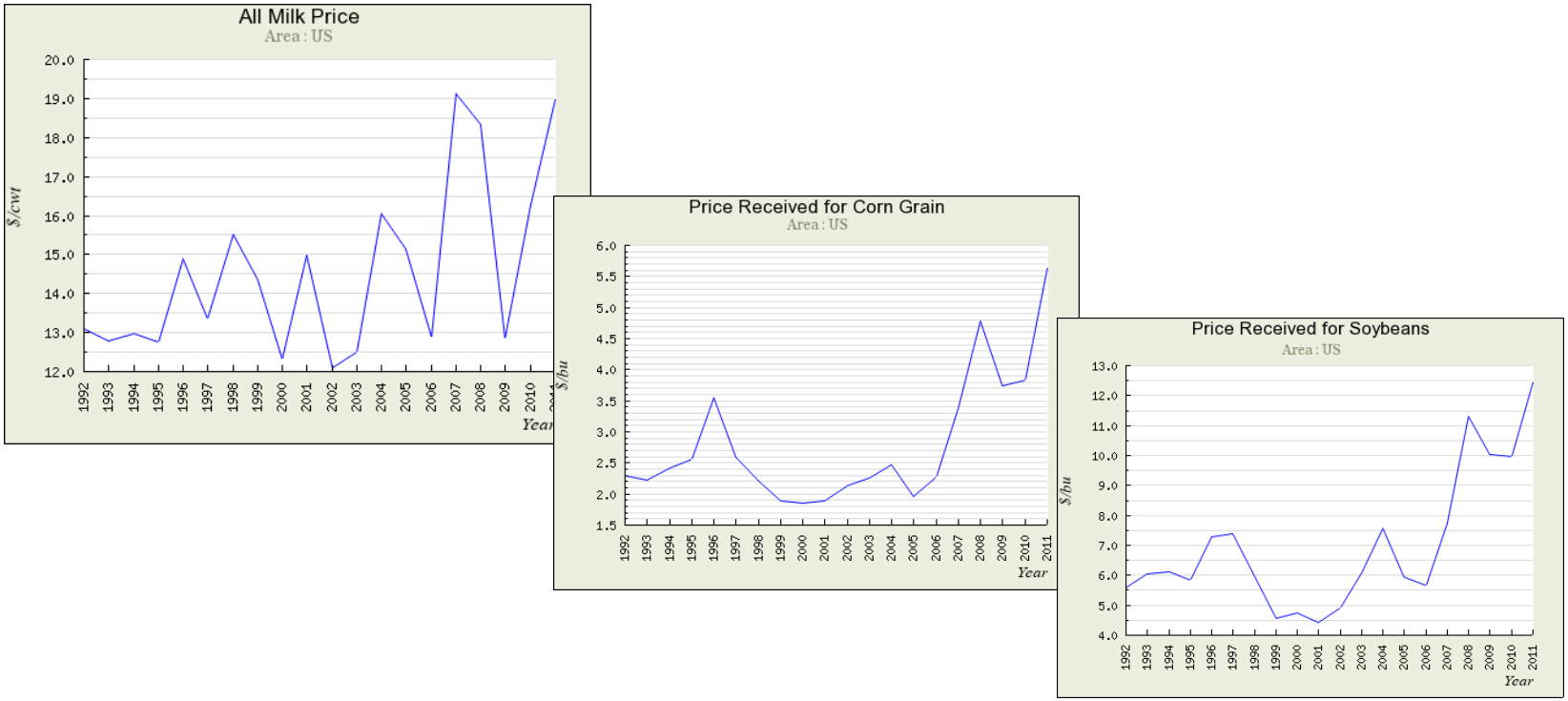
→ Economic value's calculation is complex

Introduction

→Economic value is farm specific

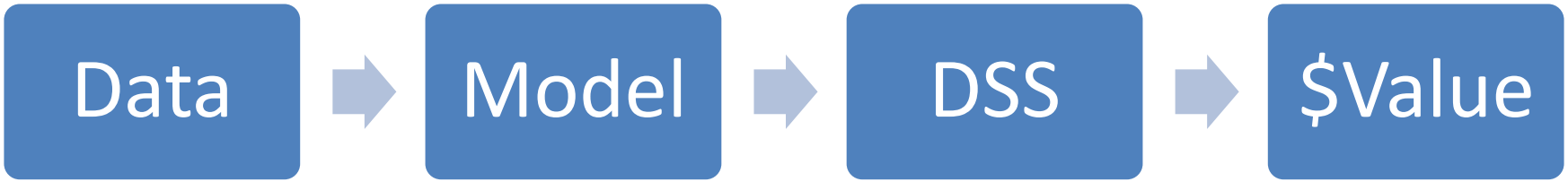
Introduction

→Economic value is market dependent



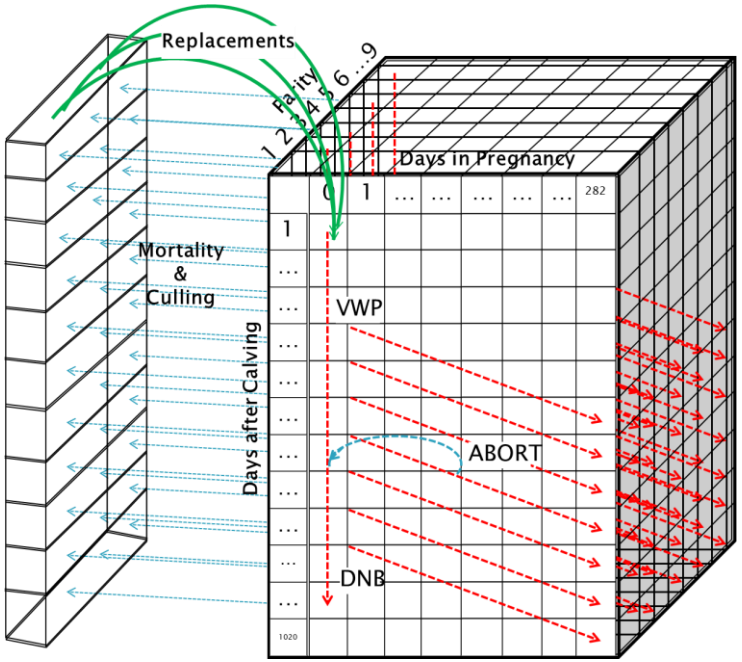
Objective

→ Develop a decision support tool to assess the economic value of reproductive programs



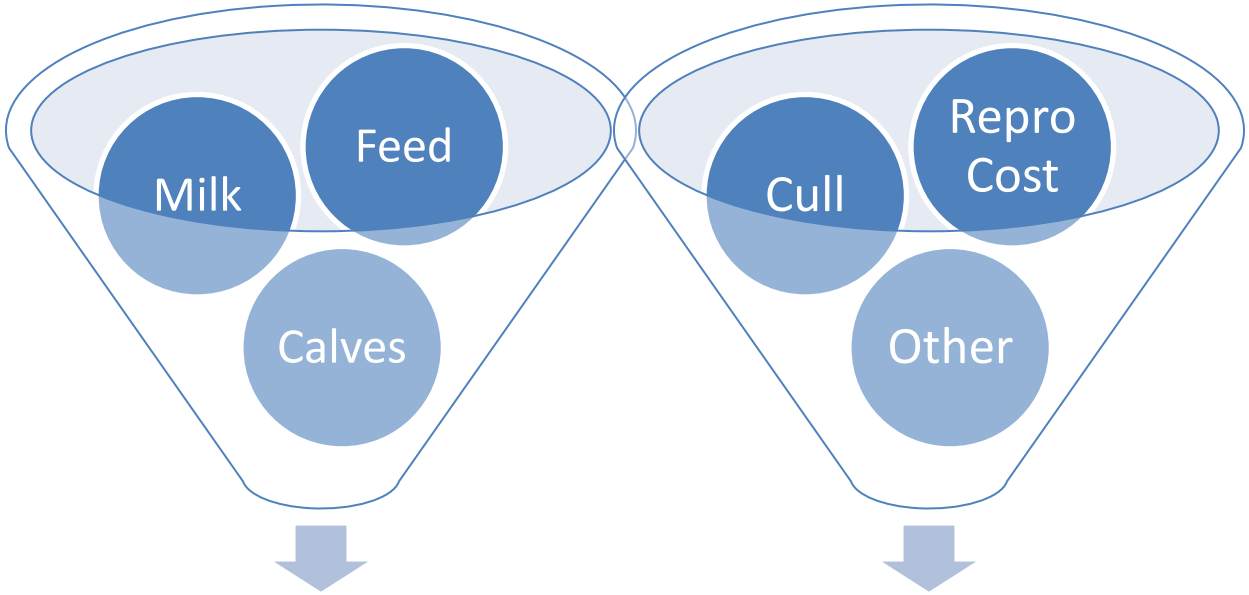
Approach

→ Predict herd structure resulting from a reproductive program



Approach

→Aggregate the economic value of all animals in the herd



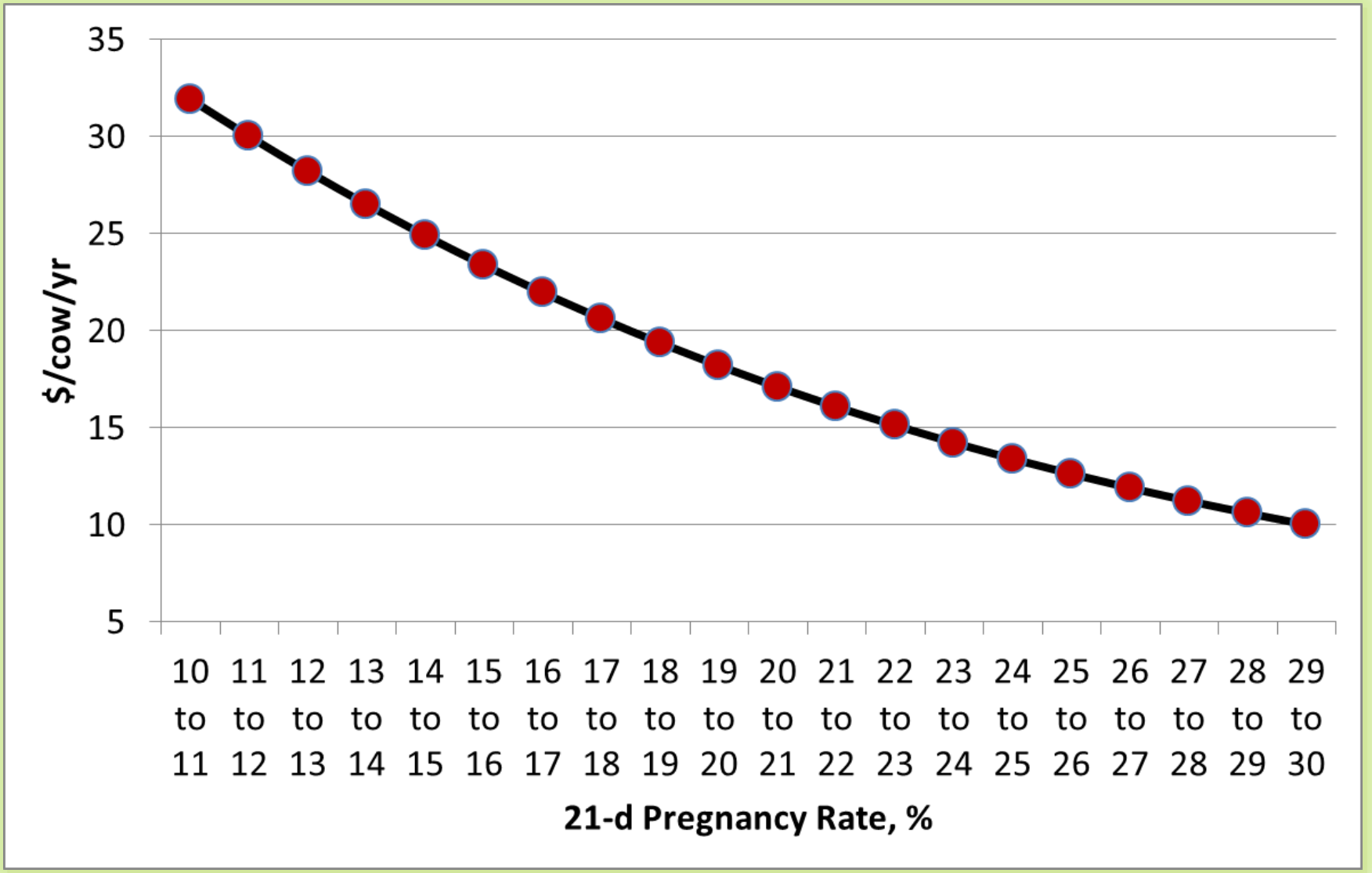
$ Economic Value Repro Programs

Results

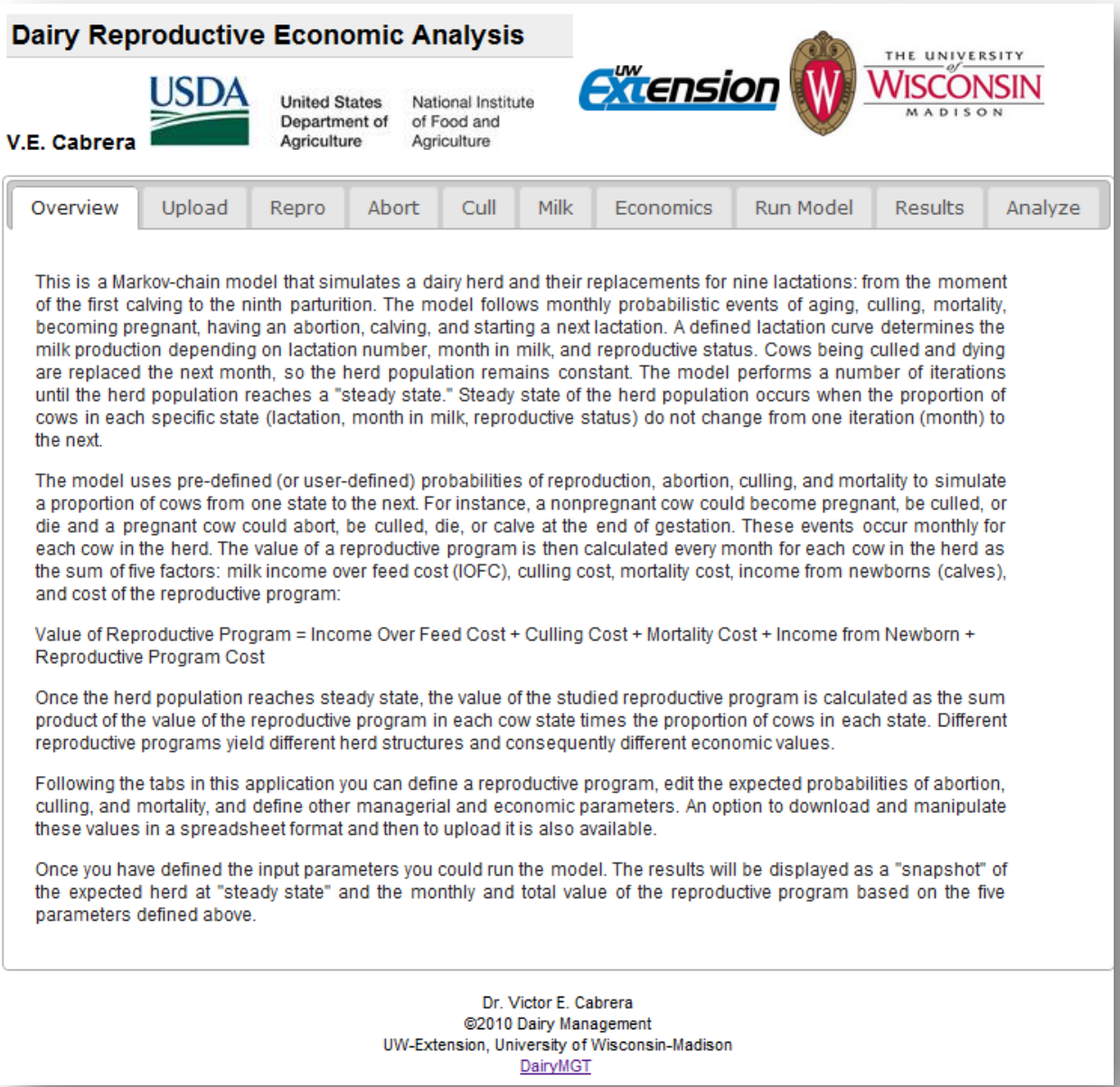
Goal 21-d PR (%) \ Current 21-d PR (%)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
11	32																			
12	62	30																		
13	90	58	28																	
14	117	85	55	26																
15	141	110	80	51	25															
16	165	133	103	75	48	23														
17	187	155	125	97	70	45	22													
18	207	176	145	117	91	66	43	21												
19	227	195	165	137	110	85	62	40	19											
20	245	213	183	155	128	103	80	58	38	18										
21	262	230	200	172	145	121	97	75	55	35	17									
22	278	246	216	188	162	137	113	91	71	51	33	16								
23	293	261	231	203	177	152	128	106	86	66	48	31	15							
24	307	276	246	217	191	166	143	121	100	81	62	45	29	14						
25	321	289	259	231	204	179	156	134	113	94	76	59	43	28	13					
26	333	302	272	243	217	192	169	147	126	107	89	71	55	40	26	13				
27	345	313	283	255	229	204	181	159	138	119	100	83	67	52	38	25	12			
28	357	325	295	266	240	215	192	170	149	130	112	95	78	63	49	36	23	11		
29	367	335	305	277	251	226	202	180	160	140	122	105	89	74	60	46	34	22	11	
30	377	345	315	287	261	236	212	190	170	150	132	115	99	84	70	56	44	32	21	10

Value ($/cow/yr) of improving 21-d PR

Results


35
30
25
20
15
10
5
$/cow/yr
10 to 11
11 to 12
12 to 13
13 to 14
14 to 15
15 to 16
16 to 17
17 to 18
18 to 19
19 to 20
20 to 21
21 to 22
22 to 23
23 to 24
24 to 25
25 to 26
26 to 27
27 to 28
28 to 29
29 to 30
21-d Pregnancy Rate, %

Decision Support System



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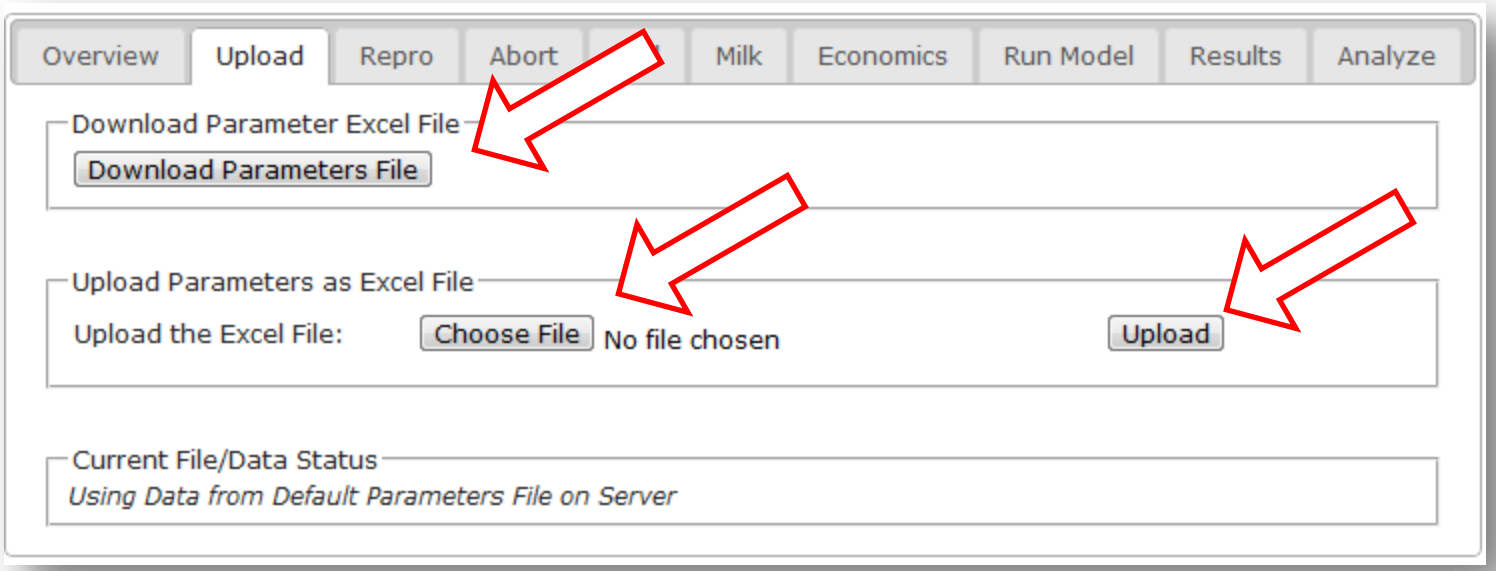
Tools

Reproduction

Decision Support System



Decision Support System

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

Month in Milk	Lactation 1		Lactation 2		Lactation 3		Lactation 4		Lactation 5		Lactation 6		Lactation 7		Lactation 8		Lactation 9	
	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo	Preg Per Month (%/mo)	Cost Per Month $/cow/mo
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
3	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
4	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
5	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
6	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
7	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
8	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
9	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
10	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
11	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25	18	25
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Decision Criteria for Reproductive Failure Culling

Month in lactation (threshold) to stop reproductive services (MIM)	11
Minimum amount of milk (threshold) produced (lb/cow/day)	50

Decision Support System

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

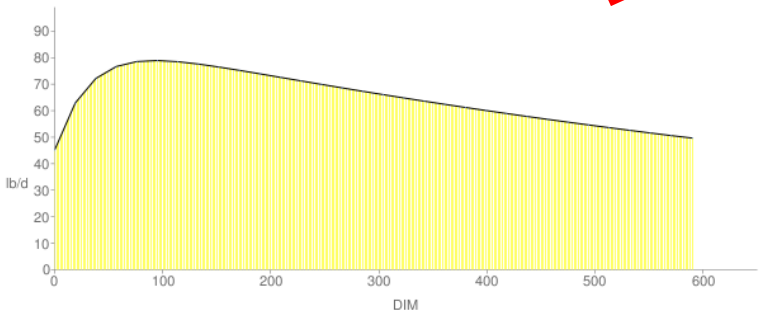
MilkBot Lactation Curves Parameters by Lactation *Milkbot*				
	a=Scale	b=Ramp	c=Offset	d=Decay
Lactation 1	66.4242290	14.6841	-2.4854	0.001005
Lactation 2	107.669823	16.2648	0.0147	0.001757
Lactation 3	132.005066	23.2079	2.5848	0.001922
Lactation 4	132.005066	23.2079	2.5848	0.001922
Lactation 5	132.005066	23.2079	2.5848	0.001922
Lactation 6	132.005066	23.2079	2.5848	0.001922
Lactation 7	132.005066	23.2079	2.5848	0.001922
Lactation 8	132.005066	23.2079	2.5848	0.001922
Lactation 9	132.005066	23.2079	2.5848	0.001922

Month in Pregnancy	Decrease in Milk
1	0
2	0
3	0
4	0
5	5
6	10
7	15
8	30
9	45

Test Lactation Curve Parameters

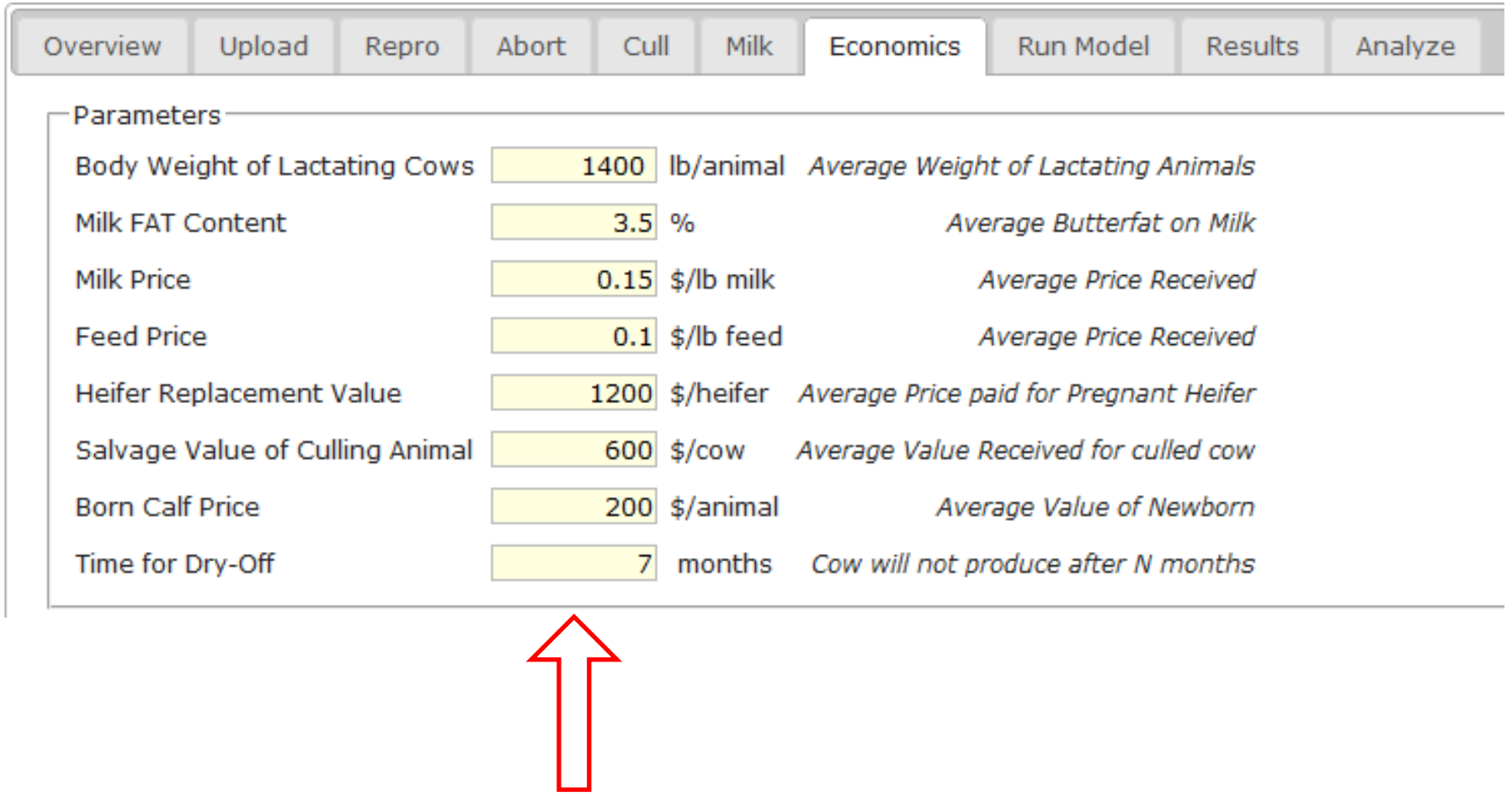
Scale	89.5968
Ramp	34.194
Offset	0.6591
Decay	0.001

Plot



For more information please visit *Exploring Pregnancy Timing on Income Over Feed Cost*

Decision Support System



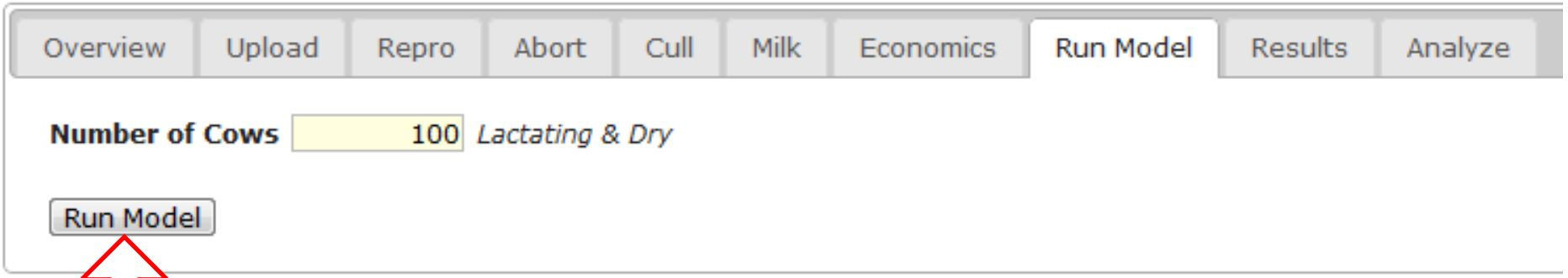
Decision Support System

Dairy Reproductive Economic Analysis

United States Department of Agriculture

National Institute of Food and Agriculture

V.E. Cabrera



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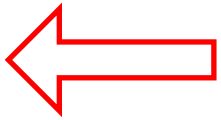
Decision Support System

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

Total Number of Cows	**100**
Iterations Performed	**737**
Reached Steady State	**YES**



	Total Revenues & Costs				
	IOFC	**Cull**	**Repro**	**Calves**	**Net Return**
$/herd/month	15128.81	-1353.02	-932.8	1048.08	13891.07
$/herd/day	504.29	-45.1	-31.09	34.94	463.04
$/cow/year	1840.67	-164.62	-113.49	127.52	1690.08

Decision Support System

Month in Milk	Month in Pregnancy												Revenues & Costs ($)			
	0	1	2	3	4	5	6	7	8	9						
	Lactation 1										Cull Cows		IOFC	Cull	Repro	Calves
1	3.54										0.14		422.47	-69.93	0.00	0.00
2	3.39										0.09		489.30	-45.44	84.80	0.00
3	2.70	0.59									0.06		466.27	-27.96	67.62	0.00
4	2.17	0.48	0.59								0.05		438.04	-24.08	54.34	0.00
5	1.77	0.38	0.47	0.57							0.04		410.78	-20.87	44.17	0.00
6	1.45	0.31	0.38	0.46	0.55						0.04		385.40	-19.18	36.26	0.00
7	1.20	0.26	0.31	0.37	0.44	0.54					0.04		358.39	-18.42	29.94	0.00
8	0.99	0.21	0.25	0.30	0.35	0.43	0.53				0.04		330.60	-17.73	24.73	0.00
9	0.82	0.17	0.21	0.24	0.29	0.35	0.43	0.53			0.04		302.77	-17.76	20.42	0.00
10	0.67	0.14	0.17	0.20	0.24	0.28	0.34	0.42	0.52		0.04		190.20	-18.69	16.84	0.00
11	0.55	0.12	0.14	0.17	0.20	0.23	0.28	0.34	0.42	0.52	0.58		102.51	-20.39	13.84	103.04
12	0.01		0.12	0.14	0.16	0.19	0.23	0.28	0.34	0.41	0.03		29.79	-8.72	0.00	82.79
13	0.01			0.11	0.13	0.16	0.19	0.23	0.27	0.33	0.03		13.03	-6.91	0.00	66.52
14	0.01				0.11	0.13	0.16	0.19	0.22	0.27	0.02		0.47	-5.37	0.00	54.08
15	0.00					0.11	0.13	0.15	0.19	0.22	0.01		-8.44	-4.10	0.00	44.37
16	0.00						0.11	0.13	0.15	0.18	0.01		-14.17	-3.05	0.00	36.57
17	0.00							0.10	0.13	0.15	0.00		-17.51	-2.18	0.00	30.16
18	0.00								0.10	0.12	0.00		-19.11	-1.41	0.00	24.85
19	0.00									0.10	0.00		-8.57	-0.68	0.00	20.41
20											0.00		0.00	0.00	0.00	0.00
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

Decision Support System

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Find the economic value of improving reproductive performance

	21-d Preg Risk (%)	Repro Cost ($/cow/mo)
Current Repro Program	18	25
Goal Repro Program	21	25

Analyze

Analysis Results

Program	21-d Preg Risk (%)	Repro Cost ($/cow/mo)	IOFC ($/cow/year)	Cull ($/cow/year)	Repro ($/cow/year)	Calves ($/cow/year)	Net Return ($/cow/year)
Current Repro Program	18	25	1840.67	-164.62	-113.49	127.52	1690.08
Goal Repro Program	21	25	1873.33	-160.64	-103.79	135.83	1744.72

Economic value of improving pregnancy risk from 18% to 21% is $54.64/cow/year.

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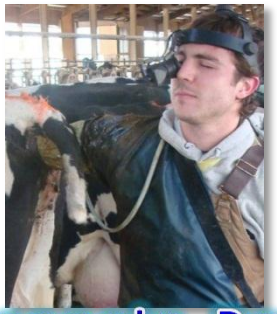


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