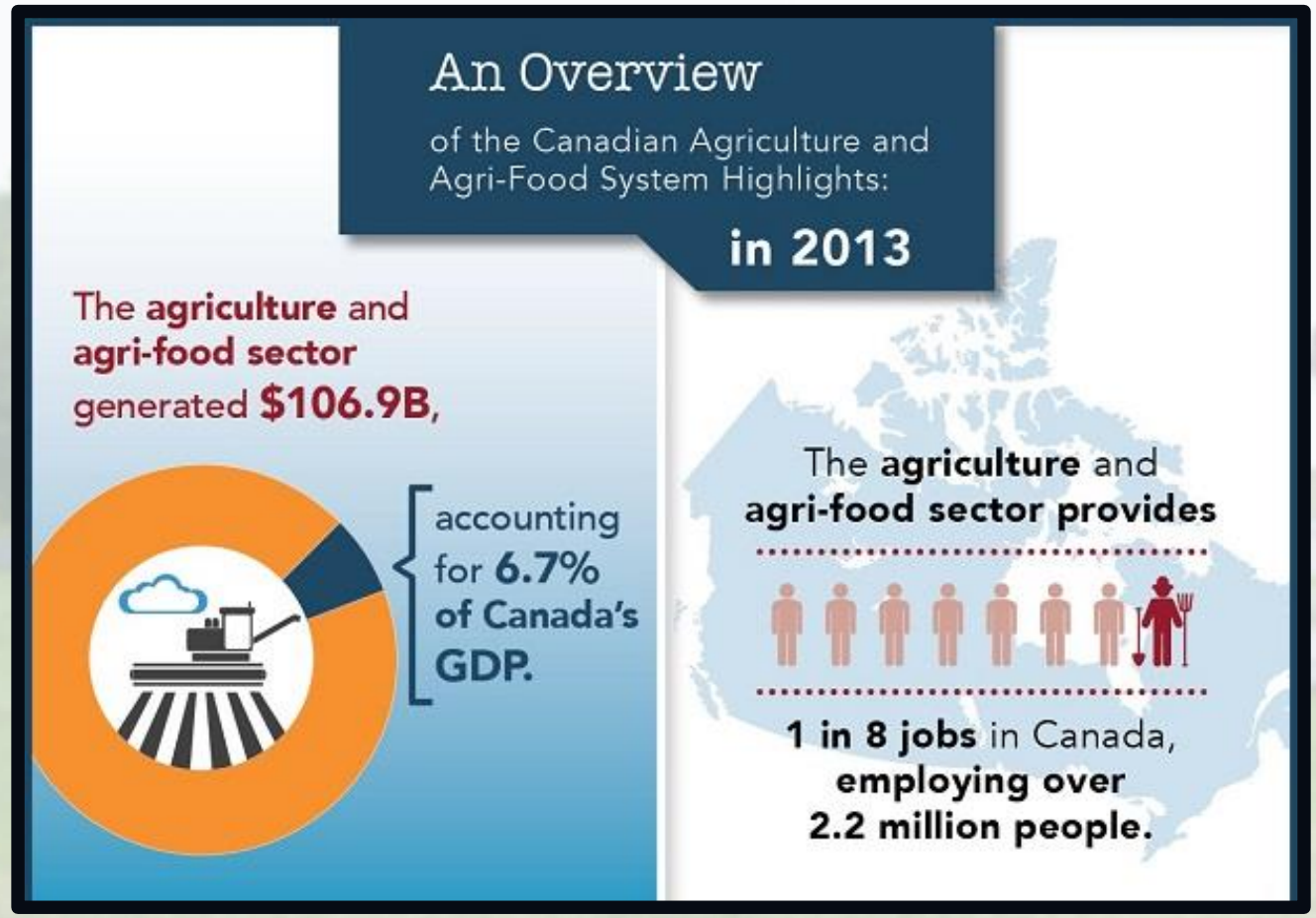
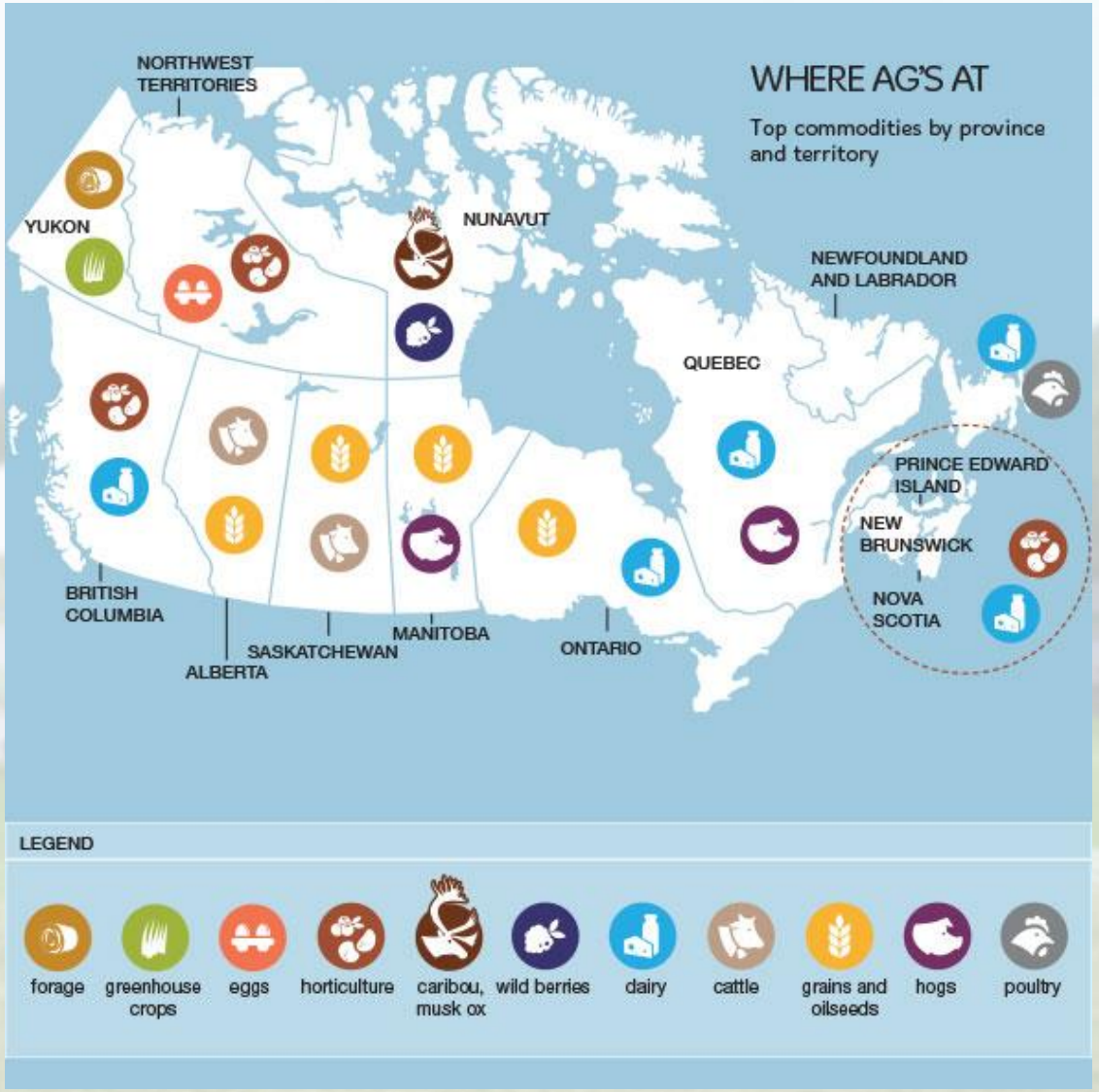
Upcoming Schedule…

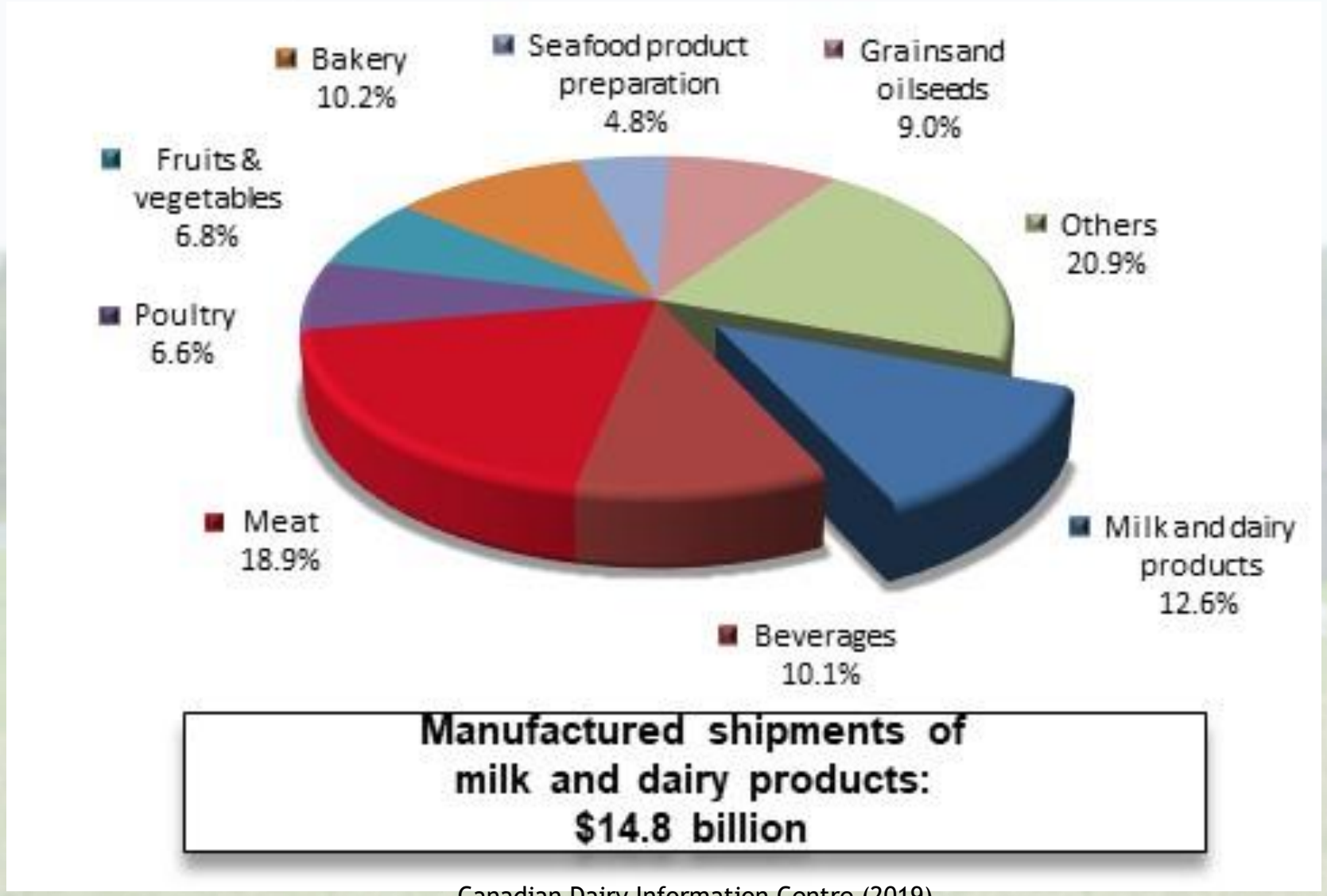
- Monday (Oct 5th):
  - Dairy Industry
  - Quiz *post mortem*
  - Introduction to Genetics
- Wednesday (Oct 7th):
  - "Lab": Overview of Macdonald Campus Farm with Farm Manager
- Monday (Oct 12th):
  - Thanksgiving – no classes
- Wednesday (Oct 14th):
  - Qualitative Genetics

The Canadian Dairy Industry

Contribution of Agriculture…

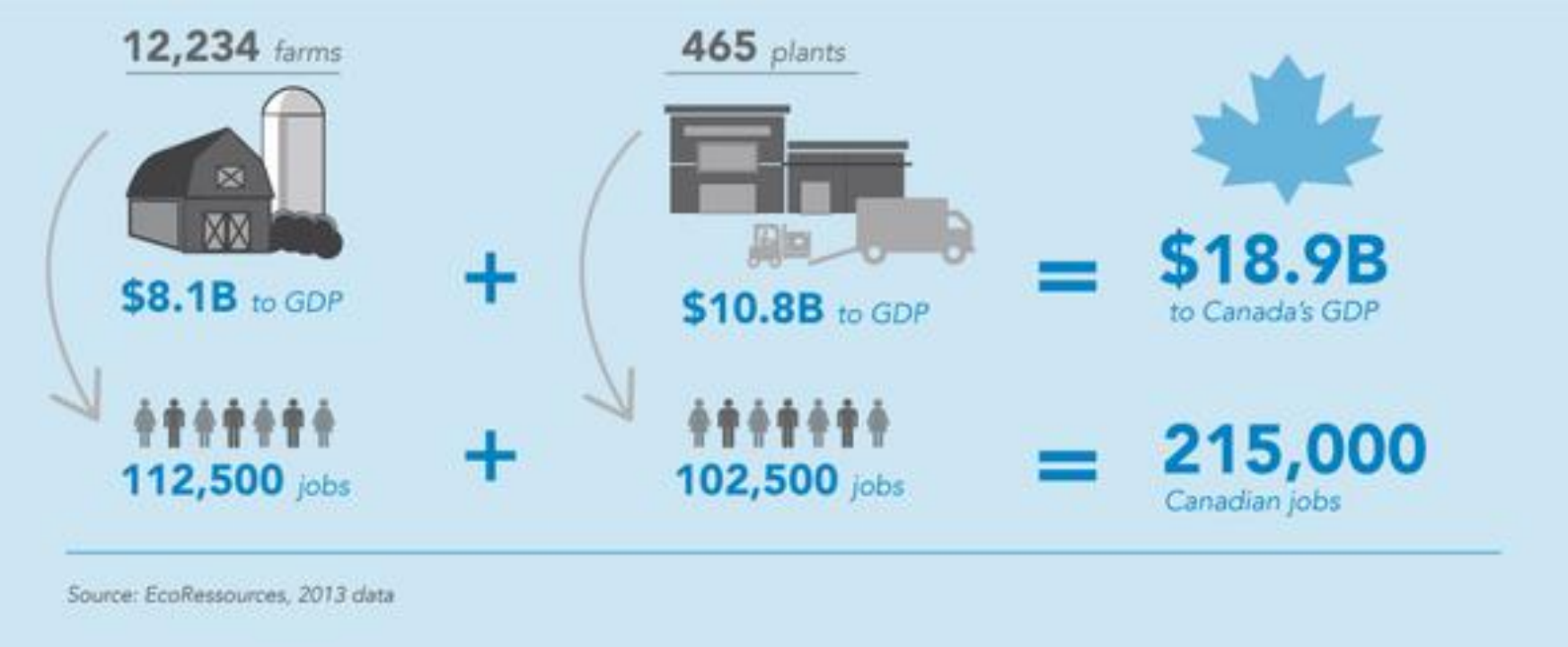






Canadian Dairy Information Centre (2019)

Contribution of the Dairy Industry in Canada…



Canadian Dairy Industry - Overview

- The Canadian dairy sector operates under a *supply management (Quota) system*, based on planned domestic production, administered pricing and dairy product import controls. The dairy industry ranks second (based on farm cash receipts) in the Canadian agriculture sector ranking just behind red meats.

- In addition to being world-renowned for their excellence, the Canadian milk and dairy products are recognized for their variety and high-quality. Enforcement of strict quality standards on dairy farms and in processing plants enhances this international reputation, along with a strong commitment to sound animal welfare practices and environmental sustainability.

Canadian Dairy Industry - Farm

• Total net farm cash receipts from dairying	$ 6.17 billion
• Dairy manufacturing shipments	$15.20 billion
• Dairy cattle population (dairy cows and heifers)	1.4 million (1/1/2019)
• Number of dairy farms	10,371 (1/ 1, 2019)
• Milk production	84.7 million hl
• Organic milk production (Dairy Year 2015/16)	1.111 million hl
• Goat milk production	0.547 million hl

Canadian Dairy Industry – Processing Sector

- Largest processors — Saputo, Agropur and Parmalat
- Number of plants — 471 dairy plants

Milk utilization

- Fluid milk — 27.7 million hl
- Industrial milk — 56.8 million hl

  Main Products

  - Specialty cheese (152,540 tonnes)
  - Cheddar (155,206 tonnes)
  - Mozzarella (136,386 tonnes)
  - Yogurt (403,030 tonnes)
  - Hard ice cream (136,281 kilolitre)
  - Butter (93,420 tonnes)
  - Skim milk powder (102,953 tonnes)

Saputo Inc.

Fluid milk company

saputo.com/en

Saputo Inc. is a Montreal-based Canadian dairy company founded in 1954 by the Saputo family. Currently, Saputo produces, markets, and distributes a wide array of dairy products, including cheese, fluid milk, extended shelf-life milk and cream products, cultured products and dairy ingredients. Wikipedia

Stock price: SAP (TSE) $34.10 0.00 (0.00%)
Oct. 2, 4:00 p.m. EDT - Disclaimer

CEO: Lino A. Saputo (2004–)

Headquarters: Montreal

Founder: Lino A. Saputo

Founded: 1954, Montreal

Revenue: 11.2 billion CAD (2017)

Subsidiaries: Warrnambool Cheese & Butter, MORE

Agropur Coopérative

Company

The Agropur Dairy Cooperative, usually shortened to Agropur, is headquartered in Longueuil, Quebec, Canada. It was founded in 1938 and now comprises roughly 3,290 dairy farmers. Wikipedia

Production output: 6.1 billion litres of milk

Headquarters: Saint-Hubert, Longueuil

CEO: Émile Cordeau (Oct. 15, 2019–)

Revenue: 6.4 billion CAD (2017)

Subsidiaries: Natrel, Island Farms Dairy Cooperative, MORE

Parent organization: Farmers Co-operative Dairy Limited

Disclaimer

People also search for View 10+ more

Saputo Inc. | Lactalis | Schreiber Foods | Parmalat | Cargill

Parmalat

Food company

parmalat.com

Parmalat S.p.A. is a dairy and food corporation which is a subsidiary of French multinational company Lactalis. It was founded by Calisto Tanzi in 1961. Wikipedia

Parent organization: Lactalis

CEO: Yvon Guérin (Jul. 2011–)

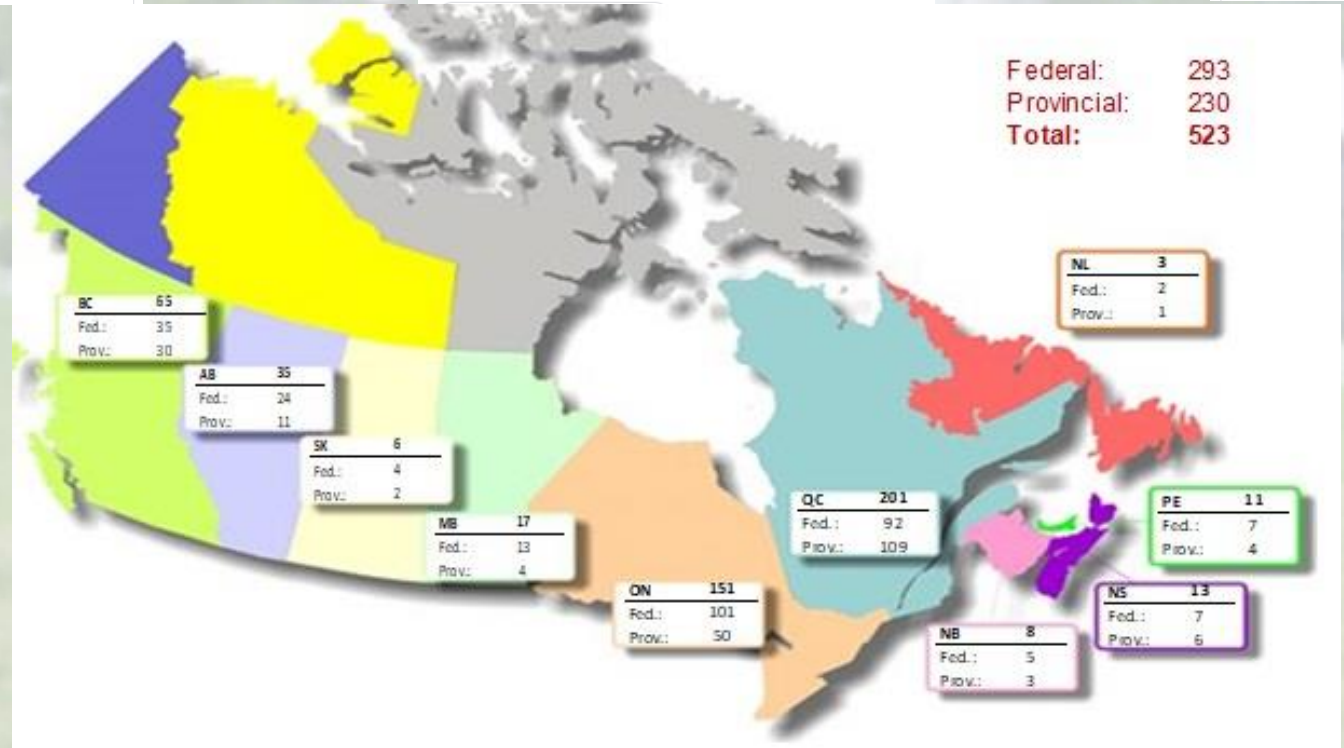
Founder: Calisto Tanzi

Founded: 1961, Collecchio, Italy

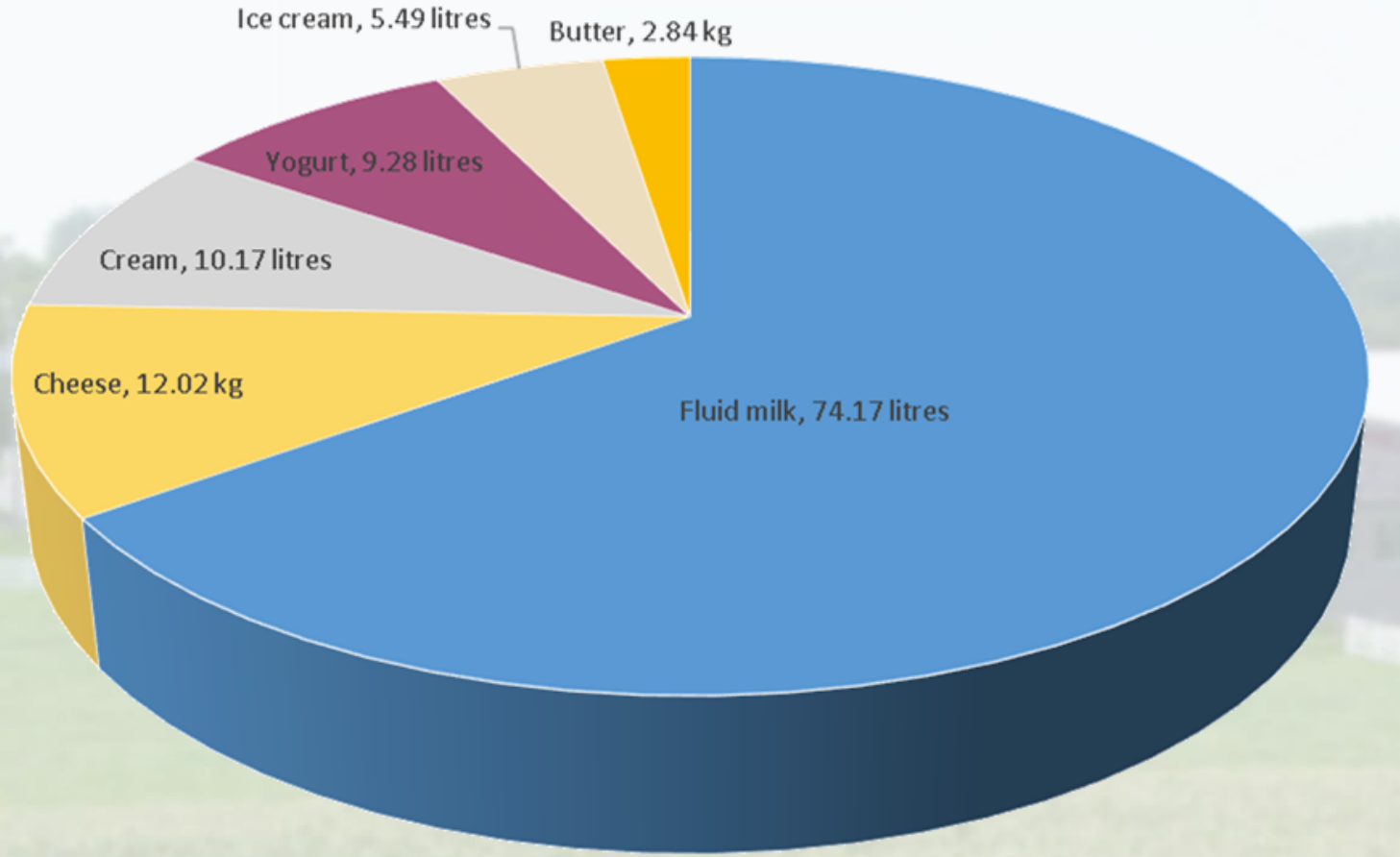
Revenue: 6.416 billion EUR (2015)

Subsidiaries: Parmalat Administracao e Participacoes do Brasil Ltda, MORE

Disclaimer



Canadian *per capita* consumption of dairy products (2014)



Canadian Dairy Information Centre

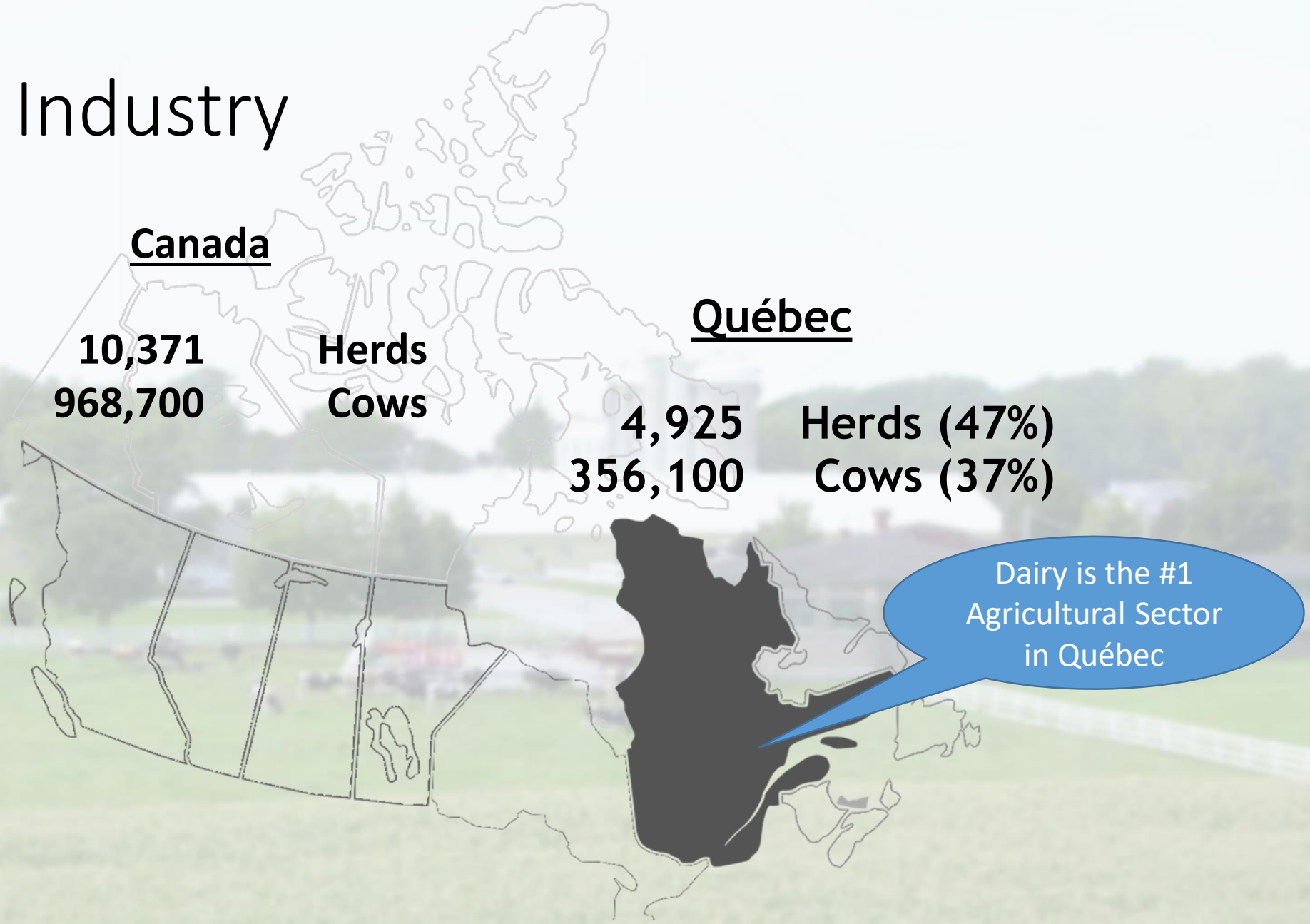
The Dairy Industry

Canada

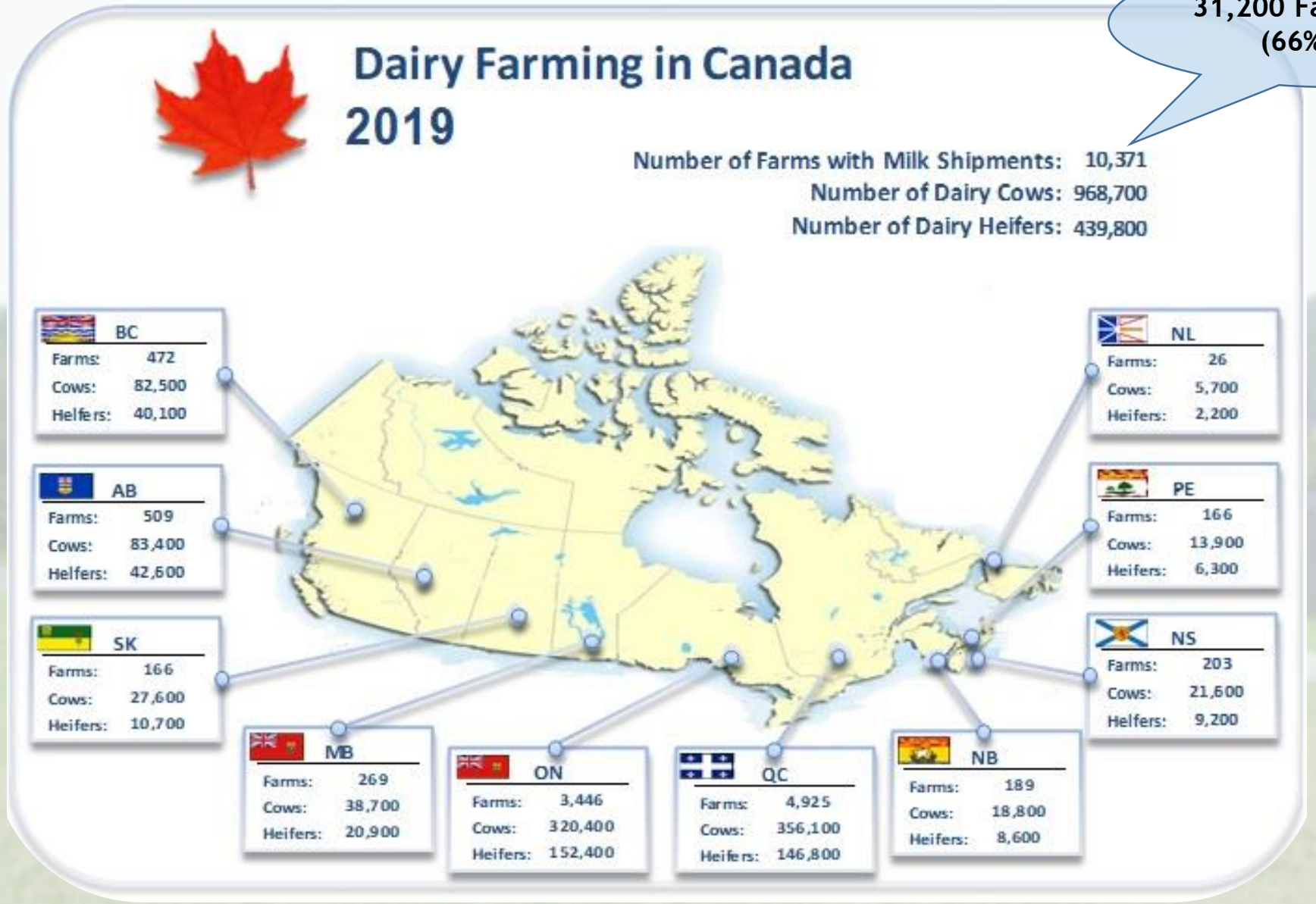
10,371 **Herds**
968,700 **Cows**

Québec

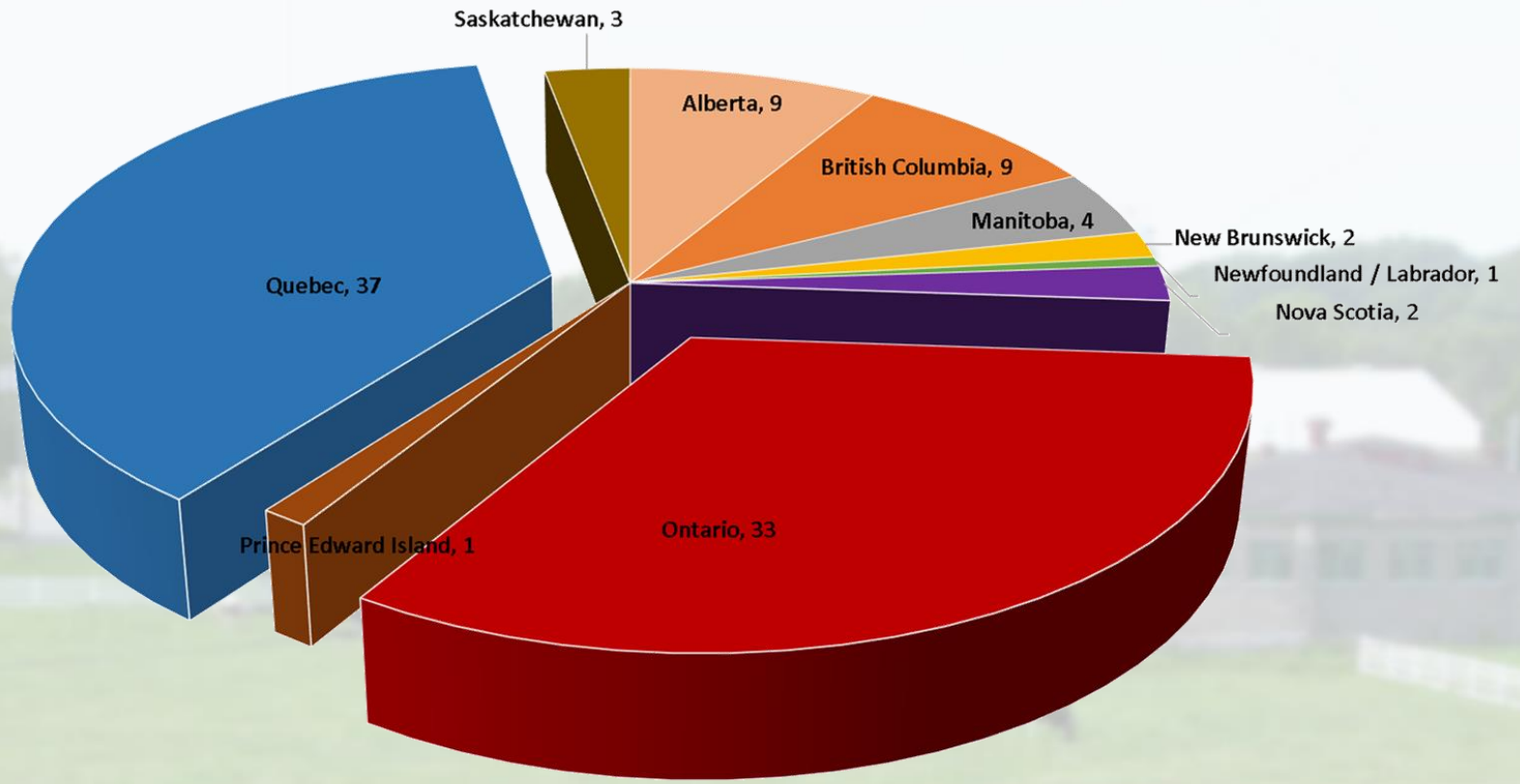
4,925 **Herds (47%)**
356,100 **Cows (37%)**



Canadian Milk Production



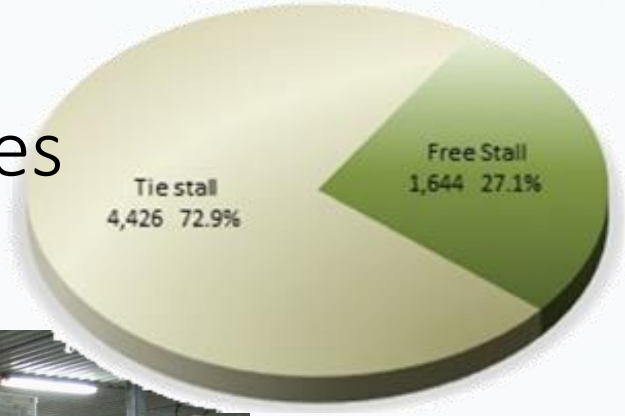
Provincial % Contribution to Canadian Milk Production
(80 million hectoliters)

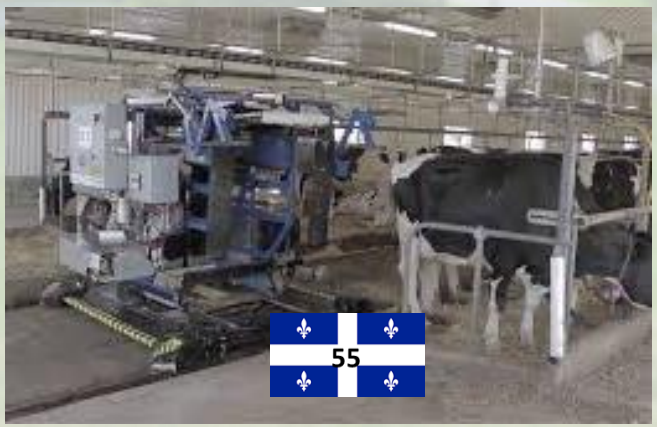


A Typical *Québec* Dairy Farm…

- Family-owned
- Dairy Farm Operators aged 45-54
- Average Herd Size = 72 milking cows/farm

Dairy Barn Types and Systems

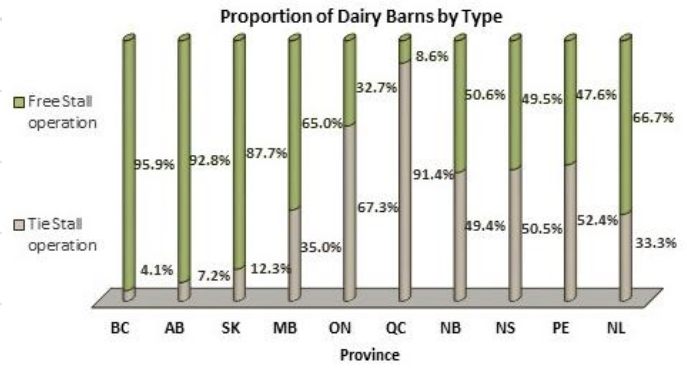


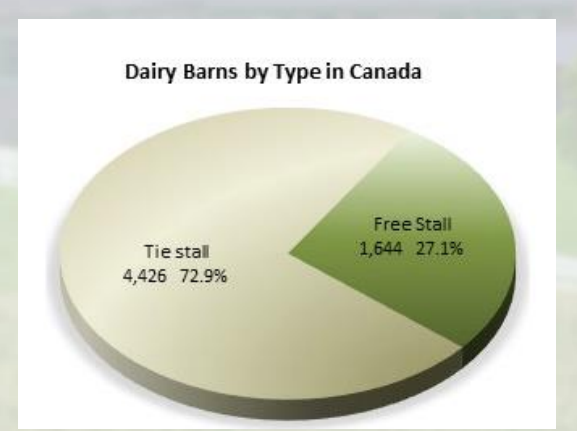


Dairy barns by type in Canada [1] - 2019

Province	# barns Tie Stall	% Tie Stall	Herd Size Tie Stall	# barns Free Stall	% Free Stall	Herd Size Free Stall	# barns Unrecorded	Herd Size Unrecorded	Total Number of barns
British Columbia	8	4.1%	68.8	187	95.9%	210.3	-	-	195
Alberta	19	7.2%	84.4	245	92.8%	174.4	-	-	264
Saskatchewan	8	12.3%	106.6	57	87.7%	237.1	-	-	65
Manitoba	36	35.0%	87.6	67	65.0%	234.6	2	146	105
Ontario	1,409	67.3%	61.4	686	32.7%	141.8	1	32	2,096
Quebec	2,807	91.4%	64.4	265	8.6%	138.9	51	122	3,123
New Brunswick	40	49.4%	64.7	41	50.6%	161.5	10	69	91
Nova Scotia	53	50.5%	59	52	49.5%	134.5	1	-	106
Prince Edward Island	44	52.4%	67.1	40	47.6%	103.1	2	72	86
Newfoundland and Labrador	2	33.3%	209.5	4	66.7%	189.5	1	-	7
Canada	4,426	72.9%	-	1,644	27.1%	-	68	-	6,138

[1] Based on Herds Enrolled in Milk Recording Program





Québec Milk Production Over Time…

1966
62,000 herds
16-cow herds
3,000 litres per cow

2019
4,925 herds
72-cow herds
10,675 litres per cow

Total Québec Milk Production *remains* around 28 million hl
(but from ⅓ of the number of animals!)

Statistics: Agriculture & Agri-food Canada (2019)

Dairy Breeds in Canada - 2019

Average Milk Production Weight and Component Percentage by Breed

Holstein
93% of national herd
10,909 kg milk per cow
3.98% fat, 3.27% protein

Ayrshire
2% of national herd
8,159 kg milk per cow
4.15% fat, 3.41% protein

Jersey
4% of national herd
7,106 kg milk per cow
5.13% fat, 3.87% protein

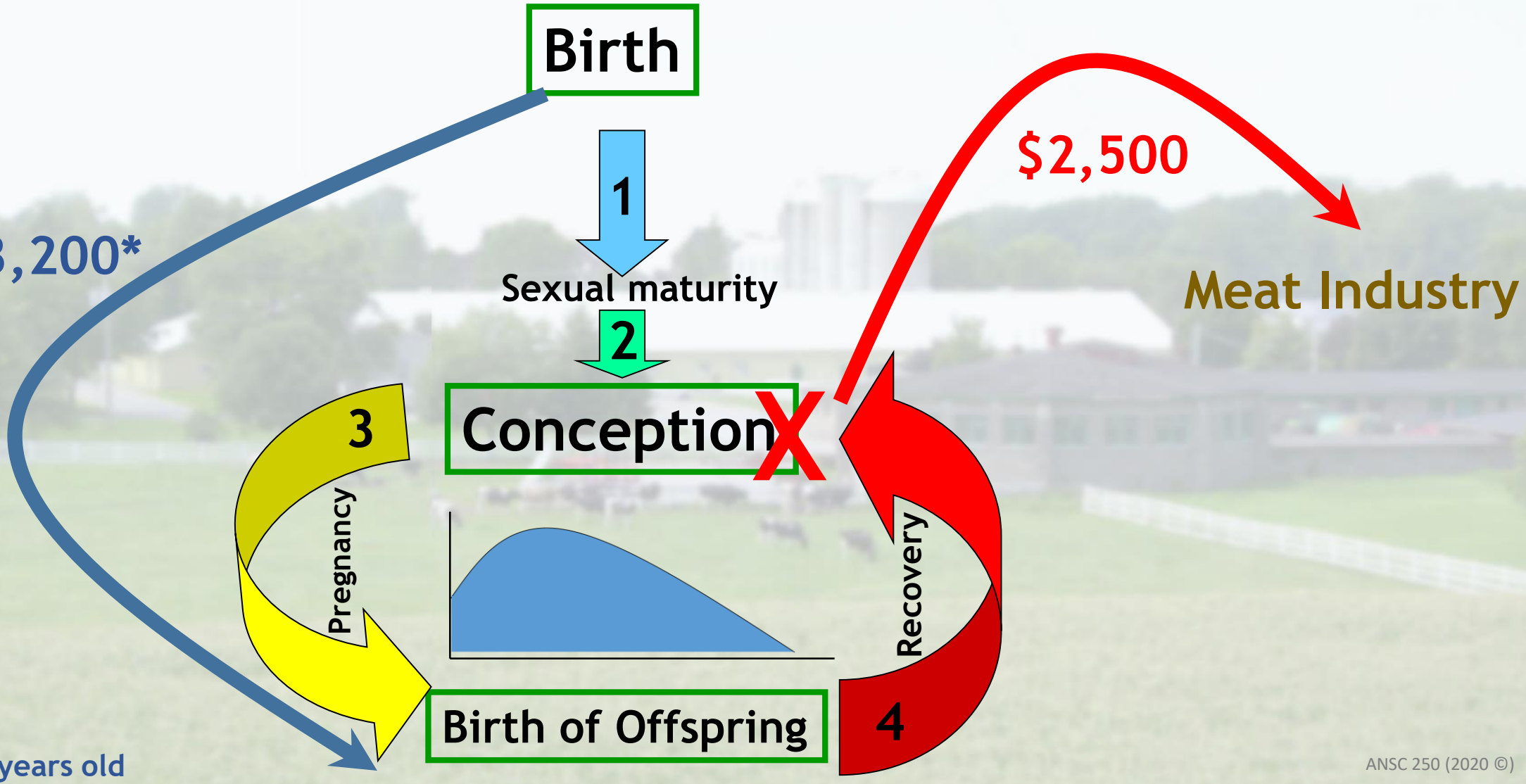
Brown Swiss
8,982 kg milk per cow
4.22% fat, 3.55% protein

Milking Shorthorn
7,335 kg milk per cow
3.99% fat, 3.31% protein

Guernsey
7,276 kg milk per cow
4.74% fat, 3.51% protein

Canadienne
6,065 kg milk per cow
4.29% fat, 3.60% protein

Reproductive efficiency in livestock production



*At 2 years old

Milk Recording…

Milk Recording

Milk Fat and Milk Protein (% and kg)

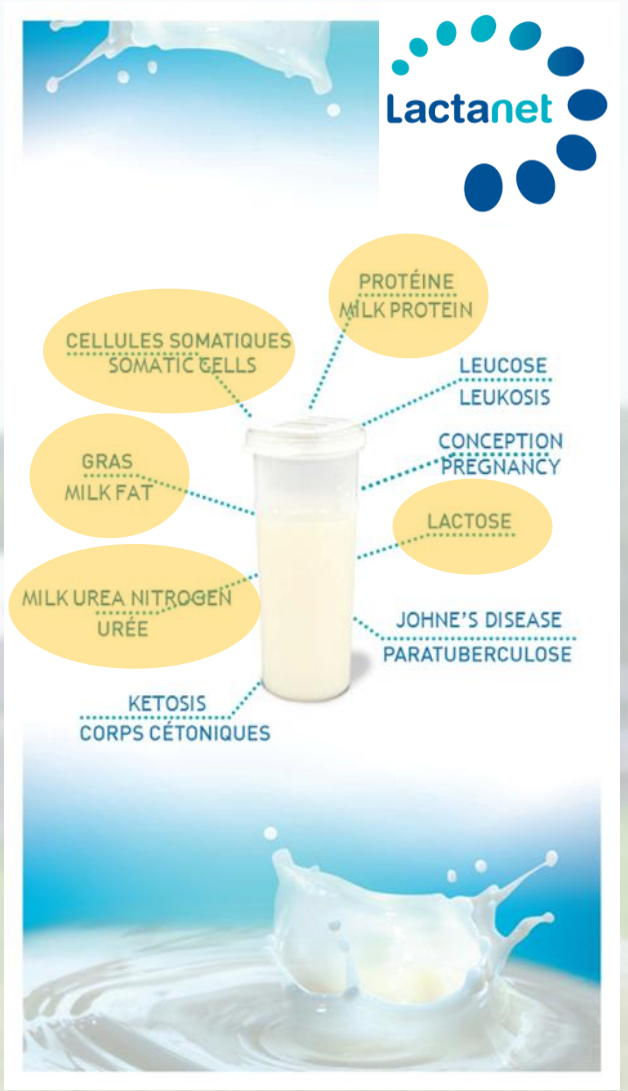
- Milk Fat used to determine cost of quota: $24,000 / kg fat produced daily
- Price paid to Farmer based on quantities of:
  - Fat ($10.8/kg) plus a premium of $0.0145/kg for SNF/Fat ratio of ≤2.35;
  - Protein ($7.8/kg); and
  - Lactose ($1.5/kg)

Somatic cell Count: indicator of mastitis and general level of infection

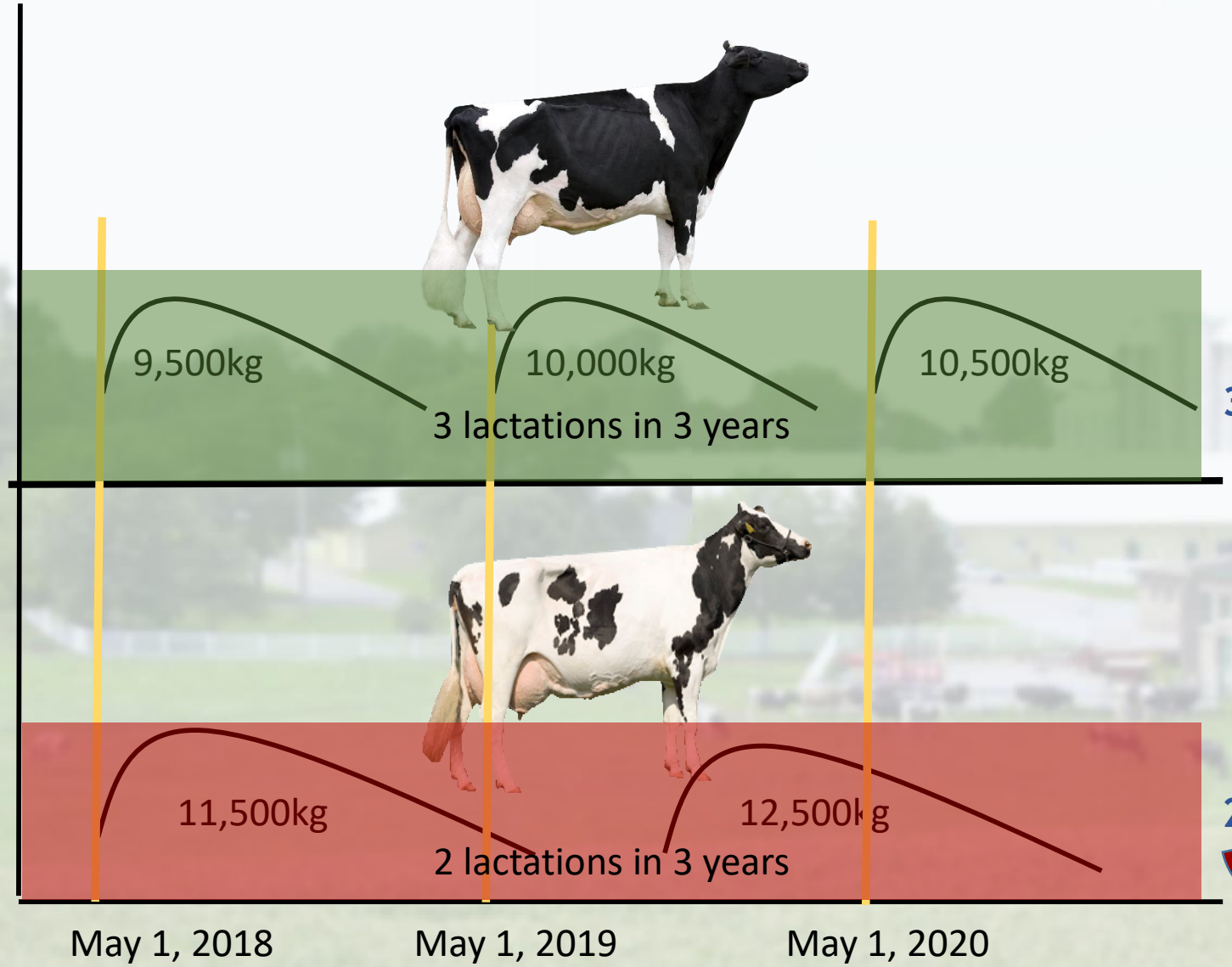
- Monthly average must be < 400,000 somatic cells per ml of milk

Milk Urea Nitrogen (MUN): aim between 8 – 14 mg/dL of milk

- < 8mg/dL implies not enough protein in diet *or* too much CHO
- >14mg/dL implies excess protein in the diet (economic/environmental issues)



Which cow is more profitable?



30,000 kg milk

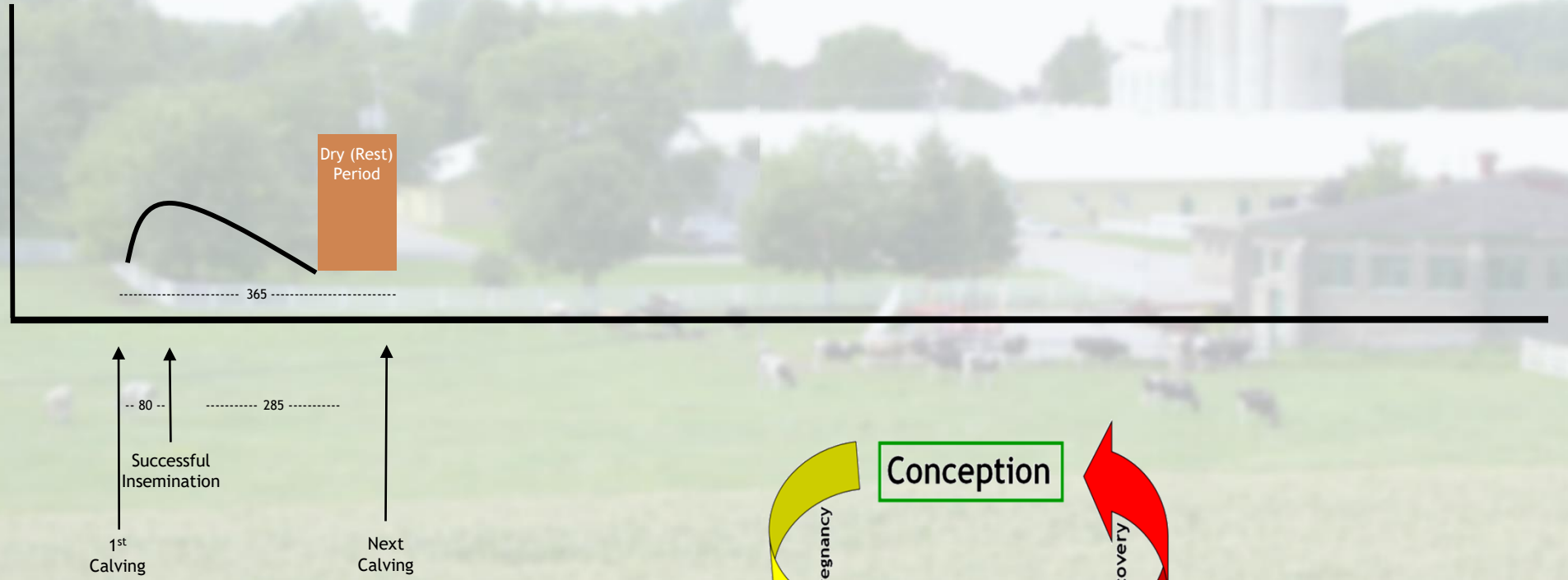
24,000 kg milk

Less milk produced

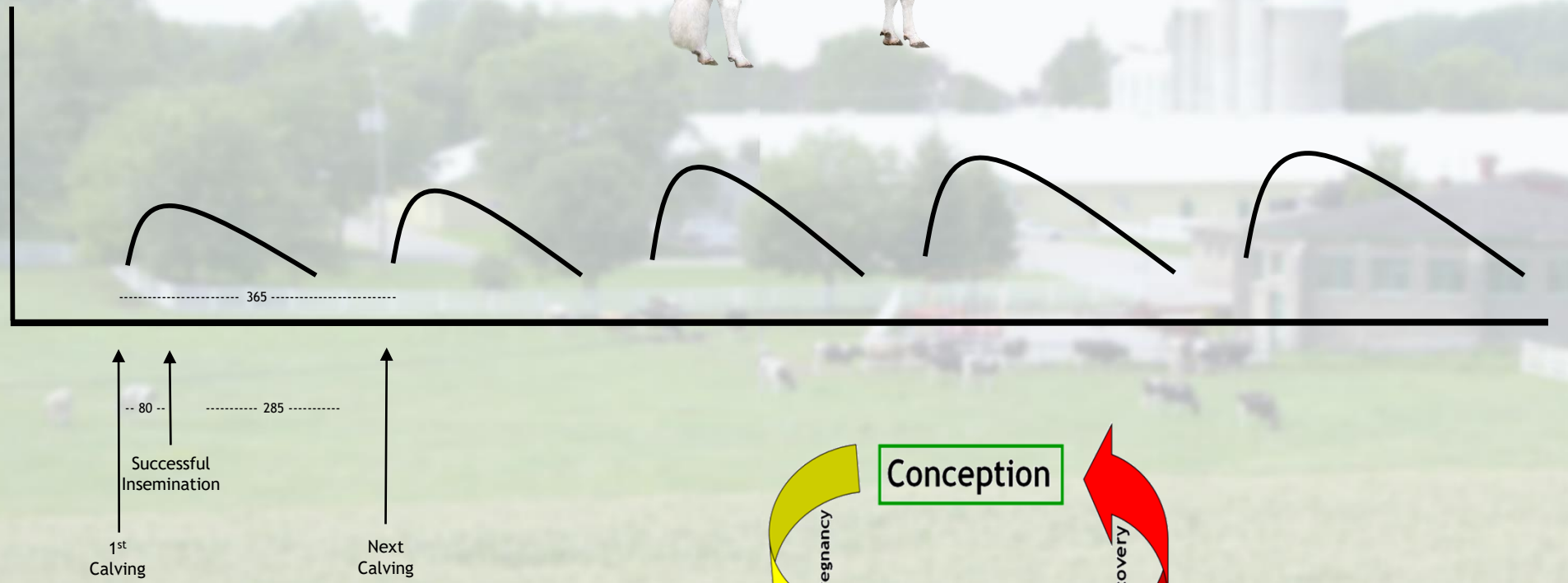
Less replacement heifers

Higher veterinarian costs

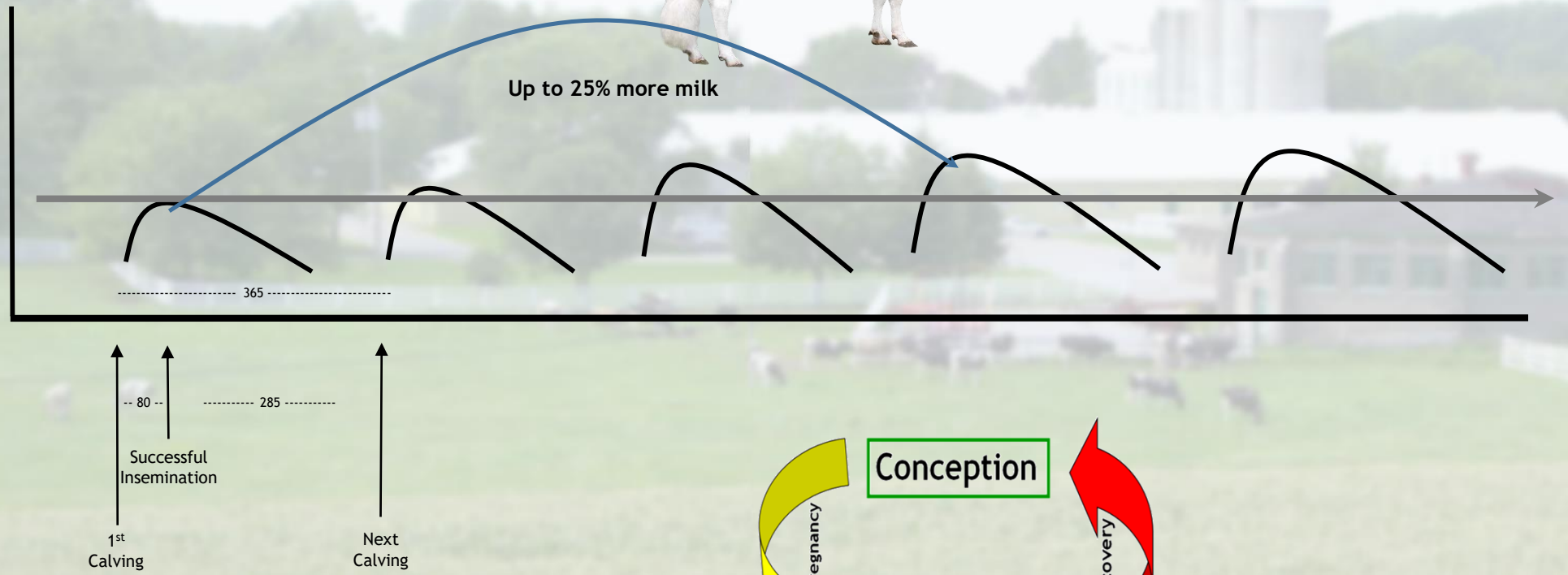
Understanding Dairy Production Systems



Understanding Dairy Production Systems



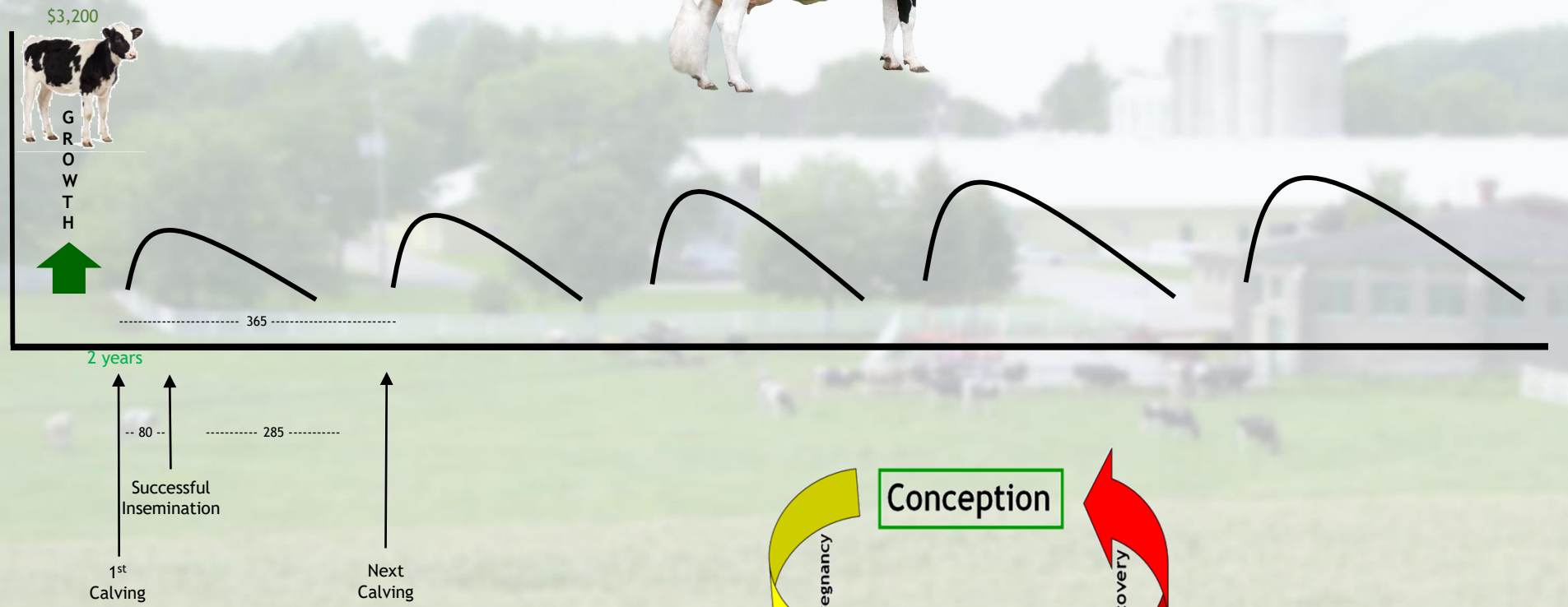
Understanding Dairy Production Systems



Understanding Dairy Production Systems

Aspects to Consider...

Age at First Calving / Growth Costs



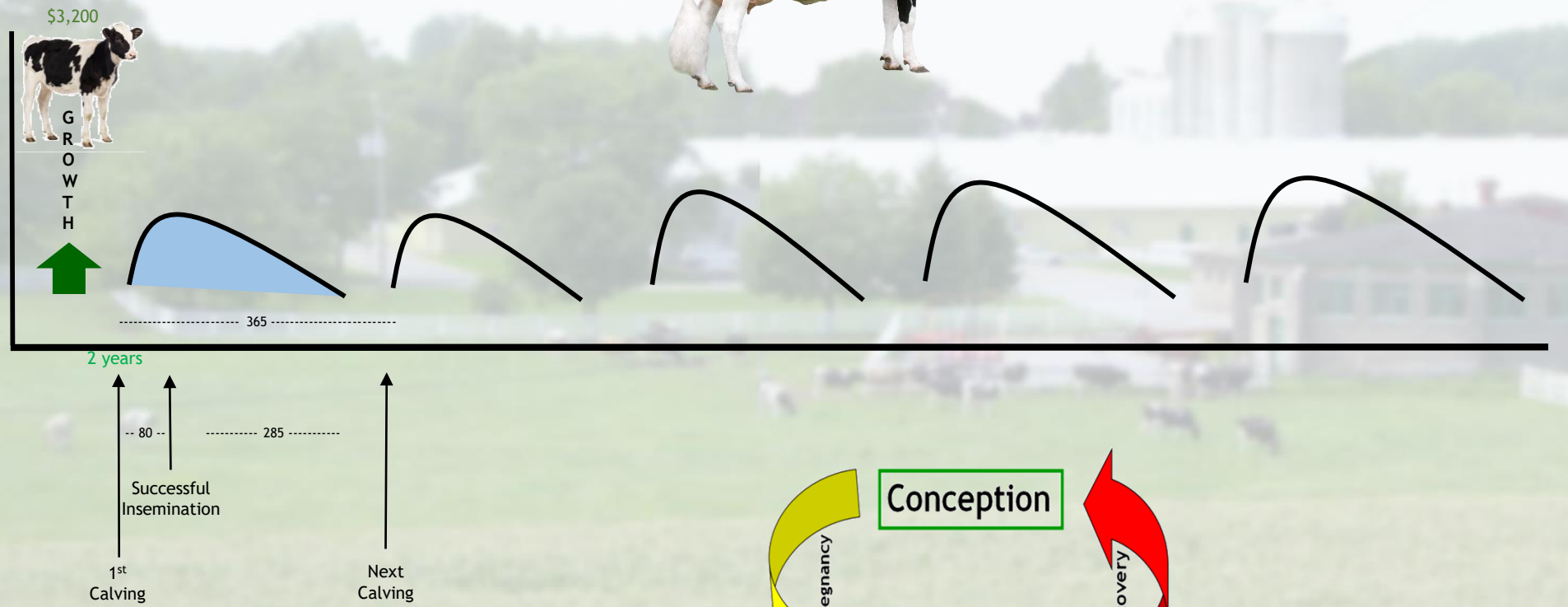
McGill ANIMAL SCIENCE

Understanding Dairy Production Systems

Aspects to Consider...

Age at First Calving / Growth Costs

Milk produced in a lactation



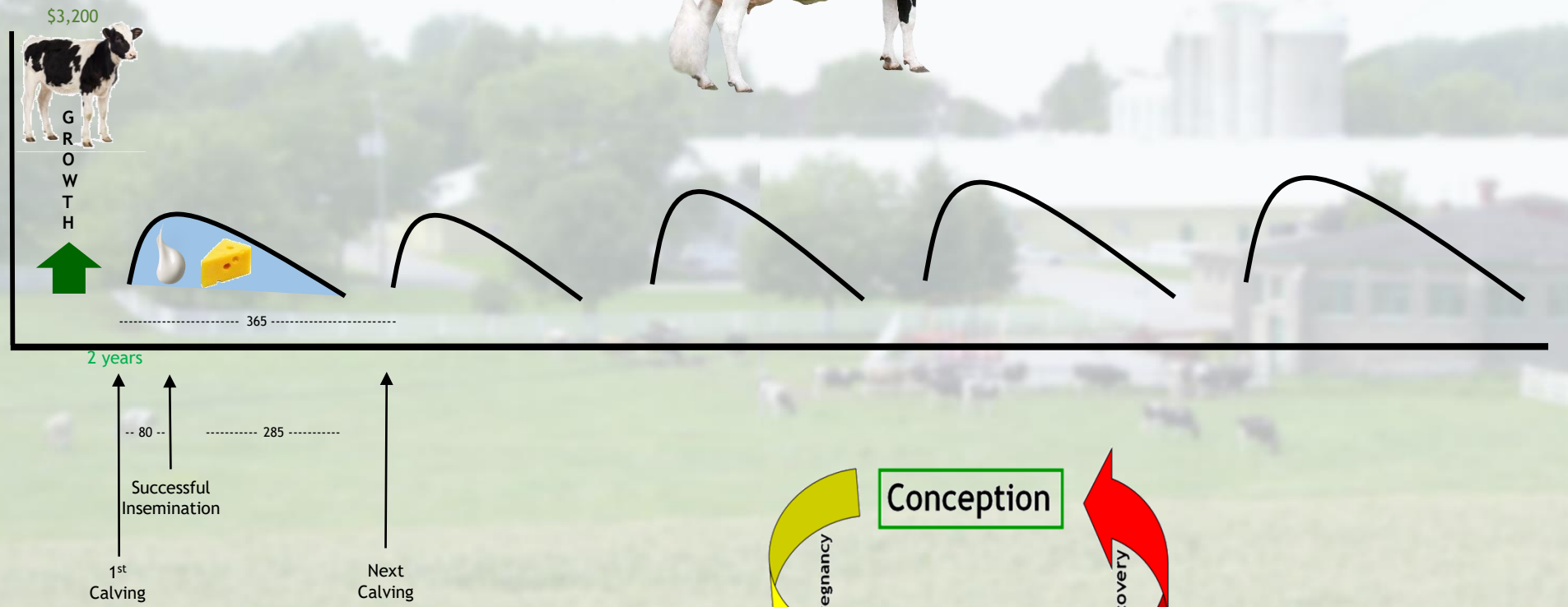
Understanding Dairy Production Systems

Aspects to Consider...

Age at First Calving / Growth Costs

Milk produced in a lactation

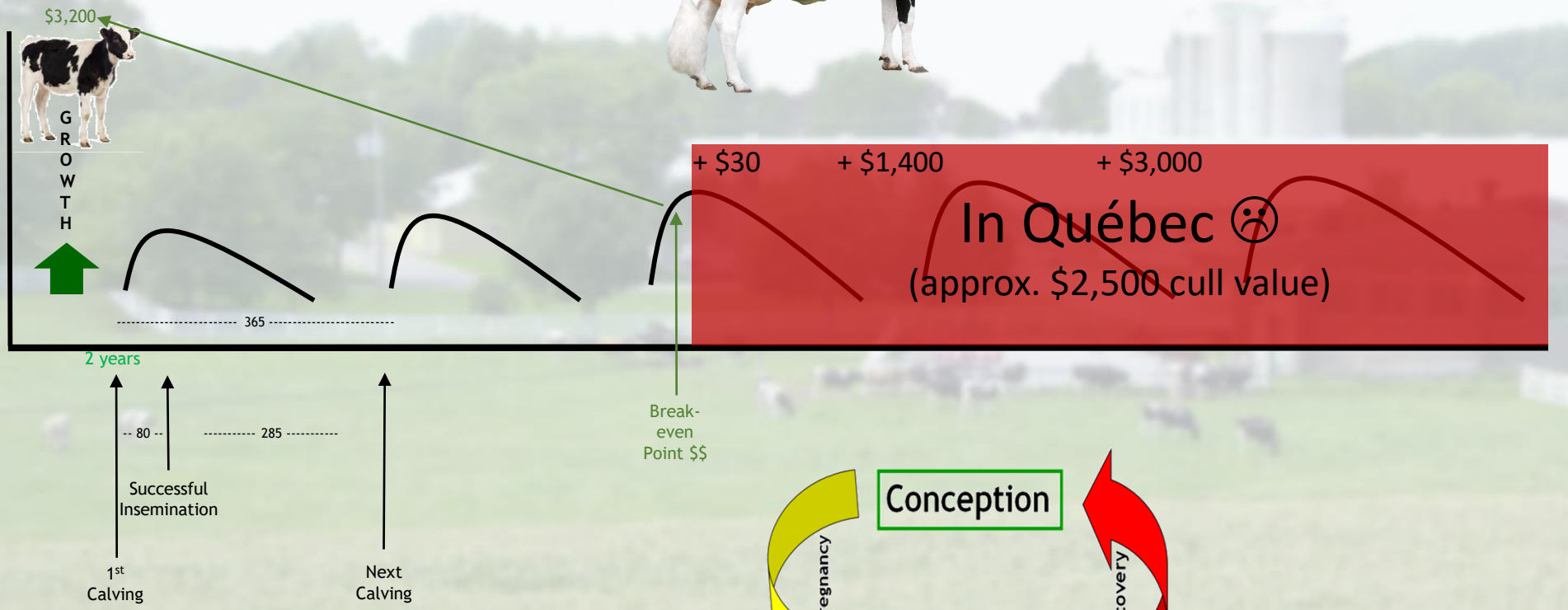
Milk Quality



Understanding Dairy Production Systems

Aspects to Consider...

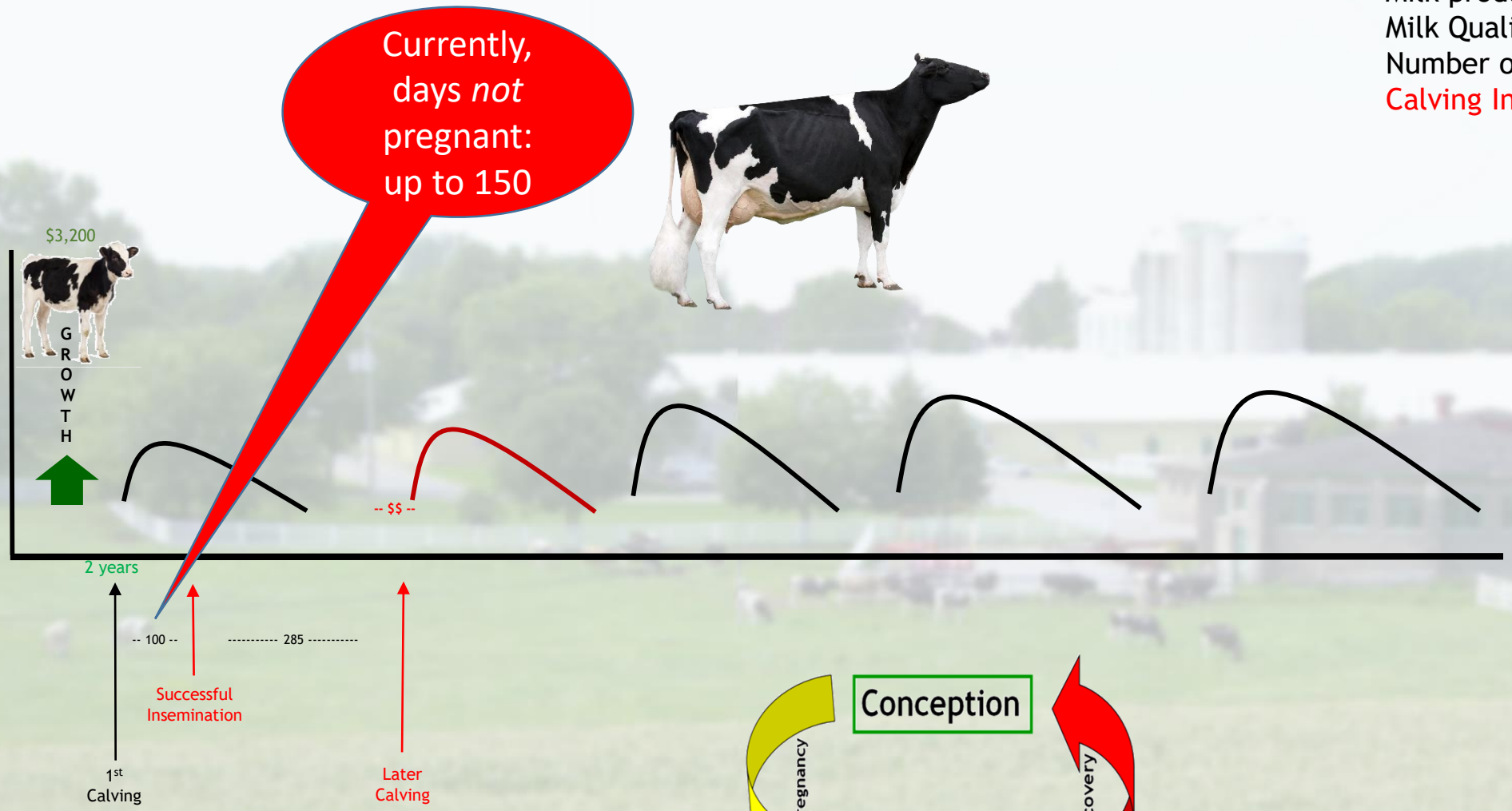
Age at First Calving / Growth Costs
Milk produced in a lactation
Milk Quality
Number of Lactations



Understanding Dairy Production Systems

Aspects to Consider...

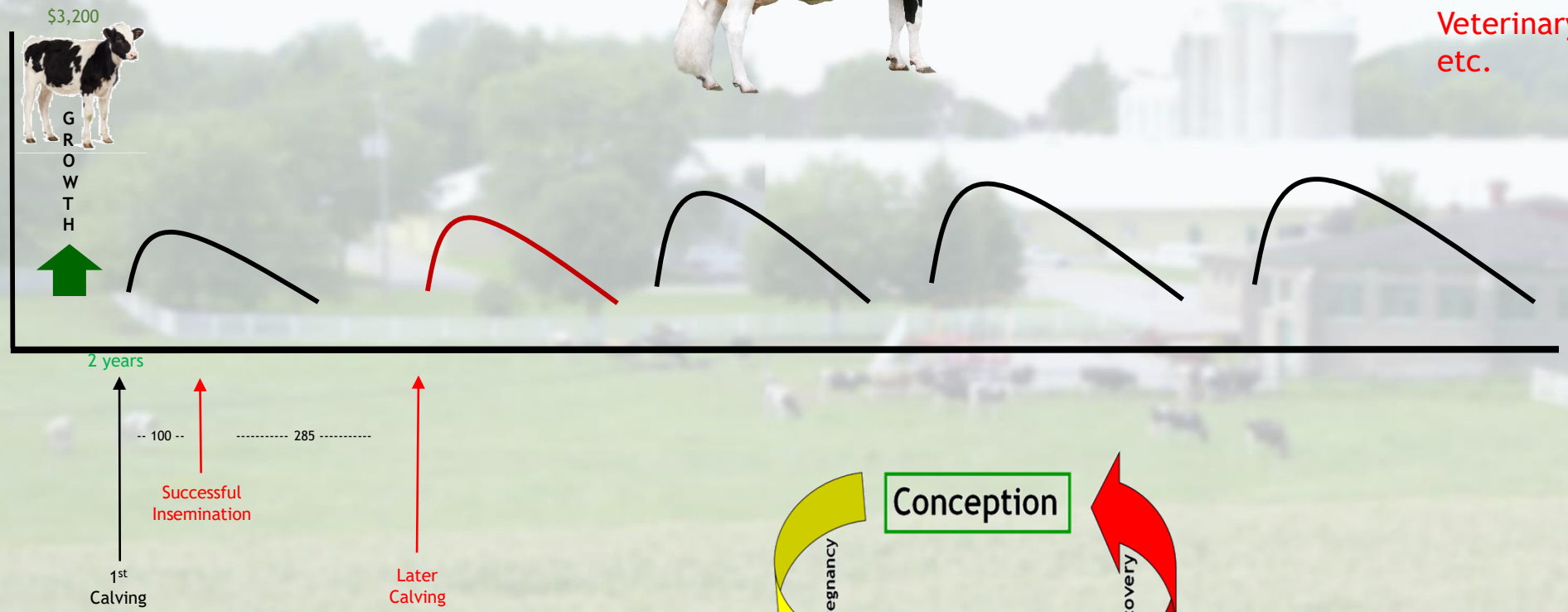
Age at First Calving / Growth Costs
Milk produced in a lactation
Milk Quality
Number of Lactations
Calving Interval



Understanding Dairy Production Systems

Aspects to Consider...

Age at First Calving / Growth Costs
Milk produced in a lactation
Milk Quality
Number of Lactations
Calving Interval
Price of Milk / Number of Cows
Cost / Insemination
Number of replacement females
Veterinary Costs
etc.



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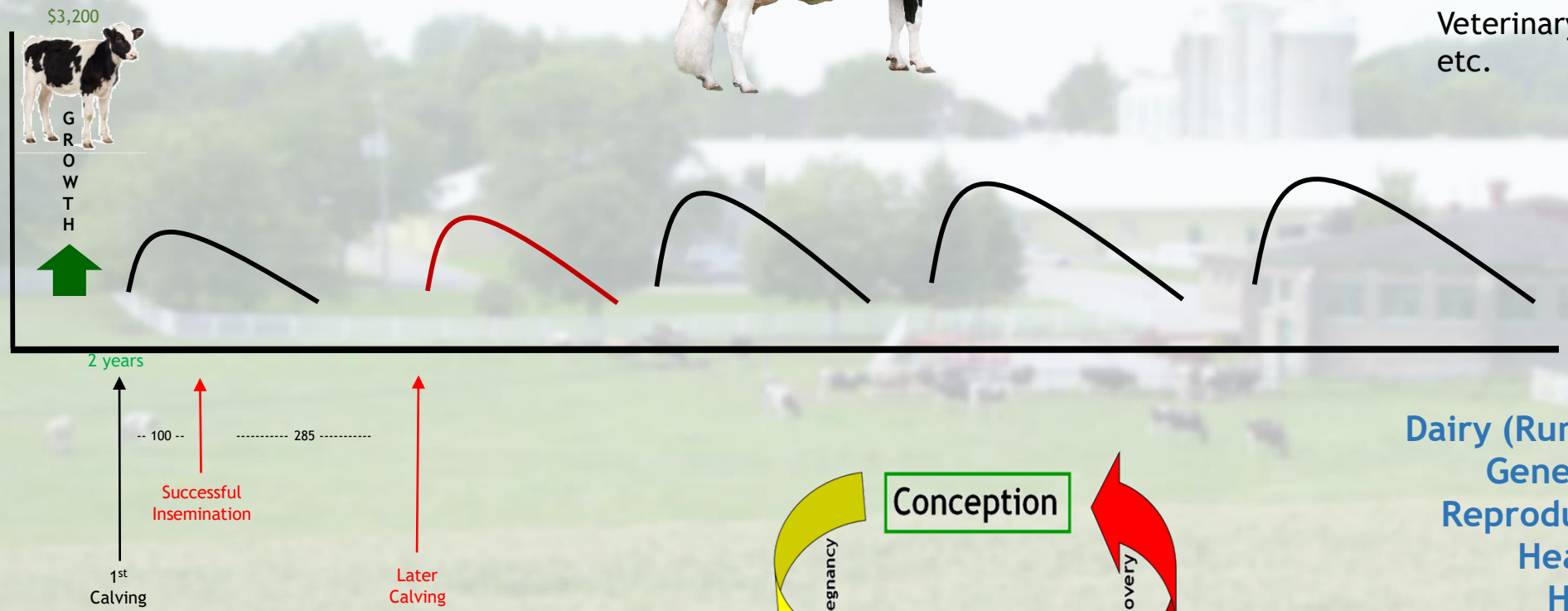

Dairy (Ruminant) Nutrition	35%
Genetic Improvement	35%
Reproductive Physiology	15%
Health Management	10%
Housing / Comfort	3%
Welfare	2%

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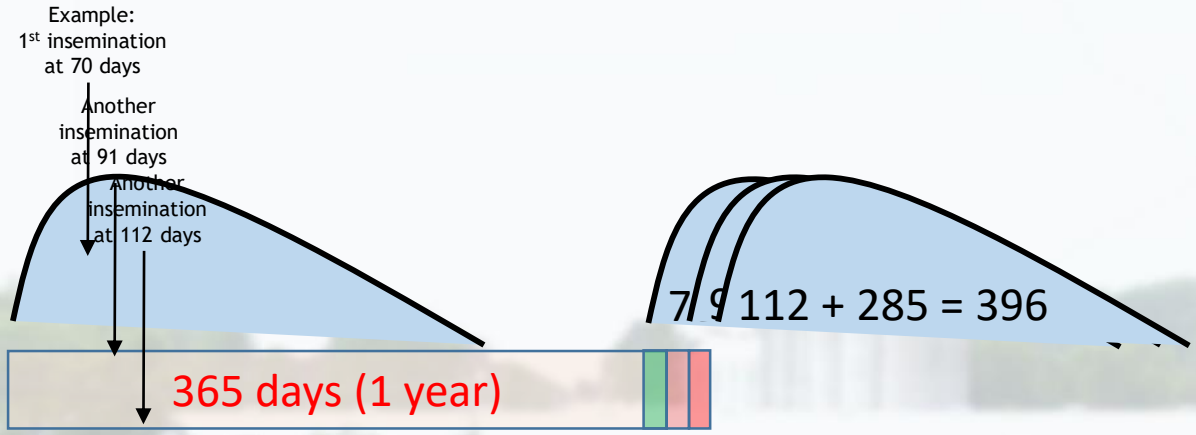
Changes in parameters over time…



Days until 1st breeding (after calving/parturition)	"Longer" (up to 85)
Days open (calving/parturition to next conception)	"Longer" (up to 150)
Services (Inseminations) per conception	"More" (up to 2.25)
Estrus ("Heat") detection efficiency	"Lower" (6% less efficient)

Culling and replacement rates in dairy herds in Canada

This page represents the main culling and replacement rates in Canada

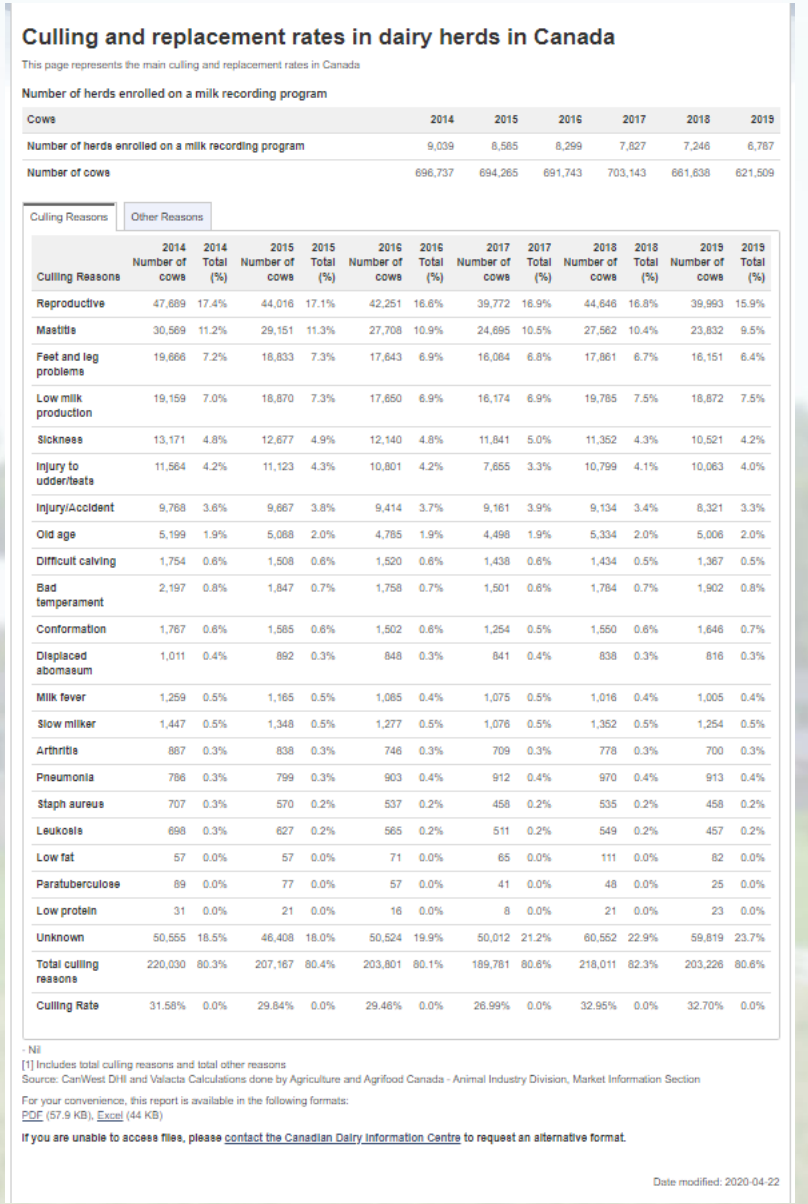
Number of herds enrolled on a milk recording program

Cows	2014	2015	2016	2017	2018	2019
Number of herds enrolled on a milk recording program	9,039	8,585	8,299	7,827	7,246	6,787
Number of cows	696,737	694,265	691,743	703,143	661,638	621,509

Culling Reasons | Other Reasons

Culling Reasons	2014 Number of cows	2014 Total (%)	2015 Number of cows	2015 Total (%)	2016 Number of cows	2016 Total (%)	2017 Number of cows	2017 Total (%)	2018 Number of cows	2018 Total (%)	2019 Number of cows	2019 Total (%)
Reproductive	47,689	17.4%	44,016	17.1%	42,251	16.6%	39,772	16.9%	44,646	16.8%	39,993	15.9%
Mastitis	30,569	11.2%	29,151	11.3%	27,708	10.9%	24,695	10.5%	27,562	10.4%	23,832	9.5%
Feet and leg problems	19,666	7.2%	18,833	7.3%	17,643	6.9%	16,084	6.8%	17,861	6.7%	16,151	6.4%
Low milk production	19,159	7.0%	18,870	7.3%	17,650	6.9%	16,174	6.9%	19,785	7.5%	18,872	7.5%
Sickness	13,171	4.8%	12,677	4.9%	12,140	4.8%	11,841	5.0%	11,352	4.3%	10,521	4.2%
Injury to udder/teats	11,564	4.2%	11,123	4.3%	10,801	4.2%	7,655	3.3%	10,799	4.1%	10,063	4.0%
Injury/Accident	9,768	3.6%	9,667	3.8%	9,414	3.7%	9,161	3.9%	9,134	3.4%	8,321	3.3%
Old age	5,199	1.9%	5,088	2.0%	4,785	1.9%	4,498	1.9%	5,334	2.0%	5,006	2.0%
Difficult calving	1,754	0.6%	1,508	0.6%	1,520	0.6%	1,438	0.6%	1,434	0.5%	1,367	0.5%
Bad temperament	2,197	0.8%	1,847	0.7%	1,758	0.7%	1,501	0.6%	1,784	0.7%	1,902	0.8%

☹



https://www.dairyinfo.gc.ca/eng/dairy-statistics-and-market-information/dairy-animal-genetics/culling-and-replacement-rates-in-dairy-herds-in-canada/?id=1502475693224

AOÛT 2014 AUGUST

CIAQ

Réseau laitier canadien
Canadian Dairy Network

Prix / Price $	Immunité+	Robot Ready							IPV/LPI: IPVG / GLPI	Fiabilité / Reliability (%)	PRODUCTION: Filles / Daughters	LAIT / MILK	GRAS / FAT (kg)	Différentielle / Dev. (%)	PROT. (kg)	Différentielle / Dev. (%)	CONFORMATION: Filles / Daughters	CONFORMATION	Syst. mamm. / Mammary Syst.	Pieds et membres / Feet & Legs	Puiss. laitière / Dairy Strength	Croupe / Rump	SYSTÈME MAMMAIRE / MAMMARY SYSTEM: Profondeur du pis / Udder Depth	Texture du pis / Udder Texture	Susp. médiane / Med. Suspensory	Attache avant / Fore Attachment	Pos. tray. avant / Fore Teat Plac.	Haut. att. arr. / Rear Att. Height	Larg. att. arr. / Rear Att. Width	Pos. tray. arr. / Rear Teat Plac.	Long. des trayons / Teat Length	Angle du pied	P…
AYRSHIRE																																	
38	I		200	AY	699	Kamouraska **DECAF**-ET, BP/GP		*Jupiter x Peterslund*	**2865**	80	56	1380	61	.06	54	.10	48	**3**	2	2	4	1	2 H/S	7	0	1	1 R/C	-4	3	6 É/W	0	0	7
68		✓	200	AY	680	Kamouraska **ROCKSTAR**, Ex		*Modem x Peterslund*	**2806**	85	99	791	47	.19	40	.17	89	**12**	10	10	6	6	3 H/S	8	6	7	5 R/C	9	6	2 R/C	3 L	12	13
65		✓	200	AY	702	Lessard **JUMPER**-ET, TB/VG		*Normandin x Trident*	**2708**	76	52	1194	39	-.11	40	.01	48	**10**	10	9	5	6	6 H/S	13	7	5	1 R/C	9	4	2 R/C	2 C/S	7	9
60			200	AY	329	Jelyca **OBLIQUE**, Ex *AH1		*Tornade x Sylvester*	**2681**	97	940	585	45	.28	22	.03	779	**10**	8	11	3	7	8 H/S	8	10	7	2 R/C	3	1	5 R/C	13 C/S	12	10
20			200	AY	635	Kellcrest **LANDSCAPE**-ET, BP/GP		*Conn x B Jurist*	**2680**	87	133	1409	56	.00	52	.05	90	**3**	3	-1	5	5	5 P/D	0	1	0	6 R/C	3	7	0	2 L	4	5
38			200	AY	687	D'Albanel **MARLOW**-ET, Ex		Normandin x Copper	**2623**	82	59	569	16	-.09	13	-.09	53	**13**	15	23	-3	0	4 H/S	16	8	13	5 É/W	10	7	0	1 C/S	16	17
38			200	AY	694	Kellcrest **LONGRUN**-ET, NC		*Poker x B Jurist*	**2569**	82	84	969	43	.05	33	.01	78	**7**	5	4	11	5	2 P/D	5	4	-1	4 R/C	5	10	2 R/C	0	8	12
35			200	AY	580	Des Chamois **POKER**-ET, TB/VG *AH1		*Pardner x B B B Kellogg*	**2501**	99	1924	411	25	.12	11	-.03	1681	**12**	9	10	9	8	3 H/S	7	5	5	5 R/C	4	5	1 É/W	3 C/S	14	13
15			200	AY	594	Duo Star **NORMANDIN**, TB/VG		*T-Bruno x B B B Kellogg*	**2483**	98	1302	980	32	-.09	31	-.02	1132	**5**	6	11	-3	-5	4 H/S	7	5	5	9 É/W	9	-1	3 É/W	2 C/S	12	11
45			200	AY	691	Des Fleurs **PERFECT**-ET, TB/VG *AH1		*Poker x B Jurist*	**2436**	79	57	971	41	.02	23	-.13	56	**11**	10	9	5	8	6 H/S	8	7	3	9 R/C	11	8	5 R/C	7 C/S	13	10
45	I		200	AY	711	Duo Star **POKERSTARS**, NC *AH1		*Poker x Trident*	**2400**	80	95	413	11	-.06	11	-.03	75	**10**	11	9	1	5	9 H/S	6	4	9	3 R/C	16	4	0	9 C/S	8	10
25			200	AY	697	Palmyra **BINGO**-ET, NC *AH1		*Poker x Jerry*	**2371**	78	73	61	19	.24	7	.06	54	**5**	6	7	1	0	8 H/S	2	-1	10	4 R/C	4	1	6 É/W	6 C/S	3	7
20			200	AY	701	D'Albanel **JURASSIC**, NC		*Jupiter x Copper*	**2324**	79	65	428	6	-.15	16	.01	59	**8**	3	15	4	0	5 P/D	7	0	3	5 R/C	1	7	1 É/W	4 L	4	9
40			200	AY	652	Nexus **DREAMER**, BP/GP		*Calimero x Tradition*	**2194**	83	106	366	18	.05	8	-.07	72	**10**	8	6	10	10	0	7	8	6	5 R/C	4	7	10 R/C	0	1	2
JERSEY																																	
45			200	JE	477	Lucky Hill **JOKER** NC	N	*Blackstone x Legion*	**M1736**	74	68	1885	81	-.18	64	-.11	38	**3**	3	-3	6	5	2 P/D	–	0	1	1 R/C	4	–	–	3 C/S	-5	–
55		✓	200	JE	470	Comestar JDF **BEAUTIFULL** ET, B/G *JH1	N	*Iatola x First Prize*	**1664**	76	37	236	32	.31	23	.21	25	**11**	8	12	5	7	7 H/S	6	6	4	4 R/C	5	4	5 R/C	6 L	7	8
45			200	JE	463	Gillard **PANCHO** ET, BP/GP		*Legacy x Centurion*	**1608**	82	48	906	63	.23	41	.08	43	**3**	1	1	5	4	1 P/D	0	6	0	1 É/W	2	0	0	6 C/S	-1	-3
32			200	JE	946	Sunset Canyon **DICE**-ET, Ex *JH1		*Jace x Lemvig*	**1565**	92	210	78	61	.83	30	.40	165	**1**	5	1	-5	0	1 P/D	0	5	5	14 R/C	6	3	14 R/C	1 C/S	4	-3
25	I		200	JE	314	Hollylane Lilibet's **LEGACY**, TB/VG		*Perimiter x Renaissance*	**1532**	98	1383	86	25	.30	21	.26	1232	**3**	5	4	-3	3	6 H/S	4	7	0	1 É/W	1	-3	2 R/C	2 C/S	4	4
40			200	JE	349	Dutch Hollow **IMAGINATION-P**, NC		*Iatola x Legion*	**1477**	81	49	718	42	.10	31	.05	44	**2**	2	3	-2	4	1 P/D	4	5	-2	1 R/C	0	4	10 R/C	1 C/S	0	5
38			200	JE	163	Greenmoor **JAG**, TB/VG	N	*Iatola x Counciller*	**1407**	79	51	408	32	.17	21	.08	28	**4**	5	3	2	5	2 H/S	4	6	0	3 R/C	0	-1	0	6 L	4	1
28			200	JE	430	Lencrest **ON TIME**, TB/VG *JH1		*Sultan x Declo*	**1399**	97	814	746	29	-.11	38	.14	683	**4**	5	7	1	3	2 P/D	3	-2	6	2 R/C	9	6	2 R/C	1 L	4	4
20			200	JE	340	Verdurelea **RESOLUTION**, NC		*Big Time x Hallmark*	**1348**	85	57	79	29	.36	11	.12	49	**6**	6	0	0	3	6 H/S	6	0	2	5 R/C	6	5	2 R/C	8 C/S	-5	-2
15		✓	200	JE	423	Lencrest **BLACKSTONE**-ET, TB/VG		*Parade x Declo*	**1337**	98	1050	709	40	.07	36	.13	893	**2**	2	0	4	4	1 P/D	0	3	-1	1 R/C	4	4	1 R/C	2 C/S	-2	-6
35			200	JE	352	Hometown **ON THE MONEY**, TB/VG		*On Time x Counciller*	**1169**	84	80	733	24	-.16	28	.02	65	**3**	-1	4	7	11	5 P/D	-1	-4	3	6 É/W	1	4	3 É/W	2 L	3	5
SUISSE BRUNE/BROWN SWISS																																	
45			196	BS	16092	Alders Wagor **NELGOR** *TM, NC		*Wagor x Cowboy*	**M1678**	73	90	1402	24	-.41	42	-.10	87	**8**	12	4	-1	4	9 H/S	—	10	-2	3 R/C	10	8	10 R/C	9 C/S	-2	—
32			200	BS	2	Olson MILLENIUM ET, NC *BH2		Zeus x Brinks	**1547**	80	46	535	24	.01	24	.04	38	**2**	7	-1	-3	-4	6 H/S	10	3	4	1 R/C	6	4	3 É/W	10 C/S	4	3
50			200	BS	113	Olsons Macys Vigor MAC	N	*Vigor x Scipio*	**1424**	67	18	83	10	.06	7	.04	11	**8**	10	9	-1	0	6 H/S	3	7	6	6 R/C	10	5	2 R/C	6 C/S	9	2
15			200	BS	301	Gubelman Vigor DASHER ET, NC *BH1*BH2		*Vigor x Gordon*	**1351**	79	42	205	9	.02	29	.23	35	**5**	7	2	0	2	6 H/S	-1	7	5	6 R/C	8	-2	1 É/W	4 L	6	7
30			200	BS	406	Hilltop Acres GOLDMINE, TB/VG *BH1*BH2		*Dynasty x Dalton*	**1202**	88	143	240	1	-.11	18	.08	112	**4**	5	2	5	-5	0	11	6	-2	6 R/C	1	9	7 R/C	2 C/S	0	-6
35			200	BS	408	Swiss Fantasy FERRARI ET, NC *BH1		*Dynasty x Prelude*	**1135**	82	51	235	8	-.01	15	.06	48	**6**	6	3	6	6	4 P/D	9	9	1	2 R/C	-2	9	0	2 L	-4	-5
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