Alberta Agriculture and Forestry

Growing Forward 2
A federal-provincial-territorial initiative

AgriProfit$



AgriProfit$ Business Analysis and Research Program

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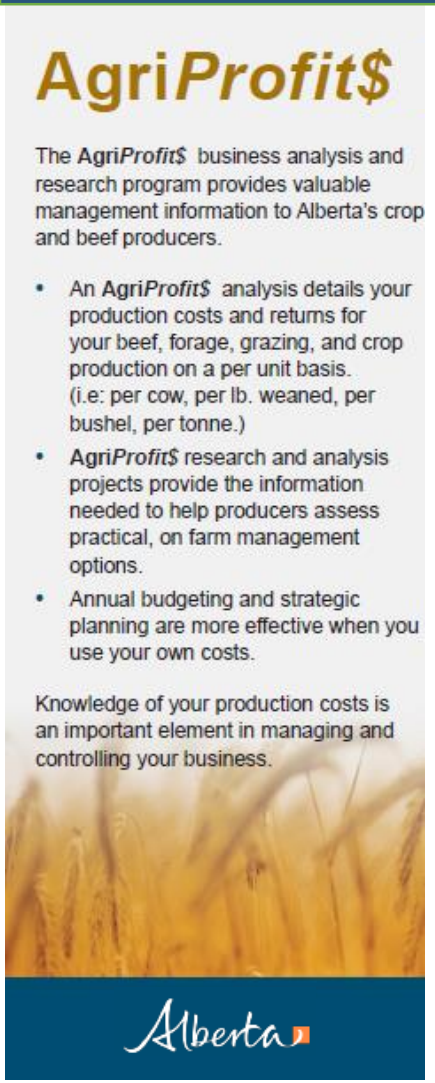
Outline

- AgriProfit$ Business Analysis and Research Program (*AgriProfit$)*
- 20-Year Historic Cow-Calf Economic, Production, and Financial Benchmarks
- AgriProfit$ GHG Simulation Module (Phase 1)

What is it?

- A cost of production program to inform public and help farmers with decision making
- Started in 1990
- Covers all crops, cow-calf, drylot, and grasser enterprises
- Based on producers' accounting, financial, and production information collected by interviewers
- Methodology reflects the accrual-adjusted method
- Produces customized reports (balance sheet, income statement, enterprise analyses) and provincial benchmarks

How does it work?



- A list of participants is formed and farm visits are scheduled
- During the farms visits financial and production data are collected in electronic form by trained interviewers
- Data are received and processed in the office
- Customized economic reports are mailed to the participants
- Individual meetings with participants are scheduled on request
- Sample benchmarks are produced, published, and send to participants

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Software and technology

- Data transfers
- Reporting
- Benchmarking

User Interface

Benefits for participants

- A detailed financial analysis of their farms (i.e. balance sheet and income statement)
- A detailed economic analysis by enterprise (i.e. cow/calf, cereal, and oilseeds)
- Productions costs and returns on a per unit output (bushel, tonne) and unit of investment (acre, cow) basis
- Benchmarks reports comparable by region and soil zone
- AgriProfit$ applied research information and bulletins

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Example of cash expenses data table

Return to Farm | Help

Producer: John Smith
Farm Name: John Smith Ltd

Expenses - Cash Basis (2016)

Code	General Farm	Description	Total ($)	Percent Allocated to:							Total % (must be 100)
				Cereals/ Oilseeds	Forage	Pasture	Cow-Calf	Beef Drylot	Other Farm	Non-Farm/ Personal	
1	2	3	4	5	6	7	8	9	15	16	17
Calculated Total			39861								
Example:	Fuel, Oil & Lube (85)		1350	30	30	10	5	5	20		100
81	Repair & Maintenance - Buildings (81)		1412.36				80.0	10.0		10.0	100
82	Repair & Maintenance - Machinery (82)		13426.25	25.0	25.0		25.0		25.0		100
83	Custom Work and/or Machine Rental (83)		132						100.0		100
84	Other Trucking Costs - not on module (84)		528	100.0							100
85	Fuel, Oil & Lube (85)		7987.2	25.0	25.0		25.0	25.0			100
86	Small Tools & Miscellaneous (86)		423.02						100.0		100
87	Land Tax (87)		1315.82	13.0	33.0	54.0					100
88	Vehicle License/Reg. & Insurance (88)		2312.25	25.0	25.0		20.0	10.0	10.0	10.0	100
89	Bldgs/Lvstk Licenses & Insurance (89)		4317	**Hi: 20**	20.0		25.0	10.0	20.0	5.0	100
90	Office Supplies (90)		285	20.0	20.0	20.0	20.0	20.0			100
91	Utilities - Natural Gas/Propane (91)		891.02	10.0	10.0		20.0		50.0	10.0	100
92	Utilities - Electricity (92)		2994.62	20.0	20.0	20.0	20.0	20.0			100
93	Utilities - Phone (93)		2959.64	**Hi: 20**	20.0	**Hi: 20**	20.0	20.0			100
94	Professional Fees (94)		0								0
95	Association Dues & Advertising (95)		135.5	20.0	20.0	20.0	20.0	20.0			100
96	Travel (96)		141.75	20.0	20.0	20.0	20.0	20.0			100
97	Tack, Horse, Guard Dog (97)		420				75.0		25.0		100
98	Other (98)		179.45	20.0	20.0	20.0	20.0	20.0			100

Example of cow-calf breeding/calving data table

Return to | Help

Producer: John Smith
Farm Name: John Smith Ltd

Cow-Calf Enterprise (2016)

Gestation Information

A Breeding Season (brought from previous year) Information - Pasture 2015

	Cows		Heifers		Total
Number of Bulls Used	22		9		31
Date bulls turned out	July 15, 2016	(mm/dd/yyyy)	July 15, 2016	(mm/dd/yyyy)	
Trigger date	April 13, 2017	(mm/dd/yyyy)	April 13, 2017	(mm/dd/yyyy)	
Date bulls removed/pulled from pasture	October 8, 2016	(mm/dd/yyyy)	September 15, 2016	(mm/dd/yyyy)	
B Females Exposed	416		122		538
(Number Pregnancy Checked)	0		122		122
Less: - Open Females Sold (Cull)	44		9		53
- Died Prior to Calving	6		3		9
- Bred Cows Sold (include culls)	0		0		0
Add: + Bred Females Purchased	18		29		47
Less: - Open or Kept to be Re-Bred	0		0		0
C 'Expected' to Calve in 2016	384		139		523

D Calving Information - Spring 2016

	Cows		Heifers		Total
Date of First Calf	April 20, 2016	(mm/dd/yyyy)	April 20, 2016	(mm/dd/yyyy)	
Cows Calved Before Trigger Date	0		0		0
Cycle 1 (day 1-21)	231		115		346
Cycle 2 (day 22-42)	102		16		118
Cycle 3 (day 43-63)	31		5		36
Cycle 4 (day 64+)	20		3		23
Total					
Date of Last Calf	June 30, 2016	(mm/dd/yyyy)	June 30, 2016	(mm/dd/yyyy)	
Calving Period (days)	72		72		72

Example of crop and rations inventories data table

Return to Farm | Help

Producer: John Smith
Farm Nam John Smith Ltd

Crop and Rations Inventories (2016)

What Percentage (%) of STRAW is CONSUMED as feed?

Code	Commodity					Opening Inventory		Production	Purchased Feed		Sales	Fed to Cow-Calf	
	Crop	Farmer Description	Unit Type	lbs/bale	% Moisture	# of units	$/unit	total # of units	# of units	$/unit	# of units	# of units	$/unit
1	2	3	4	5	6	7	8	9	10	11	12	13	14
											DM Intake	24 lb/AU/d	
Calculated Total													
Example:	Feed Barley (8)		Bushel		12.4	68436	7	38120	0	0	56556	0	0
200	Alfalfa Hay (200)		Tonne		15.0	242.2	$198.36	100.0	1.0	$1.00	1.0	1,454.1	176.3
200	Alfalfa Hay (200)		Tonne		15.0	268.5	$198.36	1.0	1.0	$1.00	1.0	0.0	0.0
214	Mixed Grass Hay (214)		Tonne		15.0	0.0	$0.00	0.0	0.0	$0.00	0.0	0.0	0.0
230	Greenfeed (230)		Tonne		65.0	371.9	$181.83	0.0	0.0	$0.00	0.0	978.0	90.9
234	Other Silage (234)		Tonne		65.0	205.0	$99.18	0.0	0.0	$0.00	0.0	0.0	0.0
240	Grain Straw - General/Bedding (240)		Tonne		12.0	0.0	$0.00	0.0	0.0	$0.00	0.0	238.0	61.6

Example of grazing data table

Return to | Help

Producer: John Smith
Farm Nam John Smith Ltd

Grazing Information (2016)

Field/ Pasture No.	Code	Crop	Farmer Description	Total Acres	Number of Days	Or		Number of Head						
						Date In (mm-dd-yyyy)	Date Out (mm-dd-yyyy)	Cows or C/C Pairs	Bred Heifers	Repl't Heifers	Bulls	Grass Ylg's	Horses	Other
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							Grazing Load	Hi: 8 AUM/hd	0 AUM/hd	3 AUM/hd	2 AUM/hd	0 AUM/hd		
					Enter Avg Weights here in Lb/Hd:			1400	1000	950	2200			
Example:	Code	Alfalfa/Grass Pasture (300)	North Field	100	30	42156	42185	100	0	15	3	0	0	0
P2	305	Tame Grass Pasture (305)	Nancy's	58	53.0	06/09/2016	08/01/2016			31	1			
P2	305	Tame Grass Pasture (305)	Nancy's	58	59.0	08/31/2016	10/29/2016			31				
P1	305	Tame Grass Pasture (305)	home	160	58.0	06/04/2016	08/01/2016	28			1			
P1	305	Tame Grass Pasture (305)	home	160	58.0	06/05/2016	08/02/2016	29			1			
P1	305	Tame Grass Pasture (305)	home	160	32.0	08/31/2016	10/02/2016	47						
P3	305	Tame Grass Pasture (305)	Brians	320	83.0	06/09/2016	08/31/2016	30			1			
P3	305	Tame Grass Pasture (305)	Brians	320	52.0	08/31/2016	11/22/2016	40						
P4	312	Annual Cereal (312)	10	25	30.0	08/01/2016	08/31/2016	57		31	1			
P6	312	Annual Cereal (312)	5	28	21.0	10/02/2016	10/23/2016	47						
P6	312	Annual Cereal (312)	5	28	25.0	10/30/2016	11/24/2016	87		31				
P5	312	Annual Cereal (312)	11	34	45.0	11/24/2016	12/31/2016	87		31				

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Example of cattle purchases data table

Back to CowCalf | Help

Producer: John Smith
Farm Name: John Smith Ltd

Production & Breeding Stock Purchases (Transferred In)

Code	Livestock Category	Sale / Transfer Date (mm/dd/yyyy)	No. of Head	Cash/ CMV	by Total		OR by Average		Gross Value ($)	Deductions ($) (enter 0 if no expenses)		Net Value ($)	Average Weight (lb/hd)	Average Value ($/Hd)	Average Value ($/lb)
					Total Weight (lbs)	Total Gross Value ($)	Average Weight (lbs/hd)	Average Value ($/lb)		Trucking	Other				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Calculated Total			113		0				204,025	0	0	204,025			
	Breeding Herd Purchased for Cash														
Example:	Bulls	June 15,2016	2	Cash	2400	8000									
61	Open Heifers (61)	March 17, 2016	65	Cash	0.0	$115,375.00	800.0		$115,375.00	$0.00	$0.00	$115,375.00	800.0	$1,775.00	**Lo: 2**
61	Open Heifers (61)	November 17, 2016	29	Cash	0.0	$51,300.00	881.0		$51,300.00	$0.00	$0.00	$51,300.00	881.0	$1,768.97	**Lo: 2**
43	Bred Cows (43)	November 17, 2016	18	Cash	0.0	$31,450.00	1,040.0		$31,450.00	$0.00	$0.00	$31,450.00	1,040.0	$1,747.22	$1.68
41	Bulls (41)	December 7, 2016	1	Cash	0.0	$5,900.00	1,500.0		$5,900.00	$0.00	$0.00	$5,900.00	1,500.0	$5,900.00	**Hi: 4**

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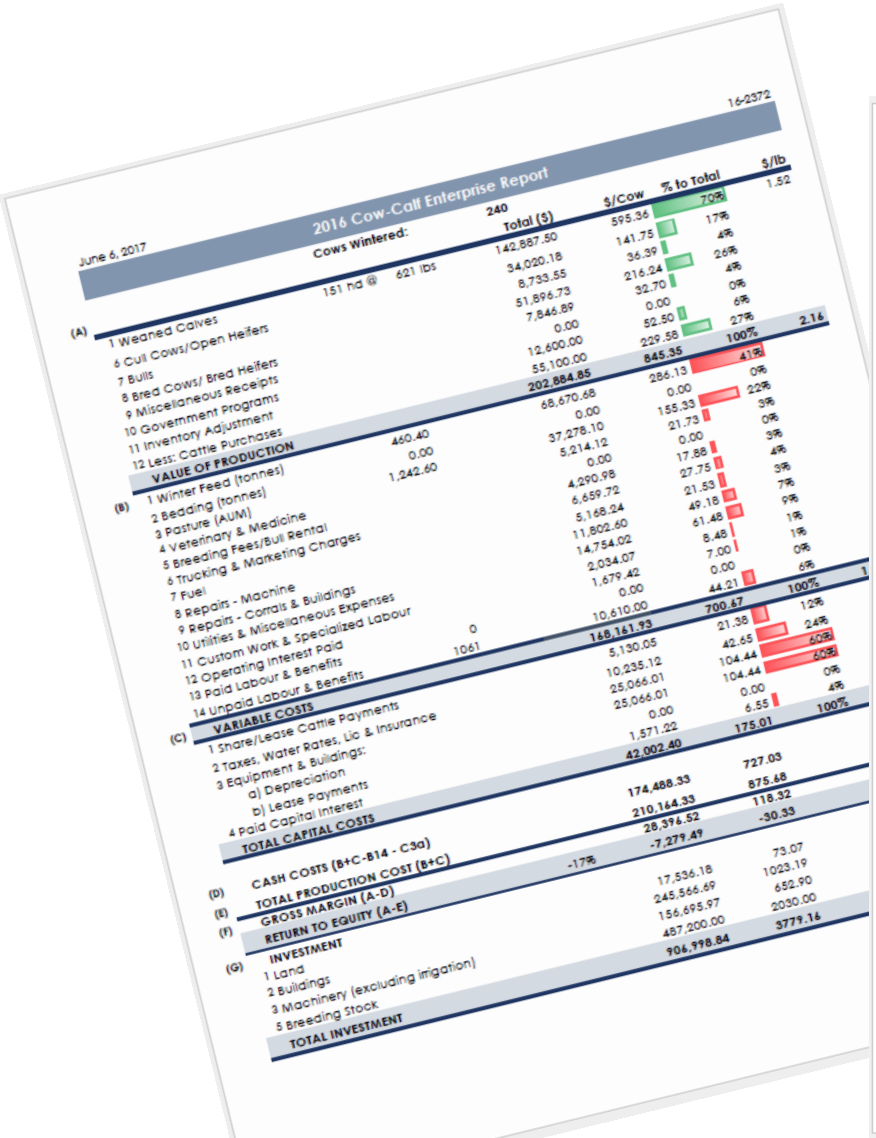
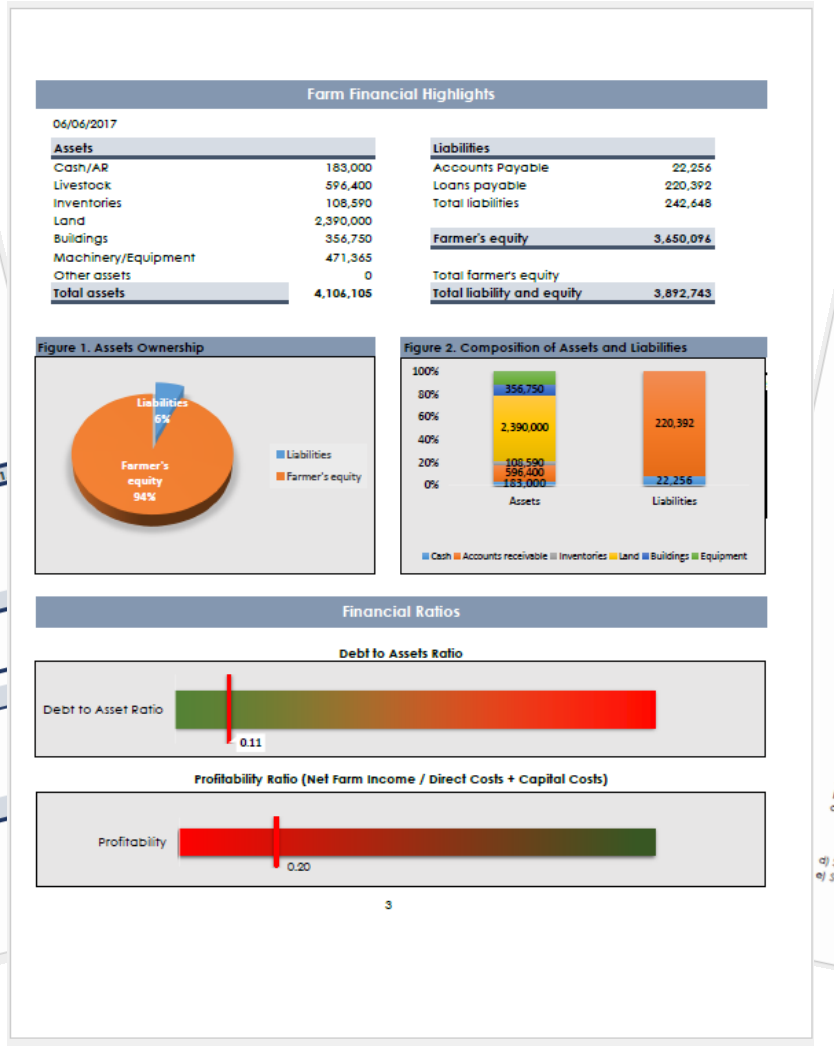
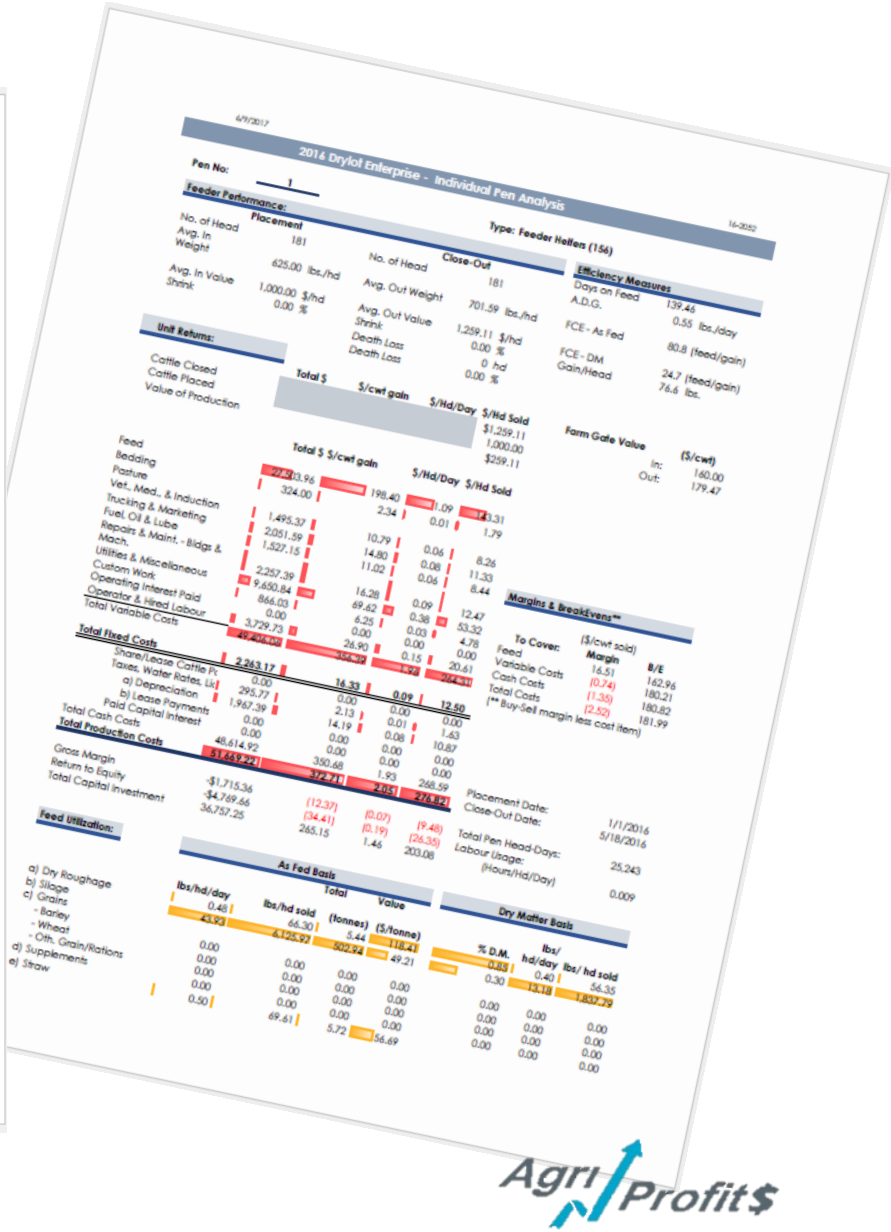
Examples of reports







Examples of provincial benchmarks

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Table 2. Economic Performance Indicators ($/Cow Wintered)

	2011	2012	2013	2014	2015	Average of Years
Average Farm Size (wintered cows)	212	198	205	217	190	205
			$/Cow Wintered			
(A) 1. Weaned Calves	787.49	715.99	843.54	1,465.08	1,350.33	1,033.57
6. Cull Cows/Open Heifers	142.54	158.91	147.13	296.40	272.13	203.44
7. Bulls	16.56	25.87	20.33	42.32	32.47	27.55
8. Bred Cows/Bred Heifers	23.30	16.14	20.56	9.88	19.34	17.78
9. Miscellaneous Receipts	0.73	0.00	0.59	0.00	1.21	0.52
10. Government Programs	0.00	0.12	0.12	0.29	6.02	1.21
11. Inventory Adjustment	192.97	87.01	94.14	93.07	18.04	98.84
12. Less: Cattle Purchases	270.74	274.66	306.12	475.53	791.90	419.15
Value of Production	**892.85**	**728.99**	**820.29**	**1,431.51**	**907.63**	**967.36**
(B) 1. Winter Feed	214.75	265.77	274.04	330.47	307.40	278.36
2. Bedding	10.95	11.67	19.25	10.26	16.48	13.64
3. Pasture	259.39	218.16	194.82	273.70	232.04	236.40
4. Veterinary & Medicine	16.83	18.49	20.66	22.93	26.55	21.03
5. Breeding Fees/Bull Rental	1.14	0.73	0.45	0.00	3.41	1.10
6. Trucking & Marketing Charges	11.68	12.15	15.31	16.67	21.03	15.30
7. Fuel	13.65	13.95	16.08	19.62	14.08	15.54
8. Repairs - Machine	10.43	11.47	12.26	15.04	11.90	12.25
9. Repairs - Corrals & Buildings	5.33	4.41	8.97	6.45	10.54	7.09
10. Utilities & Miscellaneous Expenses	13.09	15.33	18.47	18.44	26.41	18.22
11. Custom Work & Specialized Labour	4.47	5.75	3.28	6.20	7.86	5.48
12. Operating Interest Paid	2.63	1.01	0.63	1.28	2.78	1.65
13. Paid Labour & Benefits	15.95	13.26	7.90	10.85	14.38	12.44
14. Unpaid Labour	32.79	31.47	35.16	38.14	34.95	34.55
Variable Costs	**613.08**	**623.61**	**627.29**	**770.04**	**729.79**	**673.87**
(C) 1. Share/Lease Cattle Payments	2.27	1.99	11.99	0.00	3.19	3.77
2. Taxes, Water Rates, Lic. & Insurance	6.56	7.95	9.57	8.63	10.16	8.54
3. a) Equipment & Building Depreciation	29.02	34.94	33.47	34.11	46.52	35.40
b) Lease Payments	0.42	1.00	3.01	2.66	0.31	1.51
4. Paid Capital Interest	4.58	3.70	3.47	2.23	3.51	3.49
Total Capital Costs	**42.84**	**49.57**	**61.12**	**47.63**	**63.69**	**52.71**
(D) **Cash Costs (B+C-B14-C3a)**	**594.11**	**606.78**	**619.77**	**745.42**	**712.01**	**656.63**
(E) **Total Production Costs (B+C)**	**655.92**	**673.18**	**688.40**	**817.67**	**793.48**	**726.58**
(F) **Gross Margin (A-D)**	**298.74**	**122.21**	**200.52**	**686.08**	**195.62**	**310.7**
Return to Unpaid Labour (A-E+B14)	**269.71**	**87.27**	**167.05**	**651.98**	**149.09**	**275.**
Return to Investment (A-E+C4)	**241.50**	**59.50**	**135.36**	**616.06**	**117.65**	**244.**
Return to Equity (A-E)	**236.92**	**55.80**	**131.89**	**613.83**	**114.15**	**240**

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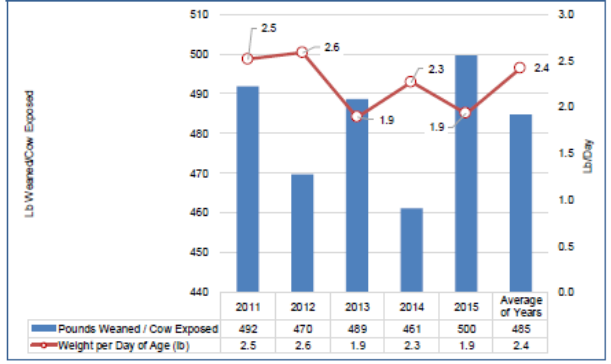
Figure 3. Physical Performance



	2011	2012	2013	2014	2015	Average of Years
Pounds Weaned / Cow Exposed	492	470	489	461	500	485
Weight per Day of Age (lb)	2.5	2.6	1.9	2.3	1.9	2.4

Figure 4. Winter Feed Use

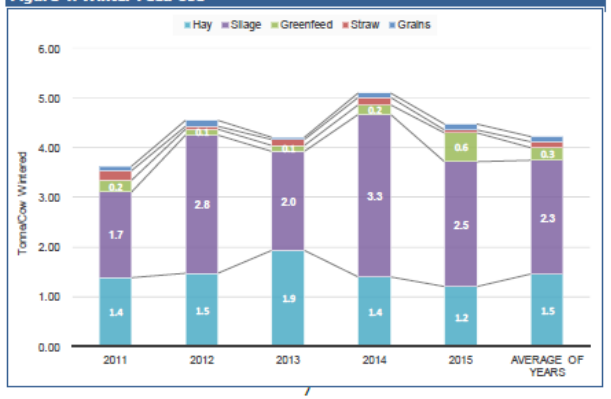


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Table 3. Physical Performance Indicators

	2011	2012	2013	2014	2015	Average of Years
BREEDING SEASON INFORMATION						
Start of Breeding Period	6/26/10	7/6/11	6/19/12	6/30/13	6/24/14	6/27/12
- no. of days	92	85	97	69	76	84
Length of Calving Period (days)	88	96	95	95	99	93
FEMALES EXPOSED						
+ Bred Females Purchased	236	216	230	247	216	228
- Bred Females Sold	11	5	5	11	1	7
- Open Cows Culled	7	12	8	4	14	10
- Open Females Kept Back to be Re-Bred	23	20	22	33	18	22
- Cow Deaths Prior Calving	4	3	2	2	1	3
COWS/HEIFERS CALVED	3	2	1	3	3	2
+ Set of Twins	210	184	202	216	182	198
- Calves Born Dead / Aborted	3	3	4	5	3	3
LIVEBIRTHS	8	7	7	7	6	7
- Pasture Loss (after 24 hours)	206	180	199	214	179	194
+ Baby Calves Purchased	7	7	6	8	5	7
- Baby Calves Sold	0	0	0	1	2	1
CALVES WEANED	1	0	0	1	1	0
	198	172	192	207	176	188
SELECTED FEEDING PERFORMANCE						
Days on Feed	139	160	176	170	182	160
Winter Feed Use Total as Fed (tonne AF/cow)	3.6	4.6	4.2	5.1	4.5	4.2
a) Hay	1.4	1.5	1.9	1.4	1.2	1.5
b) Silage	1.7	2.8	2.0	3.3	2.5	2.3
c) Greenfeed	0.2	0.1	0.1	0.2	0.6	0.3
d) Straw (feed)	0.2	0.1	0.1	0.2	0.1	0.1
e) Grains	0.1	0.1	0.1	0.1	0.1	0.1
PHYSICAL PERFORMANCE INDICATORS						
Conception Rate (%)	87	88	89	85	89	88
Calving Rate (%)	98	98	98	99	98	98
Weaning Rate (%)	96	96	97	97	98	97
Calf Crop (%)	82	83	85	81	86	83
Females Calved in First 2 Cycles (%)	84	83	86	88	87	85
ounds Weaned / Cow Exposed	492	470	489	461	500	485
lean Weight as a % of Cow Weight	45	42	44	42	44	44
eight per Day of Age (lb)	2.5	2.6	1.9	2.3	1.9	2.4
ture Cow Weight (lb)	1,375	1,403	1,369	1,398	1,366	1,381

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Benefits for Alberta public

- Up-to-date high quality financial and production information available for general public and government agencies. Collected production information is very detailed that makes it unique in Canada and internationally

- AgriProfit$ applied research media publications like newsletters bulletins, and presentations

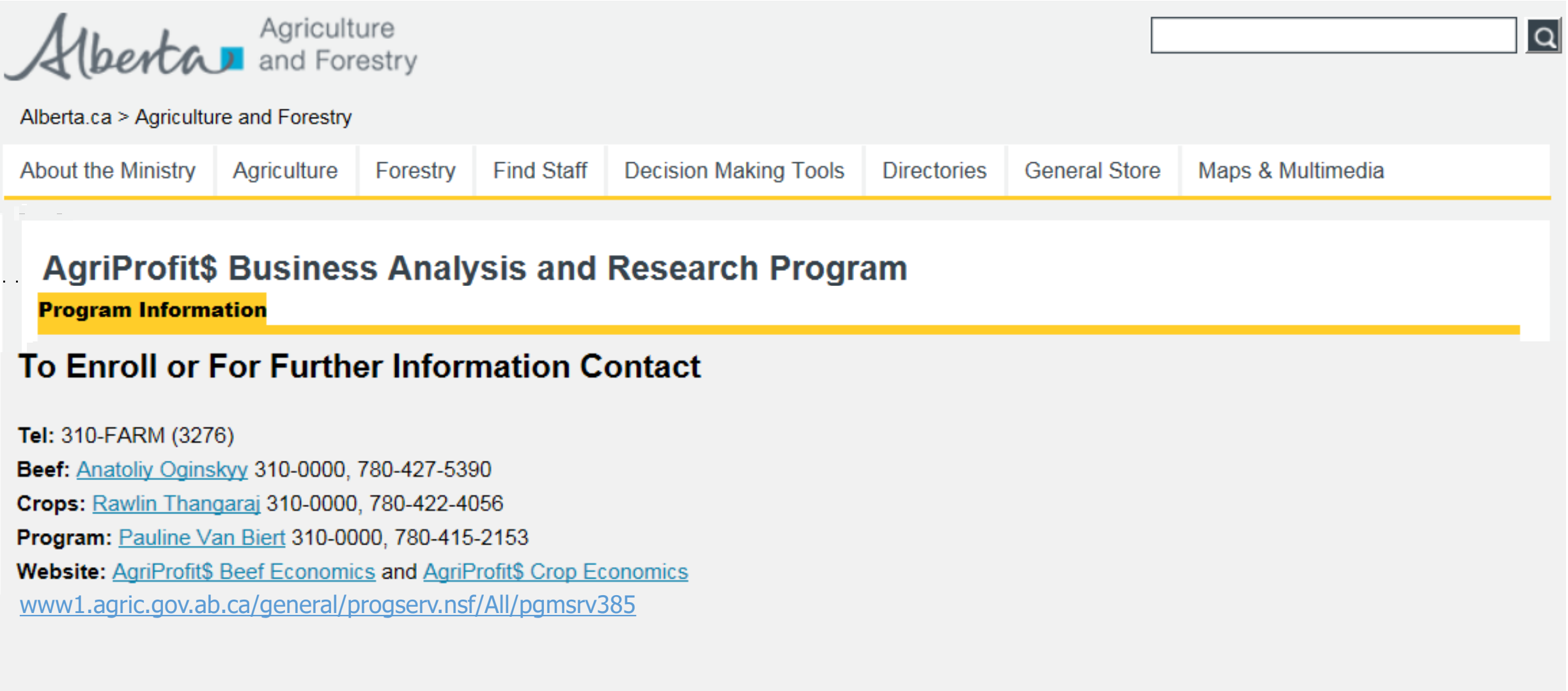
- More then 20-year comprehensive dataset that can be used for in-depth trend exploration, policy analysis, modeling, and forecasting

Future developments

AgriSustainability

- Extending business analysis capabilities
- Flexibility in surveying emerging issues, mgmt. practices, and policies/regulations
- Historical enterprise (cow/calf, crops, etc.) and thematic benchmarking (feed rations, breeding genetics, etc.)
- Sustainability benchmarking by combining social, economic, and environmental indicators

Whom to contact



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AgriProfit$ Business Analysis and Research Program

Program Information

To Enroll or For Further Information Contact

Tel: 310-FARM (3276)

Beef: Anatoliy Oginskyy 310-0000, 780-427-5390

Crops: Rawlin Thangaraj 310-0000, 780-422-4056

Program: Pauline Van Biert 310-0000, 780-415-2153

Website: AgriProfit$ Beef Economics and AgriProfit$ Crop Economics

www1.agric.gov.ab.ca/general/progserv.nsf/All/pgmsrv385

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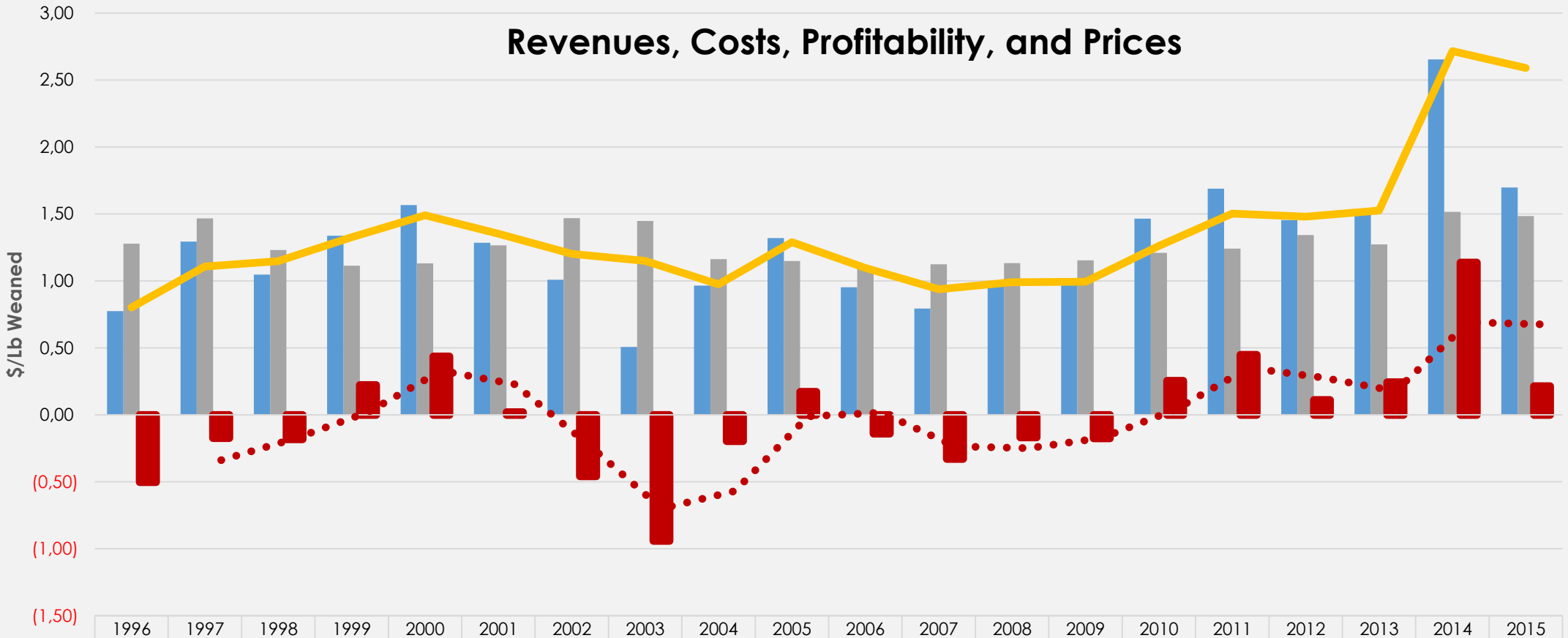
Cow/Calf Historic Benchmarks

Motivation

- Increase the amount of information derived from the collected data by by generating and maintaining general purpose and thematic historic benchmarks for public and government use, and for in-depth trend exploration, modeling, and forecasting

Does the sample reflect external conditions and shocks?



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Revenue ($/lb W)	0,78	1,29	1,05	1,34	1,57	1,29	1,01	0,51	0,97	1,32	0,95	0,79	0,96	0,98	1,46	1,69	1,45	1,52	2,65	1,70
Total Cost ($/lb W)	1,28	1,47	1,23	1,11	1,13	1,27	1,47	1,45	1,16	1,15	1,09	1,12	1,13	1,15	1,21	1,24	1,34	1,27	1,52	1,48
Net Return ($/lb W)	(0,50)	(0,17)	(0,18)	0,22	0,44	0,02	(0,46)	(0,94)	(0,20)	0,17	(0,14)	(0,33)	(0,17)	(0,18)	0,25	0,45	0,11	0,24	1,14	0,21
November Price ($/lb W)	0,80	1,11	1,15	1,33	1,49	1,35	1,20	1,15	0,97	1,29	1,10	0,94	0,99	0,99	1,26	1,50	1,48	1,53	2,72	2,59

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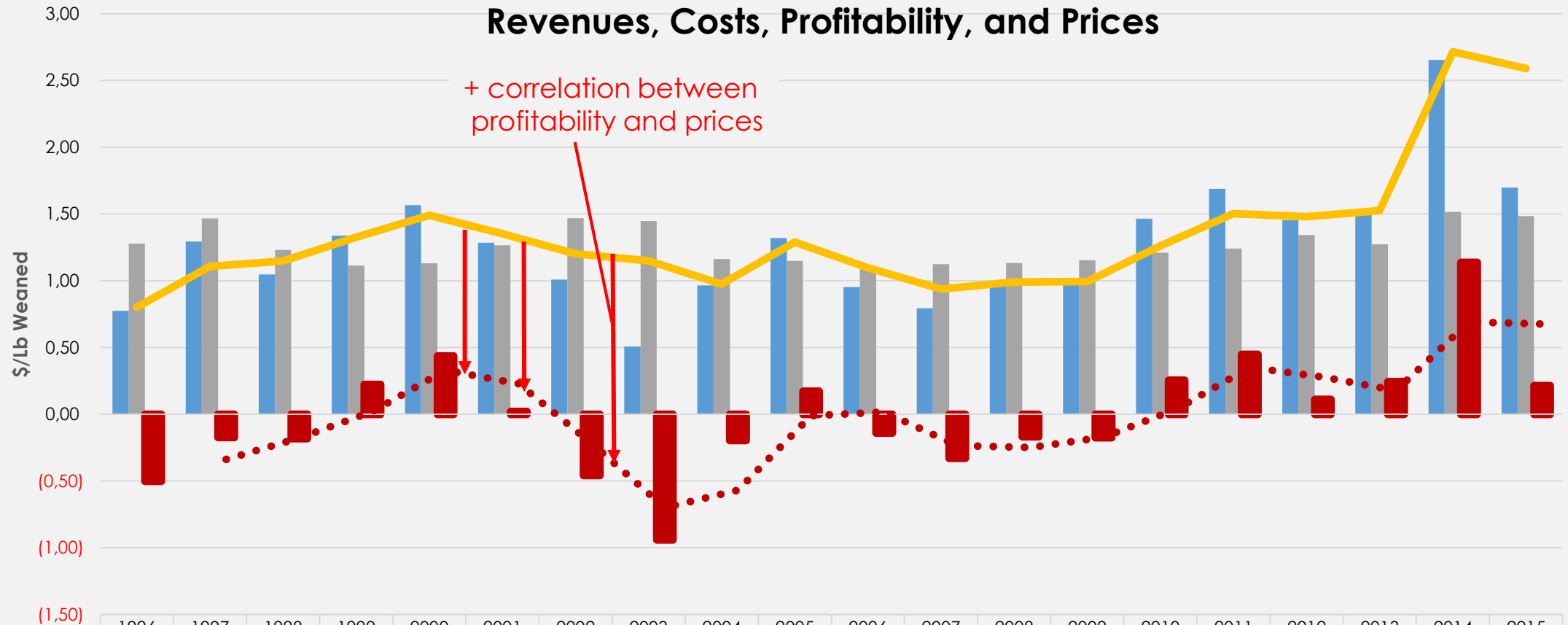
AgriProfit$

Does the sample reflect external conditions and shocks?



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Revenue ($/lb W)	0,78	1,29	1,05	1,34	1,57	1,29	1,01	0,51	0,97	1,32	0,95	0,79	0,96	0,98	1,46	1,69	1,45	1,52	2,65	1,70
Total Cost ($/lb W)	1,28	1,47	1,23	1,11	1,13	1,27	1,47	1,45	1,16	1,15	1,09	1,12	1,13	1,15	1,21	1,24	1,34	1,27	1,52	1,48
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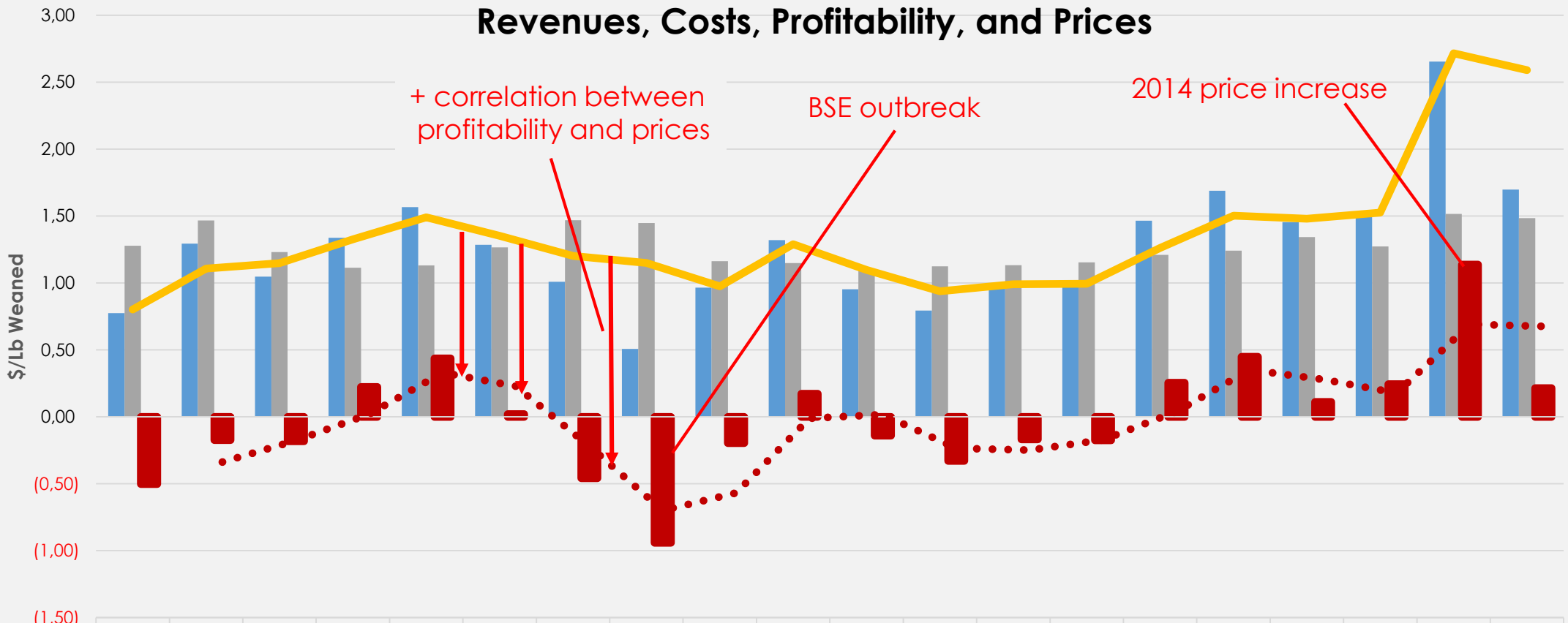

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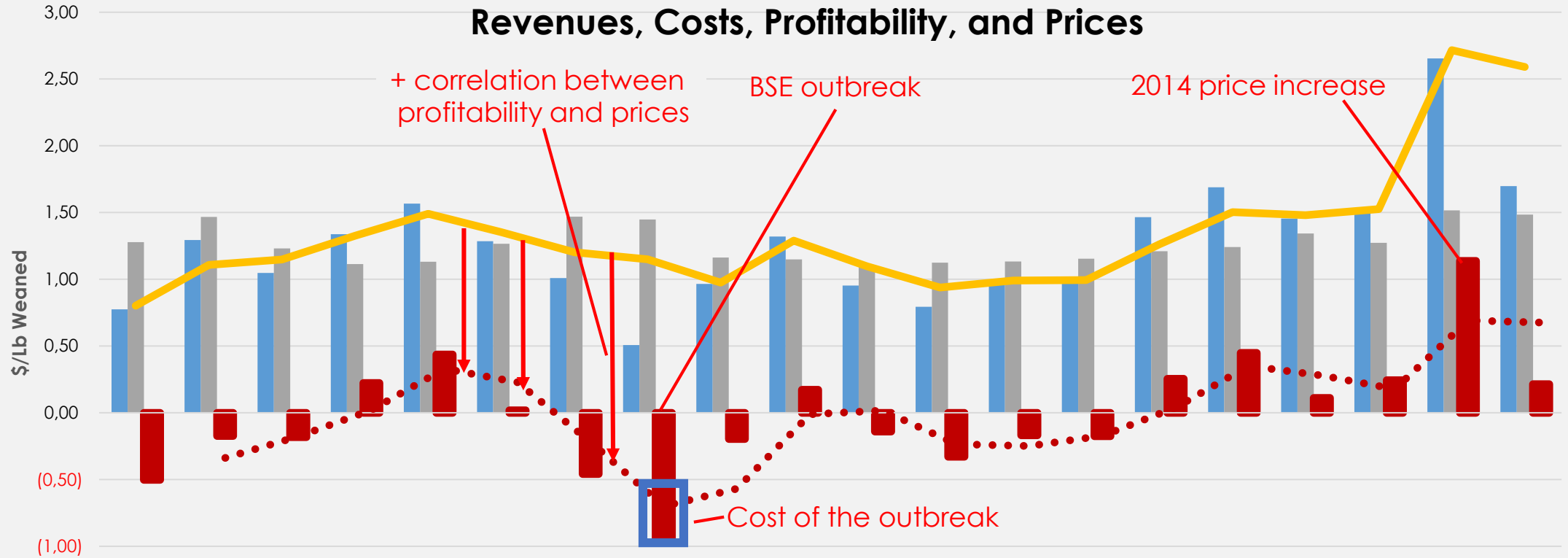

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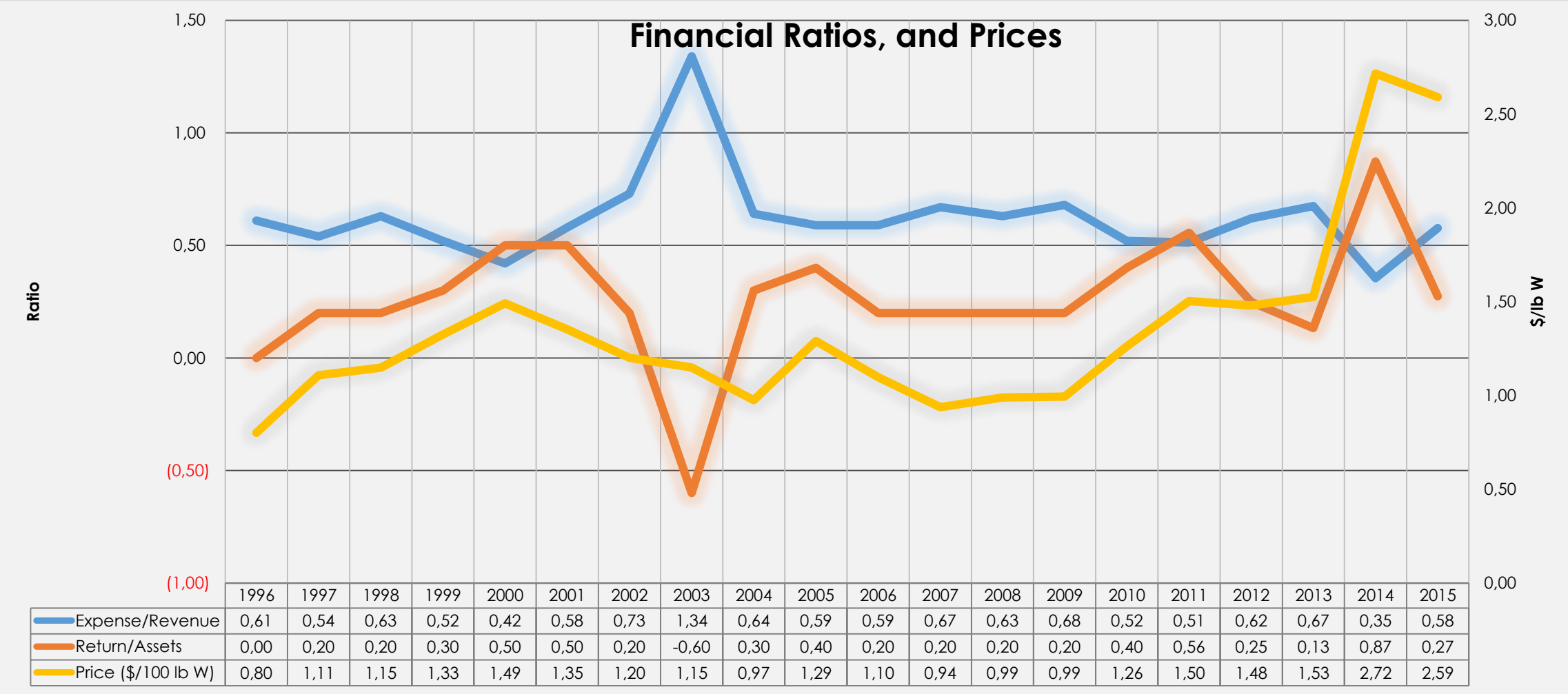
Can the price be used to estimate farm financial health?



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Expense/Revenue	0,61	0,54	0,63	0,52	0,42	0,58	0,73	1,34	0,64	0,59	0,59	0,67	0,63	0,68	0,52	0,51	0,62	0,67	0,35	0,58
Return/Assets	0,00	0,20	0,20	0,30	0,50	0,50	0,20	-0,60	0,30	0,40	0,20	0,20	0,20	0,20	0,40	0,56	0,25	0,13	0,87	0,27
Price ($/100 lb W)	0,80	1,11	1,15	1,33	1,49	1,35	1,20	1,15	0,97	1,29	1,10	0,94	0,99	0,99	1,26	1,50	1,48	1,53	2,72	2,59

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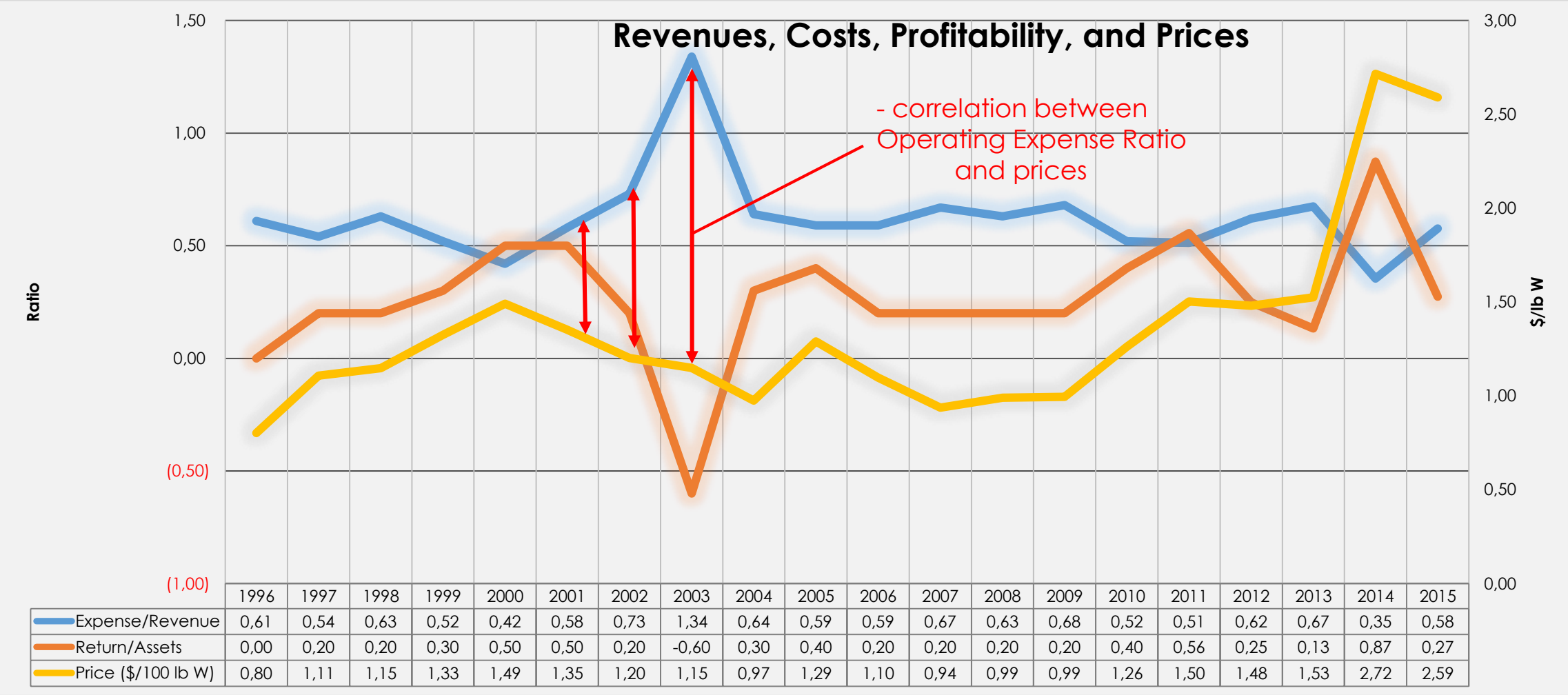

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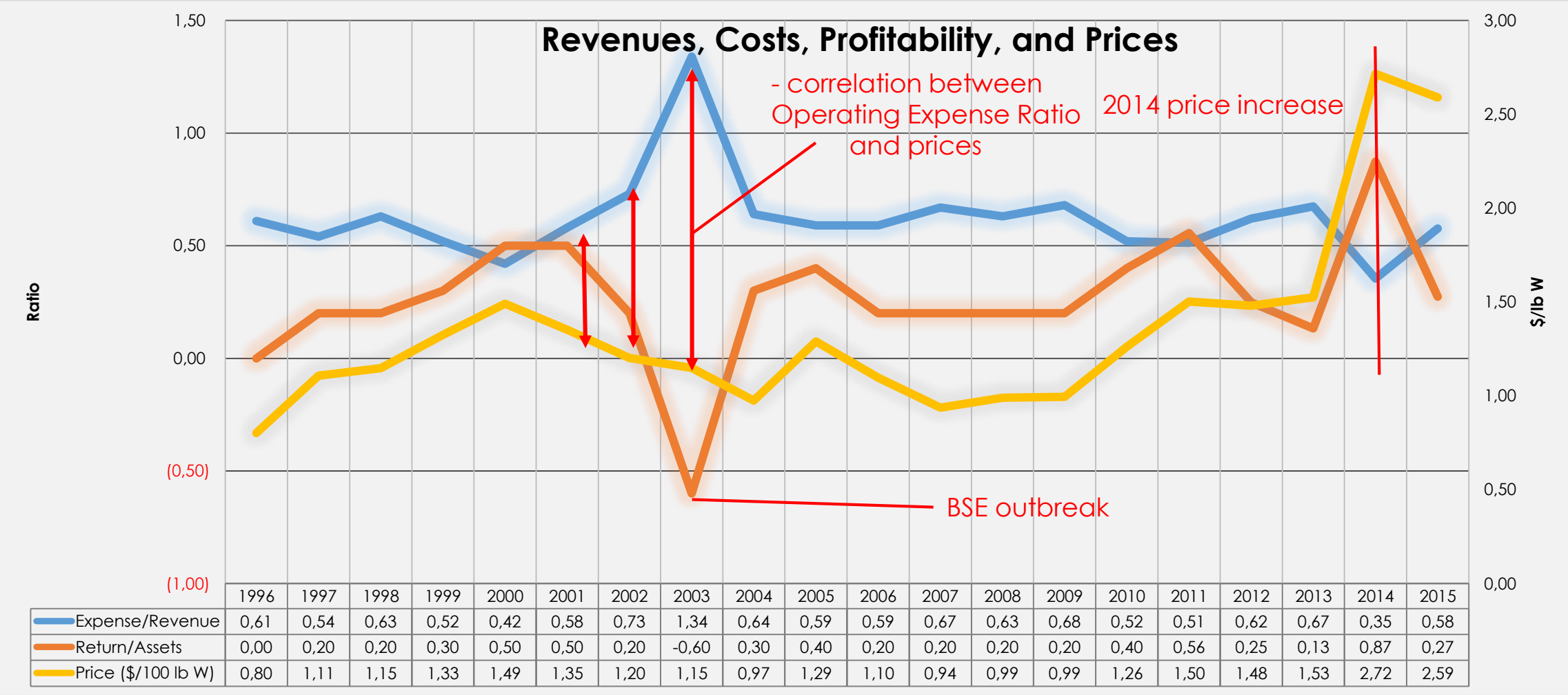

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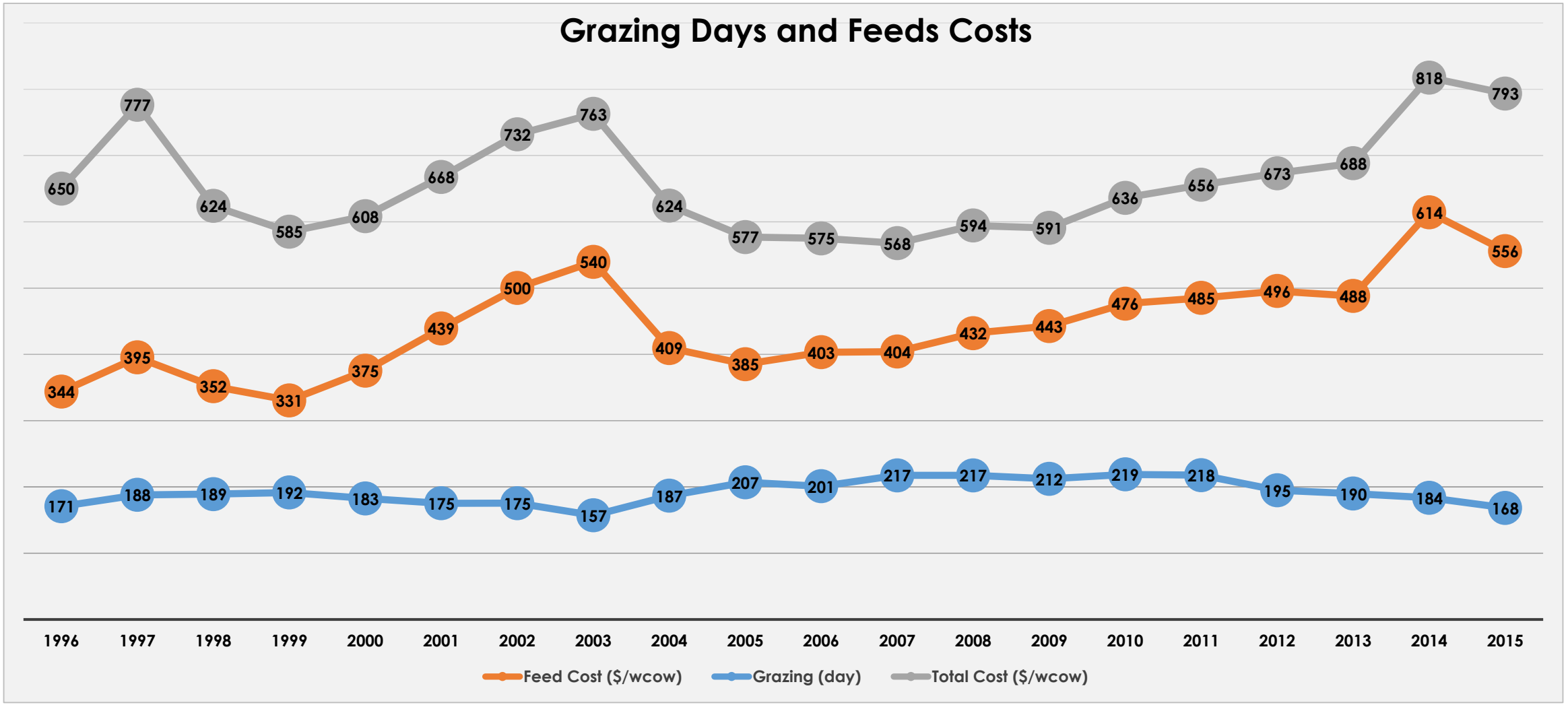
Does data support that extended grazing decreases feed cost?



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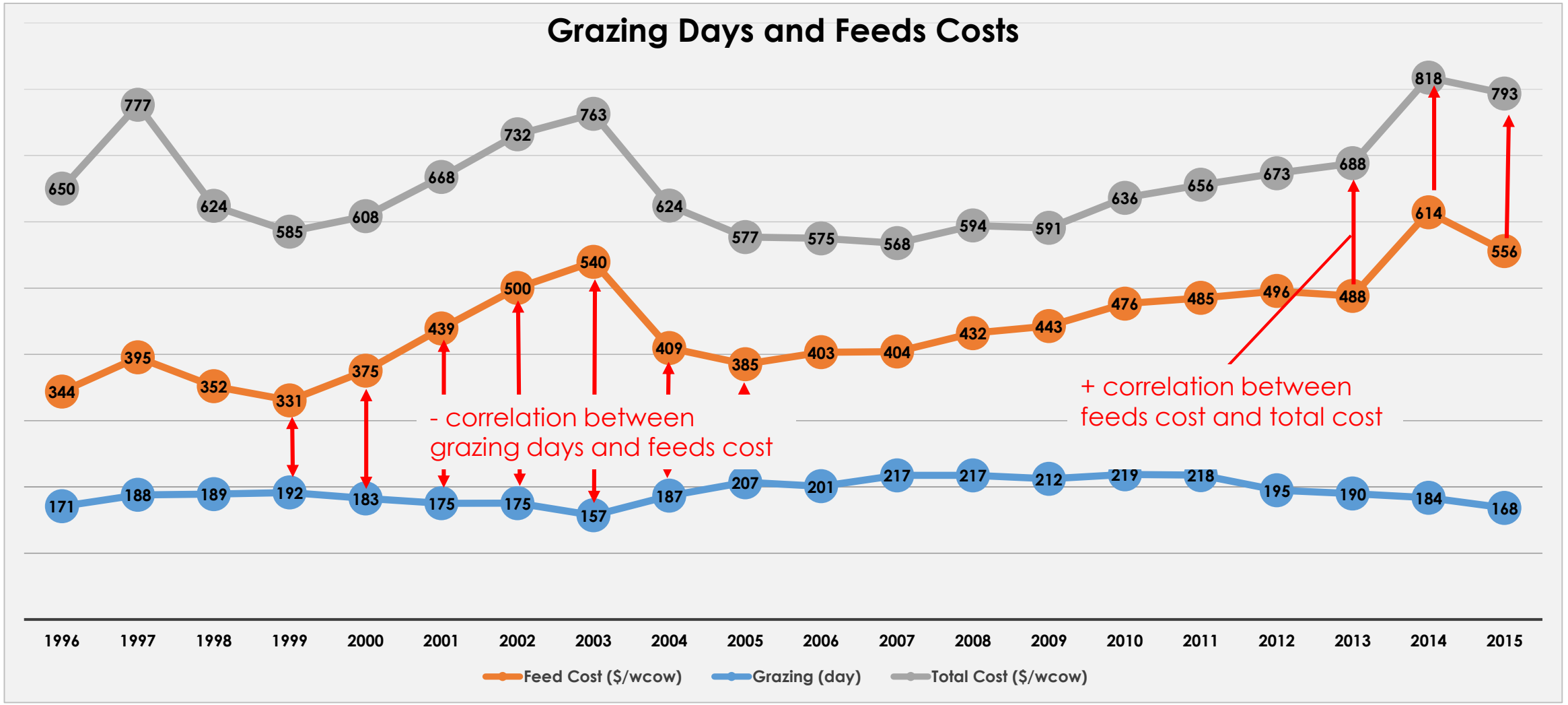

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Motivation

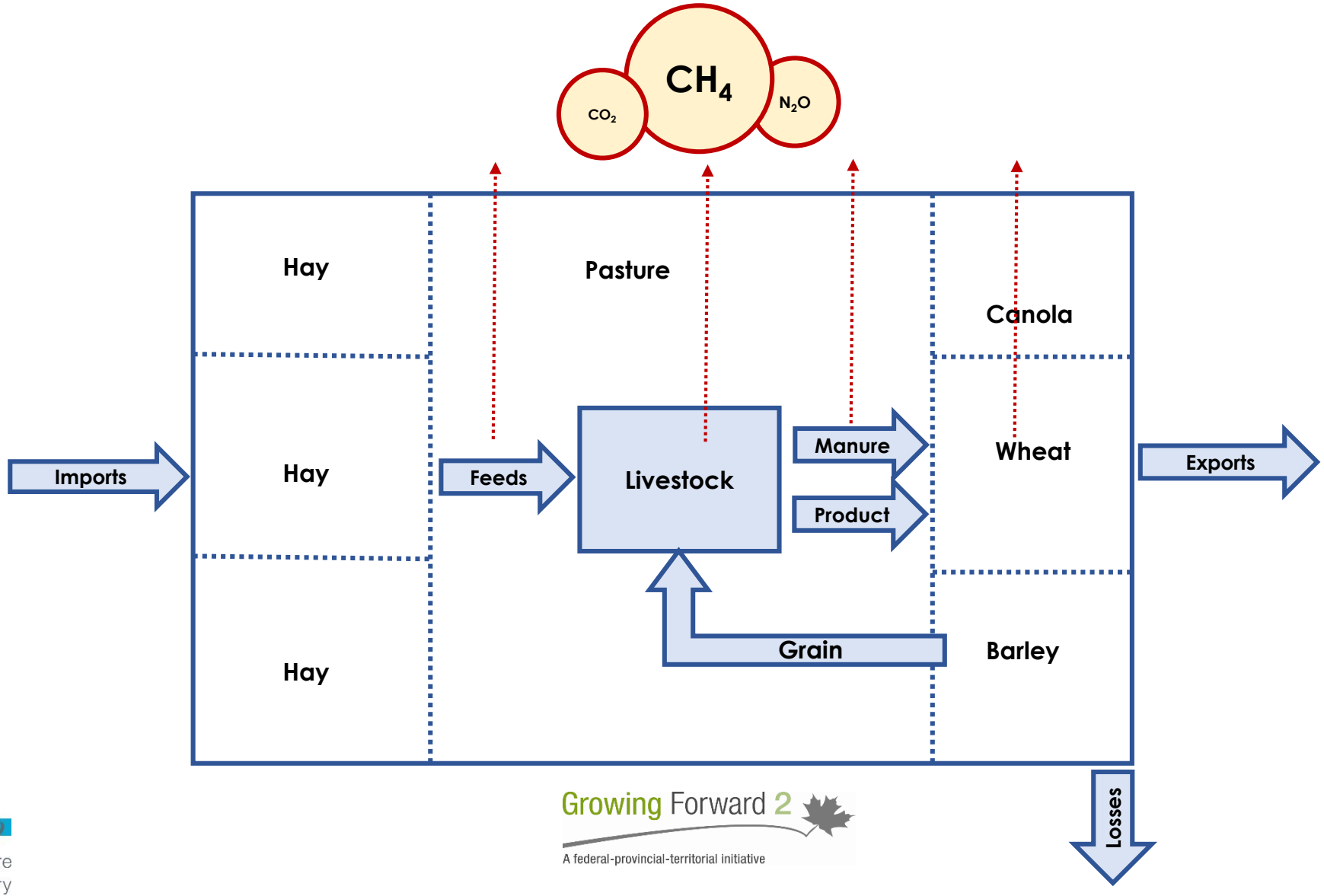
- **Increase an amount of information derived from the collected data by assessing the environmental impacts of the surveyed production systems and technologies**

Approach

- Build a separate GHG emission module
- Utilize the IPCC methodology (Phase 1) adjusted for Canadian/Alberta conditions (Phase 2)

AP$ GHG Module

Conceptual Model



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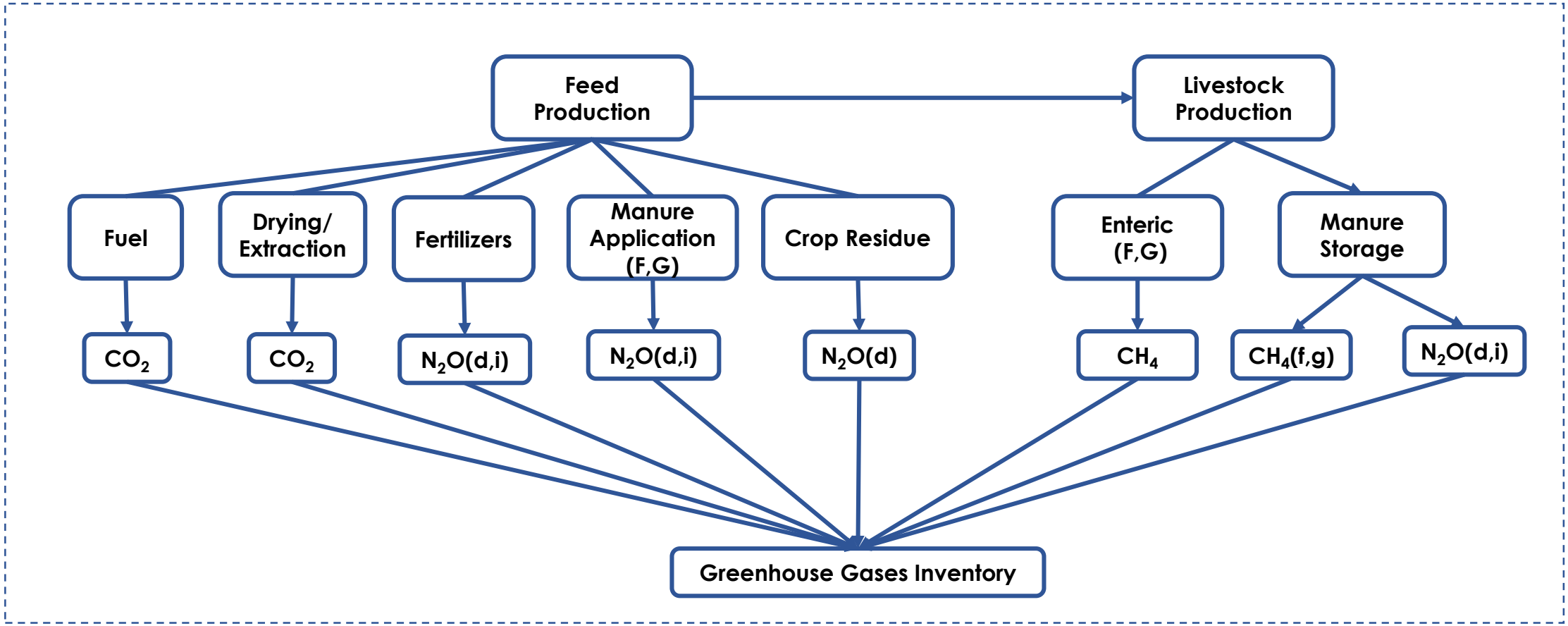
Emission Inventory



Empirical Model: Equations

Methane (CH_4)

$$CH_4(ferm) = \frac{GE \bullet (GE\,2\,CH_4)}{MJ\,2\,KG}$$

$$CH_4(manure) = VS \bullet (N_{storloss} \bullet CH_{4\,MAX}) \bullet M^3\,2\,KG$$

$$VS = GE \bullet \left(1 - \frac{DE\%}{100}\right) + (GE \bullet URINE_{frac}) \bullet \left(\frac{1 - ASH}{DMKG\,2\,MJ}\right)$$

Carbon Dioxide (CO_2)

$$CO_2(tractor) = FUEL_{litre} \bullet (L\,2\,CO_2)$$

$$CO_2(dry/extract) = GAS/ELECT \bullet (L/KW\,2\,CO_2)$$

Nitrous Oxide (N_2O)

$$N_2O_{direct}(fert) = (N_{applic} \bullet EF_{Napplic}) \bullet (N_2O_N\,2\,N_2O)$$
$$N_2O_{indirect}(fert) = (N_{applic} \bullet N_{volfrac} \bullet EF_{Nvol}) \bullet (N_2O_N\,2\,N_2O)$$

$$N_2O_{direct}(pasture) = (N_{excret} \bullet EF_{Nexcret}) \bullet (N_2O_N\,2\,N_2O)$$
$$N_2O_{indirect}(pasture) = (N_{excret} \bullet N_{volatfrac} \bullet EF_{Ndeposit}) \bullet (N_2O_N\,2\,N_2O)$$

$$N_2O_{direct}(manure) = (N_{excret} \bullet EF_{Nexcret}) \bullet (N_2O_N\,2\,N_2O)$$
$$N_2O_{indirect}(manure) = (N_{excret} \bullet N_{volatfrac} \bullet EF_{Ndeposit}) \bullet (N_2O_N\,2\,N_2O)$$

$$N_2O_{resid} = RESYLD_{DM} \bullet (N_{concfrac})$$

$$RESYLD_{DM} = YLD_{DM} \bullet 0.2_{ifbelow}\left(\frac{RESID_{ratio(above/below)}}{YLD_{ratio}}\right)$$

Empirical Model: Parameters

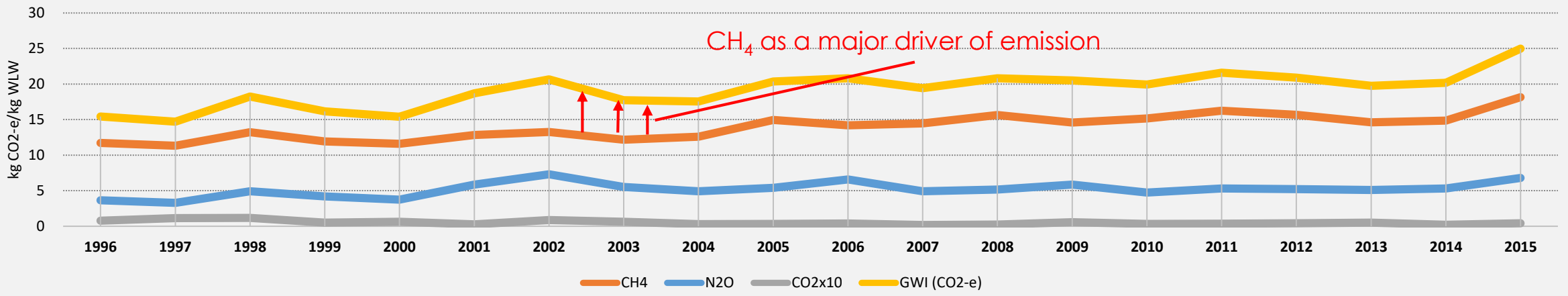
Parameter	*Value*	*Reference*
Default Emission Factors for Direct N2O Emissions		
EF1 [fertilizer, manure, residue] (kg N2O-N/kg of N)	0.01	IPCC, Ch.11, 11.11
EF [manure] (kg N2O-N / kg N excreted)	0.005	IPCC, Ch.10, 10.62
N Retention	0.07	IPCC, Ch10, 10.60
Default Emission, Volatilization and Leaching Factors for Indirect Soil N2O Emissions		
Frac_GASM [Volatilization] (kg NH3-N+Nox-N) (kg N applied or deposited)	0.2	IPCC, Ch.11, 10.24
EF4 [Volatilization] (kg N2O-N) / (kg of NH3-N+Nox-N volitalized)	0.01	IPCC, Ch.11, 10.24
Frac_GASF [Volatilization from fertilizer] (kg NH3-N + NOx-N) / (kg N applied)	0.1	IPCC, Ch.11, 10.24
Frac_GASM [Volatilization from manure] (kg NH3-N+Nox-N) (kg N)	0.2	IPCC, Ch.11, 10.24
Volatilization Losses (kg N2O-N) / (kg of NH3-N+Nox-N volitalized)	0.45	IPCC, Ch.10, 10.65
General Nitrous Oxide (N2O) Simulation Conversions		
Conversion from N2O-N to N2O	1.571	IPCC, Ch. 11, 11.10
Coefficient to account for ratio of above and below residue yields	0.2	Holos: Methodology and Algorithms for Version 1.1.x, 75

Cow-Calf Enterprise Assumptions

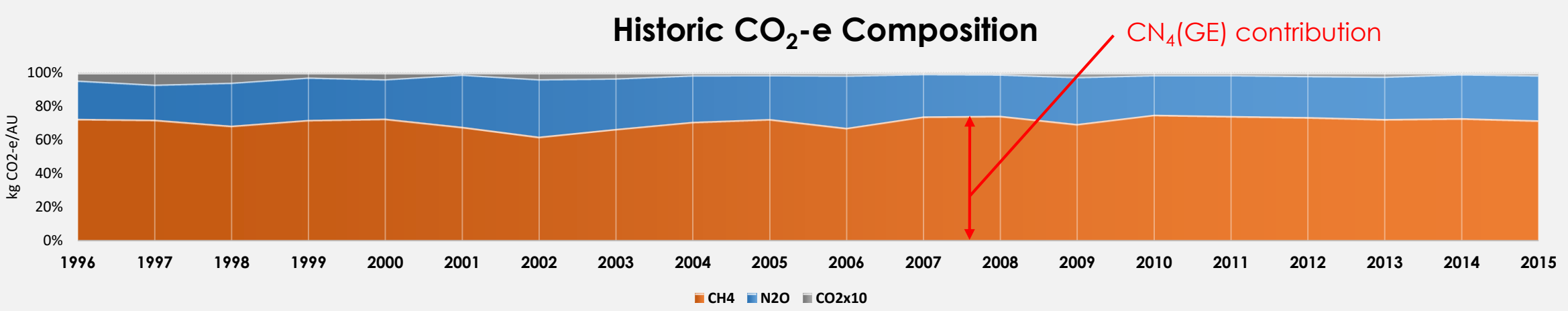
- Only primary sources of energy are used
- The end (functional) product is weaned calves evaluated at farm gate
- Feeds, manure, and residues are calculated and allocated at the farm of production origin

AP$ GHG Module

Historic CO_2-e Footprint



Historic CO_2-e Composition



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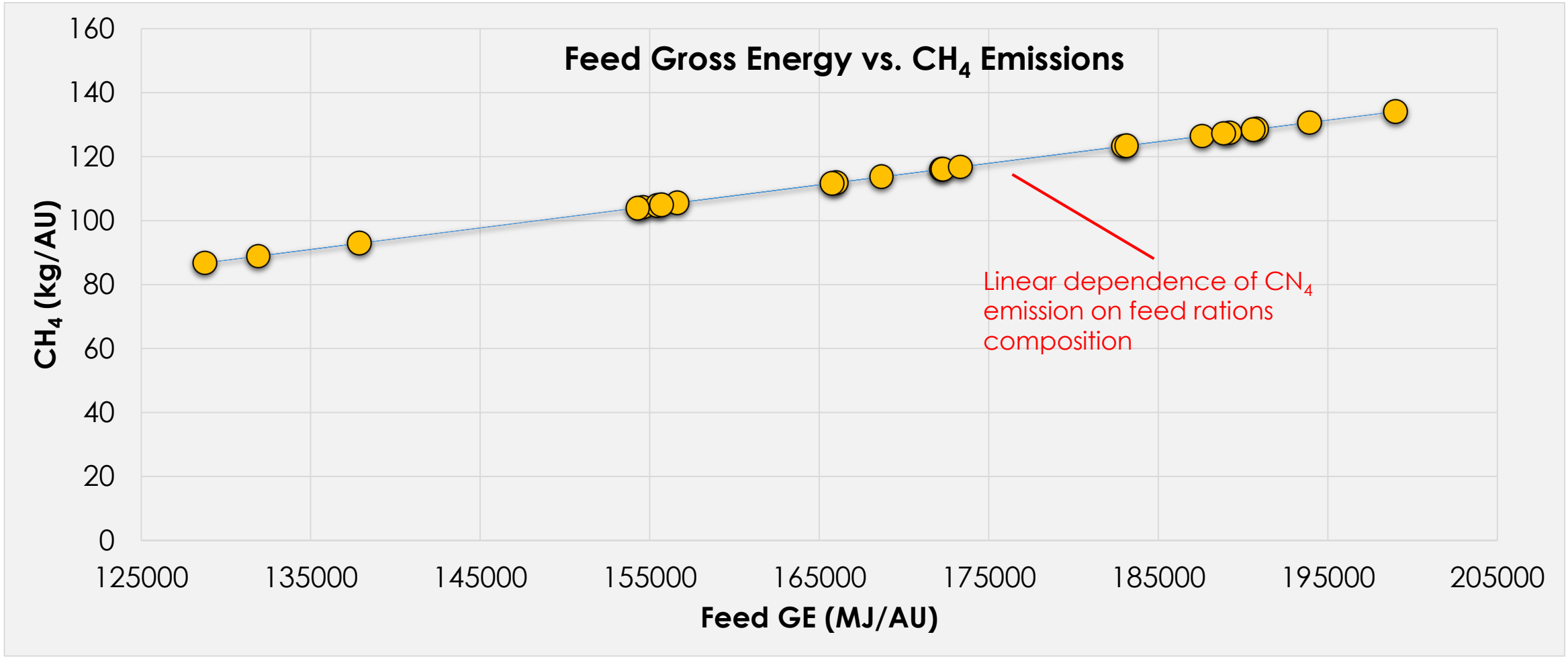
AP$ GHG Module



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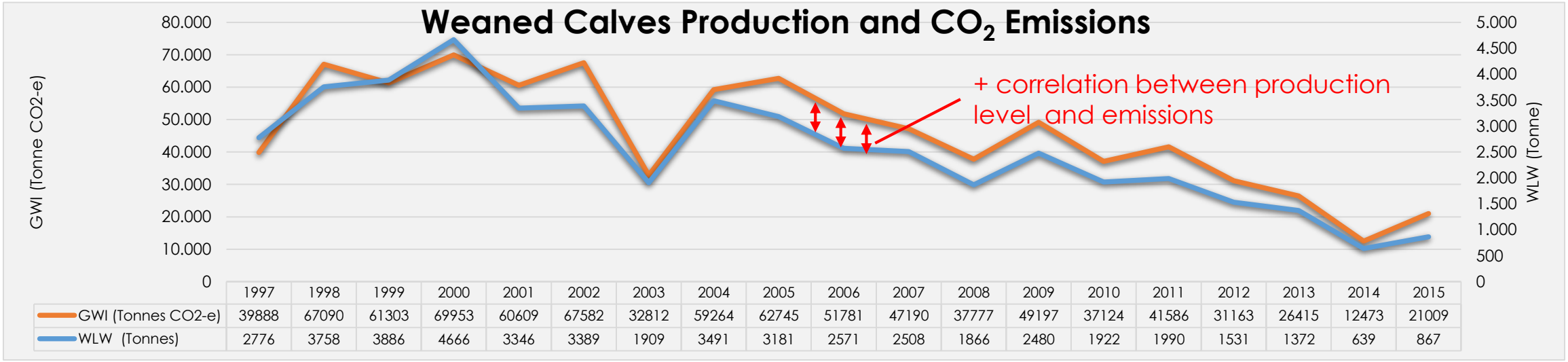

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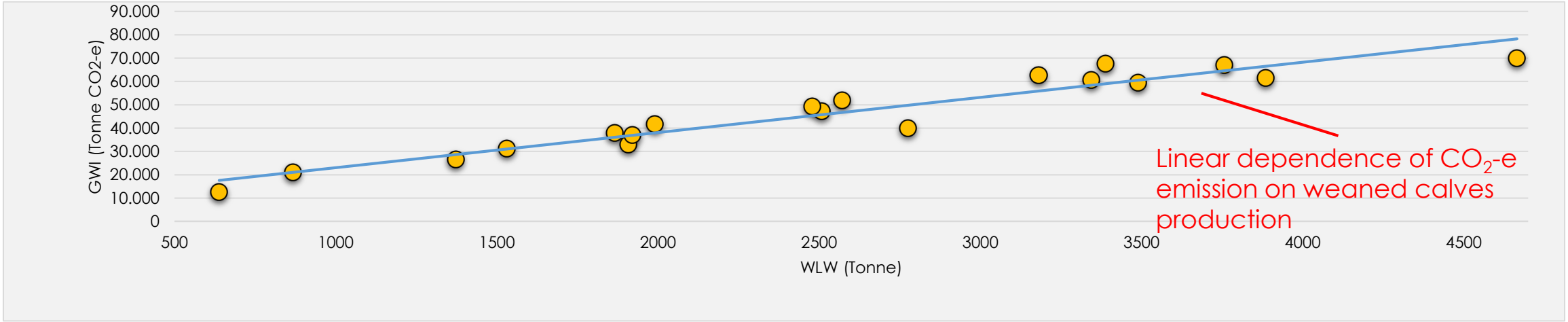
GWI (Tonnes CO2-e)	39888	67090	61303	69953	60609	67582	32812	59264	62745	51781	47190	37777	49197	37124	41586	31163	26415	12473	21009
WLW (Tonnes)	2776	3758	3886	4666	3346	3389	1909	3491	3181	2571	2508	1866	2480	1922	1990	1531	1372	639	867



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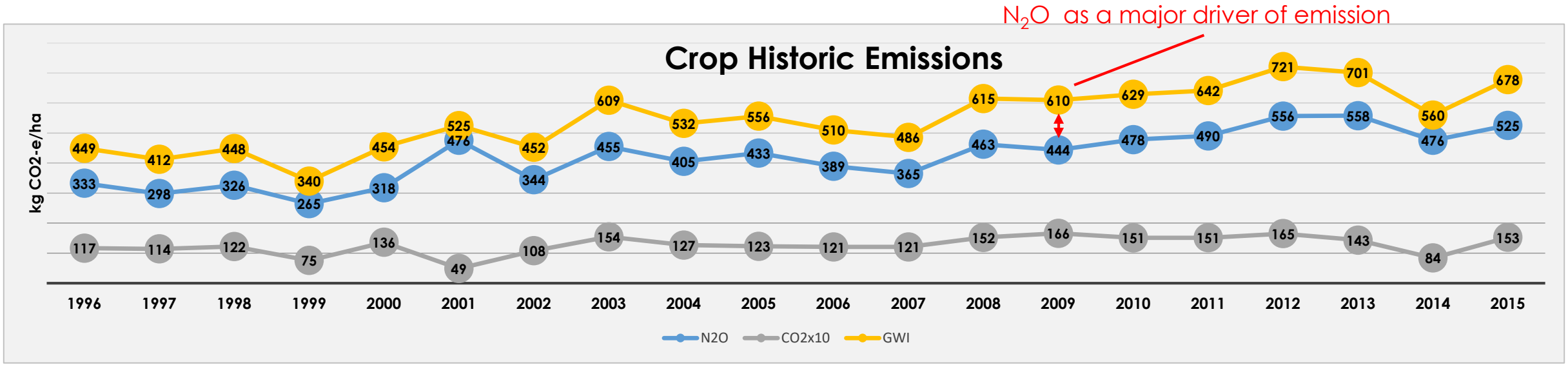
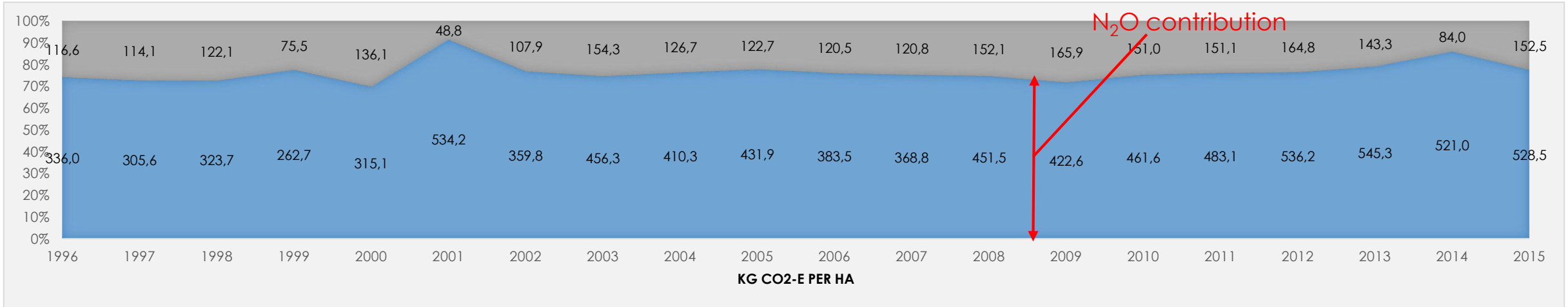
Crops Assumptions

- Only primary sources of energy are used
- The end (functional) product is harvested yield evaluated at the farm gate
- Manure, and residues are calculated and allocated at the farm of production origin
- Emissions from biological nitrogen fixation and its residue decay are not accounted for
- Grasslands do not contribute to N_2O emission

AP$ GHG Module





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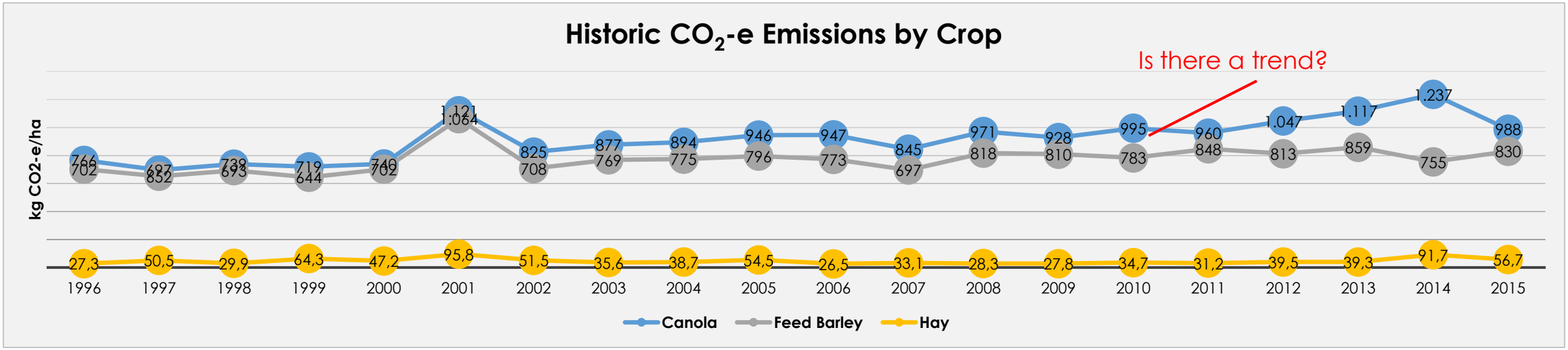

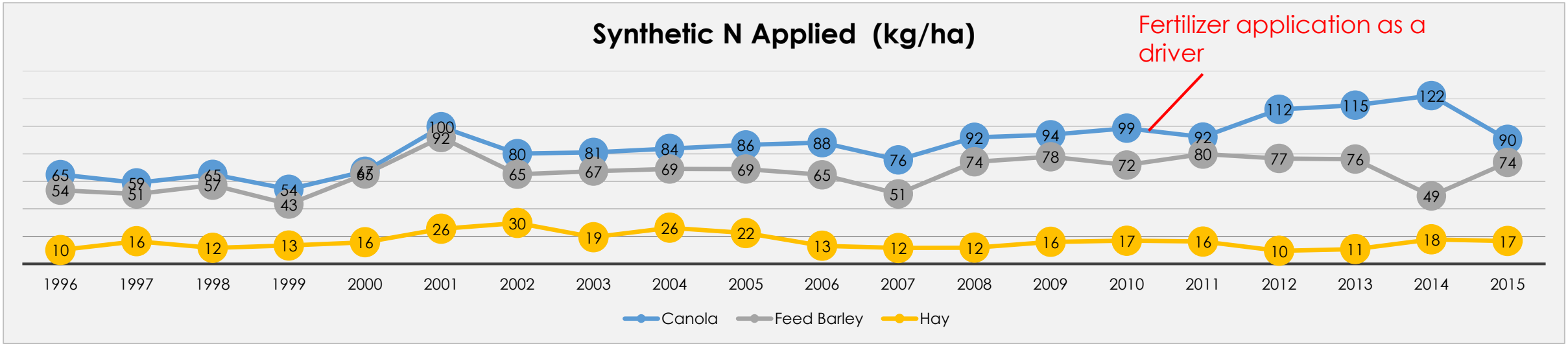

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Next Steps

- Regional assessment
- Irrigated lands
- Drylots and Grassers
- Carbon storage, tillage, indirect N_2O from leaching

Thank You!