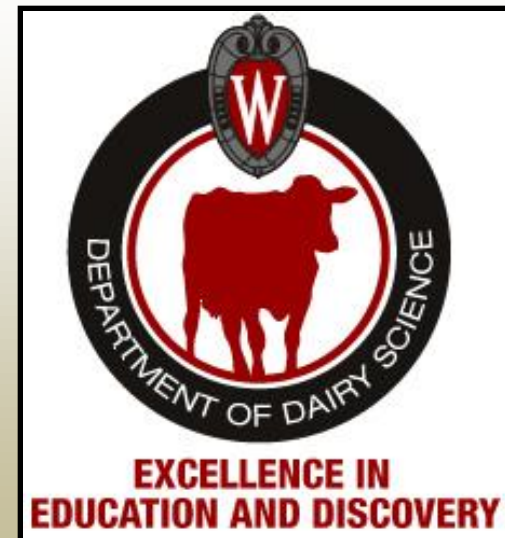


Economical Analysis of Reproductive Management Programs in Dairy Farms

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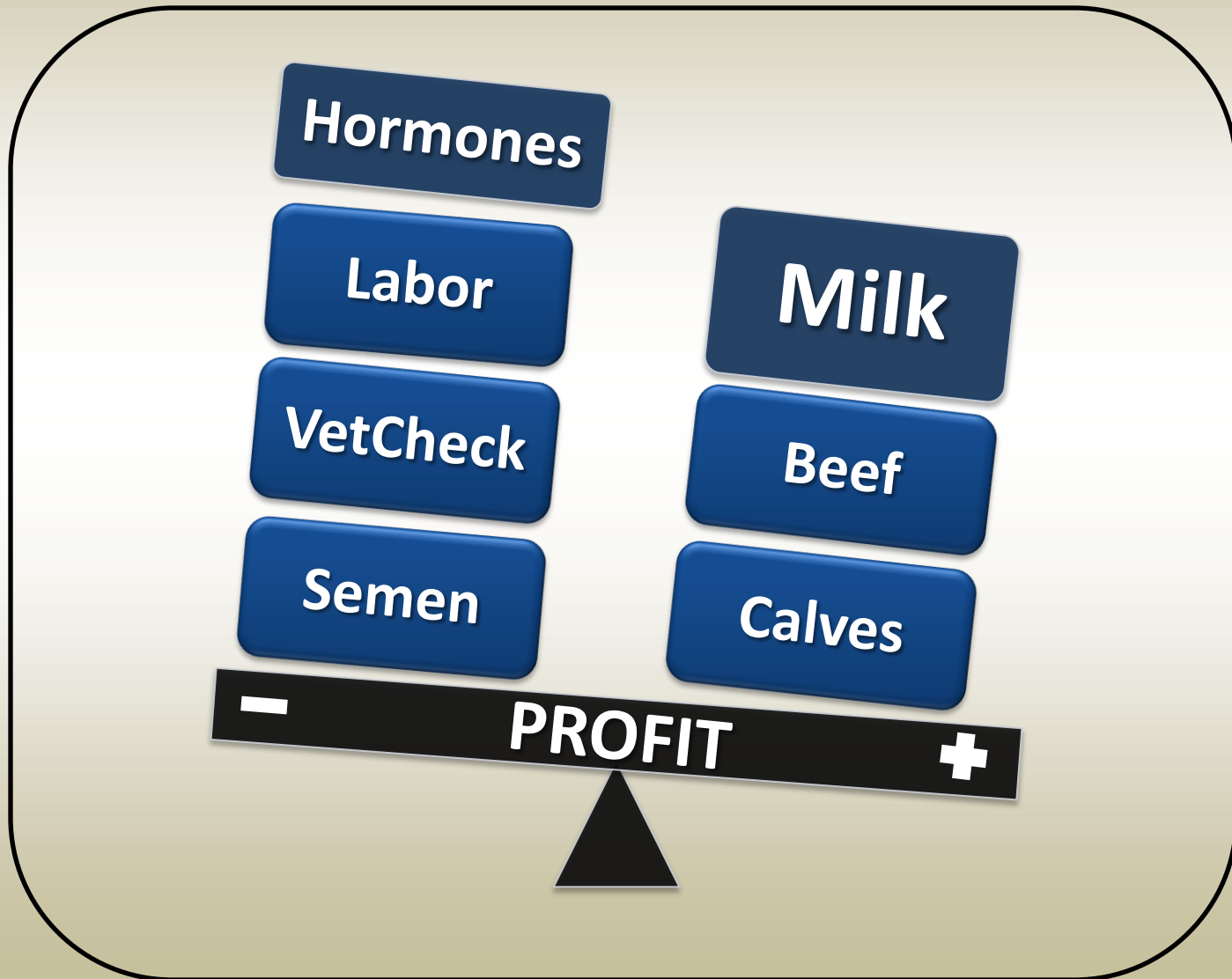


Goal

Create a tool that allows
“economic” decision-making for
selection of reproductive
management programs in dairy
farms



Repro Economic Analysis

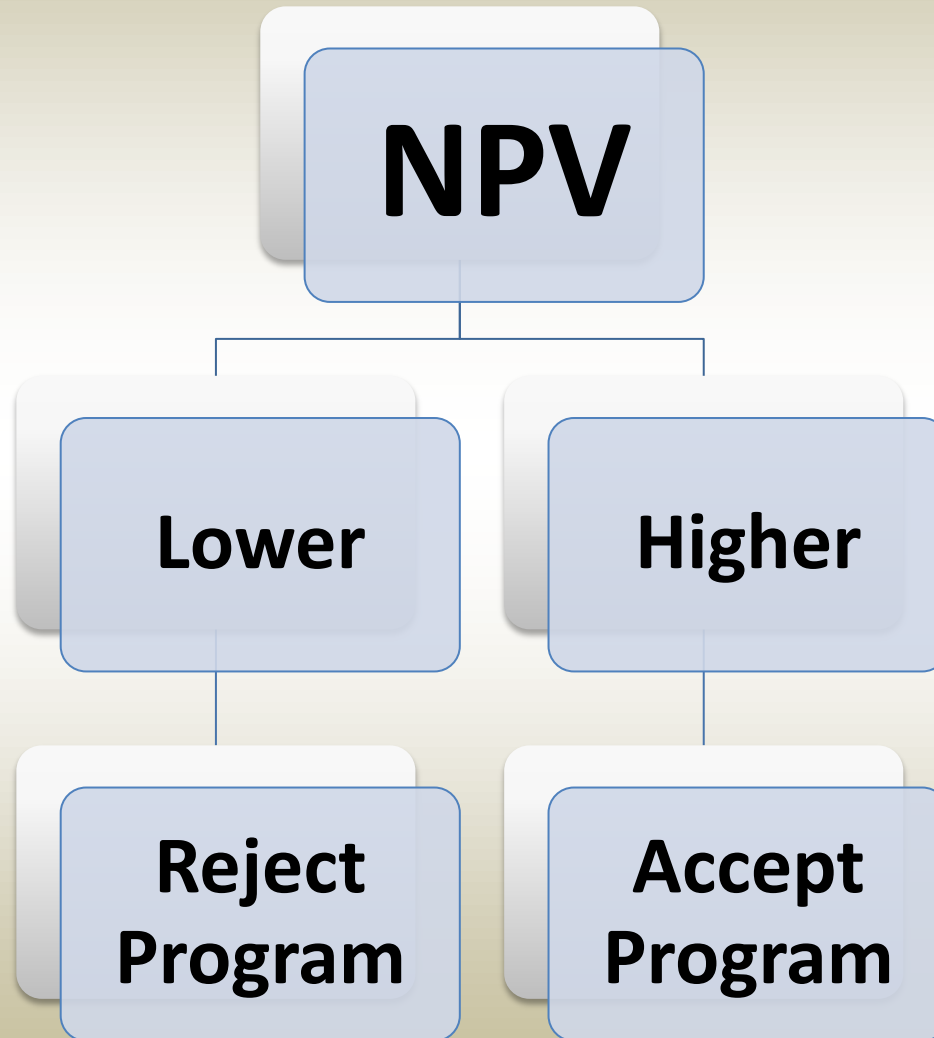


Net Present Value

- **Difference between the present value of cash inflows and the present value of cash outflows**
- **Used in capital budgeting to analyze the profitability of an investment or project**



Net Present Value



Equations

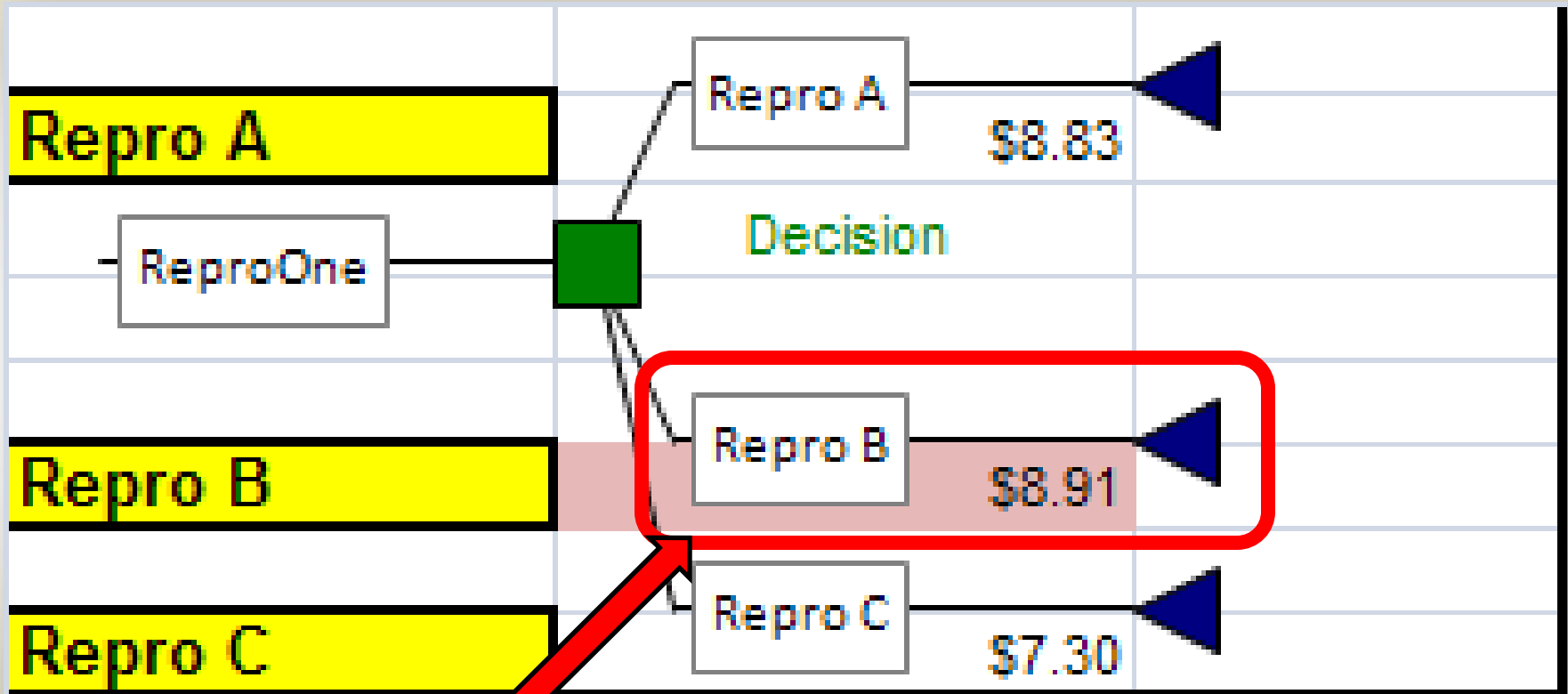
$$EMVi = MPVi + VNBi - VCPI - FCPI - CCI$$

$MPVi$ = milk revenue when pregnancy occurs in service i (\$/d)

	Lactation	Milk	Milk	Dry Matter Intake	EMV	MPVi	VNBi	VCPI	FCPI	CCI
	wo/dry period	production	production	DMI						
Days Open (d)	(d)	lb/lactation	lb/d	lb DMI	(\$/d)	(\$/d)	(\$/d)	(\$/d)	(\$/d)	(\$/d)
50	270	32212	119.30	8939	\$9.45	\$13.67	\$0.76	\$2.98	0.53	\$1.47
70	290	34303	118.29	9519	\$9.49	\$13.72	\$0.71	\$2.99	0.50	\$1.45
90	310	36371	117.32	10093	\$9.53	\$13.76	\$0.68	\$3.00	0.47	\$1.44
110	330	38316	116.11	10633	\$9.52	\$13.75	\$0.64	\$3.00	0.45	\$1.43
130	350	40221	114.92	11161	\$9.51	\$13.73	\$0.61	\$2.99	0.42	\$1.42
150	370	42086	113.75	11679	\$9.48	\$13.70	\$0.58	\$2.99	0.40	\$1.41
170	390	43780	112.26	12149	\$9.41	\$13.62	\$0.56	\$2.97	0.39	\$1.41
190	410	45446	110.84	12611	\$9.34	\$13.54	\$0.53	\$2.95	0.37	\$1.41
210	430	47084	109.50	13066	\$9.26	\$13.45	\$0.51	\$2.93	0.36	\$1.42
230	450	48588	107.97	13483	\$9.16	\$13.34	\$0.49	\$2.91	0.34	\$1.42
250	470	50035	106.46	13885	\$9.05	\$13.22	\$0.47	\$2.88	0.33	\$1.43
270	490	51425	104.95	14270	\$8.94	\$13.09	\$0.45	\$2.85	0.32	\$1.43



Decision Tree



Most Profitable Program !!!

Data Inputs



General Economic and Productive Parameters

1. Define Economic/Productive Parameters

Milk Price (\$/lb)	\$0.14	
RHA (lb/cow/yr)	30000	
Parity (#)	All	<input checked="" type="checkbox"/> Use own lactation
Average Cow BW (lb)	0	
Dry period (d)	60	
Fixed cost lactation (\$/d)	\$0.0	
Fixed cost dry period (\$/d)	\$2.9	
Involuntary Culling Rate (%)	25.00%	
Value of new born (\$)	\$250.00	
Slaughter value(\$)	\$575	
Value of heifer replacement (\$)	\$1,600	
Interest (yr)	5%	

2. Cost of Diet for Lactating Cows

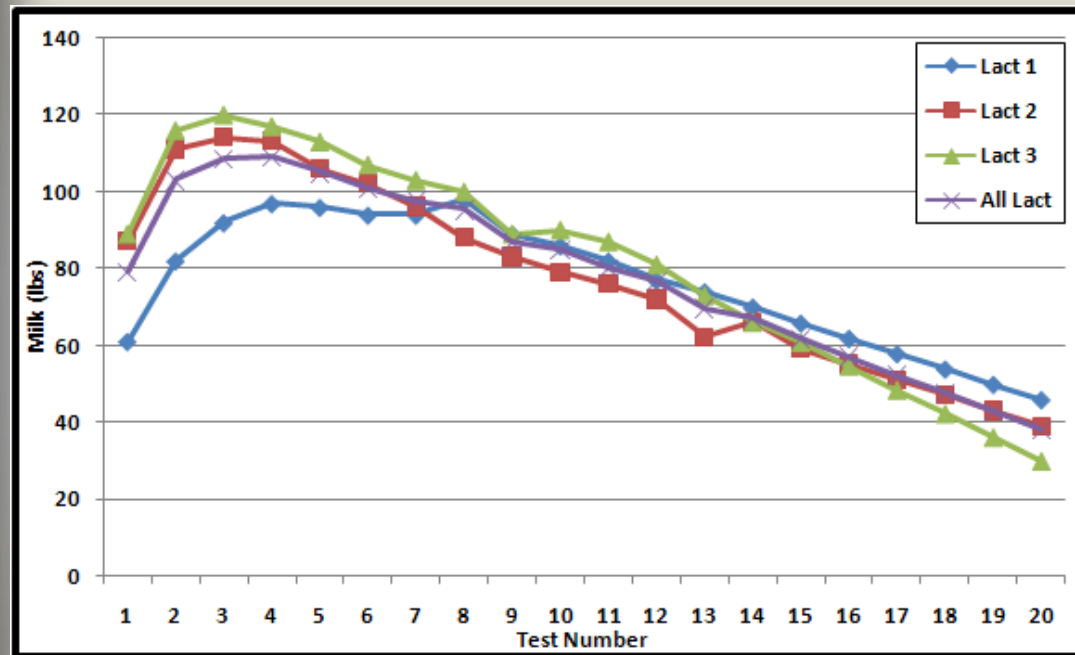
	\$/lb
Dry Matter	0.110



Lactation Curve Information

Lactation Curve Input table

Test	DIM	Lact 1	Lact 2	Lact >3	All
1st	15	61	87	89	79
2nd	45	82	111	116	103
3rd	75	92	114	120	109
4th	105	97	113	117	109
5th	135	96	106	113	105
6th	165	94	102	107	101
7th	195	94	96	103	98
8th	225	98	88	100	95
9th	255	89	83	89	87
10th	285	86	79	90	85
11th	315	82	76	87	80
12th	345	77	72	81	77
13th	375	74	62	73	70
14th	405	70	66	66	67
15th	435	66	59	61	62
16th	465	62	55	55	57
17th	495	58	51	48	52
18th	525	54	47	42	48
19th	555	50	43	36	43
20th	585	46	39	30	38



Breeding Cost



Costs of Breeding for Synch and Resynch Programs

		Hormones	Labor	Preg. Diag.	AI	Total Cost
1st service	Double-Ovsynch	\$9.72	\$3.44	\$4.08	\$15.00	\$32.25
ReSynch	Ovsynch	\$4.86	\$1.30	\$4.08	\$15.00	\$25.24
	Heat Breedings	\$0.00	\$0.0431	\$4.08	\$15.00	\$19.08

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Total Cost

\$32.25

\$25.24

\$19.08



Costs of Breeding for Synch and Resynch Programs

Hormonal treatment cost					
Double-Ovsynch					
Hormone					Totals
GnRH	# inject.	4	cost/inject.	\$1.50	\$6.00
PGF	# inject.	2	cost/inject.	\$1.86	\$3.72
CIDR	# units	0	cost/unit	\$6.00	\$0.00
hCG	# inject.	0	cost/inject.	\$3.40	\$0.00
Total cost per service					\$9.72
Ovsynch					
Hormone					Totals
GnRH	# inject.	2	cost/inject.	\$1.50	\$3.00
PGF	# inject.	1	cost/inject.	\$1.86	\$1.86
CIDR	# units	0	cost/unit	\$6.00	\$0.00
hCG	# inject.	0	cost/inject.	\$3.40	\$0.00
Total cost per service					\$5

Costs of Breeding for Synch and Resynch Programs

Labor cost data input table							
<i>Cost associated with labor for administration of hormones</i>							
	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Personnel	3	0	1	0	2	0	0
Hours	3.5	0	1.5	0	3.5	0	0
# of Cows treated	230	0	90	0	105	0	0
Personn*h	126	0	18	0	84	0	0
Cost per cow	0.55	0	0.20	0	0.80	0	0
Double-Ovsynch	3	0	1	0	2	0	0
Ovsynch	2	0	1	0	0	0	0
Double-Ovsynch			3.44		Labor Cost per hour		\$12
Ovsynch			1.30				



Costs of Breeding for Synch and Resynch Programs

Pregnancy Diagnosis

Method				
Palpation	#days	1		
	#hours	3.5		
	cost/h	\$105		
	# of cows	90		
	Total cost per cow			\$4.08
Ultrasound	#days	0		
	#hours	0		
	costs/h	\$0		
	# of cows	0		
	Total cost per cow			\$0.00
Blood Test	Cost per sample	\$0		
	Total cost per cow			\$0.00

Reproductive Parameters

3. Define Reproductive Programs to Compare			
	Repro A	Repro B	Repro C
1 st Service ReSynchs	Double-Ovsynch	Double-Ovsynch	Heat Breeding
	Ovsynch	Double-Ovsynch	Heat Breeding
VWP (Voluntary Waiting Period)	80	80	60
Estrus duration (d)	23	23	23
DIM 1st Service TAI (d)	80	80	
Interval between ReSynchs (d)	42	49	
Heat Bred before 1st TAI (%)	0%	0%	65%
CR Heat Bred before 1st TAI (%)	0%	0%	35%
Heat Bred between ReSynchs (%)	0%	0%	55%
CR Heat Bred between ReSynchs (%)	0%	0%	32%
CR 1st Service TAI	41%	41%	
CR 2nd Service TAI (ReSynch)	28%	32%	
CR 3rd+ Service TAI (ReSynch)	28%	32%	
1 st Service Synch Cost (\$/service)	\$32	\$32	
ReSynch Cost (\$/service)	\$25	\$32	
Heat Breeding Labor Cost (\$/d)	\$0.0431	\$0.0431	\$0.0431
Heat Breeding Cost (\$/service)	\$19	\$20	\$18.68



Reproductive and Economical Outcomes

Repro A	Days Open (d)	Pregnant	Non-Pregnant	Available	AI	Pregnant/Period	Open/Period	EMV (\$/d)	EMV (\$/d/preg)
VWP	80	0.00%	100.00%	100.00%	0.00%				
Heat Bred	80	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%	\$9.47	\$0.00
1st Service	80	41.00%	59.00%	100.00%	100.00%	41.00%	59.00%	\$9.42	\$3.86
Heat Bred	103	41.00%	59.00%	59.00%	0.00%	0.00%	0.00%	\$9.50	\$0.00
2nd Service (ReSynch)	122	57.52%	42.48%	59.00%	59.00%	16.52%	42.48%	\$9.48	\$1.57
Heat Bred	145	57.52%	42.48%	42.48%	0.00%	0.00%	0.00%	\$9.47	\$0.00
3rd Service (ReSynch)	164	69.41%	30.59%	42.48%	42.48%	11.89%	30.59%	\$9.41	\$1.12
Heat Bred	187	69.41%	30.59%	30.59%	0.00%	0.00%	0.00%	\$9.33	\$0.00
4th Service (ReSynch)	206	77.98%	22.02%	30.59%	30.59%	8.56%	22.02%	\$9.26	\$0.79
Heat Bred	229	77.98%	22.02%	22.02%	0.00%	0.00%	0.00%	\$9.15	\$0.00
5th Service (ReSynch)	248	84.14%	15.86%	22.02%	22.02%	6.17%	15.86%	\$9.05	\$0.56
Heat Bred	271	84.14%	15.86%	15.86%	0.00%	0.00%	0.00%	\$8.93	\$0.00
6th Service (ReSynch)	290	88.58%	11.42%	15.86%	15.86%	4.44%	11.42%	\$8.93	\$0.40
								NPV (\$/d)	\$8.83

Results: Farm A=1,000 cows

	Repro A	Repro B	Repro C
NPV(\$/d)	\$ 8.83	\$ 8.91	\$ 7.30

	B - C	B - A
	\$ 1.61	\$ 0.08
Profit (cow/year)	\$ 588 cow/year	\$ 29 cow/year
Profit Herd (year)	\$588,000/year	\$29,200/year



Final Remarks

- **Breeding costs become trivial compared with revenues realized with pregnancy**
- **Reproductive performance has a strong influence in final results**
- **Further validation and refinement are required**
- **Future projects to include more lactations and optimization**



Take Home Message

Money spent to perform a successful reproductive program should not be considered just as cost but rather a profitable long term investment !!!



Questions and Comments

