The Role of Agricultural Recording Systems in Reducing the Carbon Footprint

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DRMS Dairy Records Management Systems

DHI Enrollment

Year	All U.S. Cows	U.S. DHI Enrollment	DRMS Enrollment
2000	9,199,000	4,287,085	1,664,573
2005	9,043,000	4,121,752	1,825,864
2010	9,085,000	4,255,950	2,108,057

Thanks to Helmar Rabild
USDA, Organizer of First DHI, 1905

Challenges and DHI Response

- 1905-1950's
  - Milk production
  - Parentage recording and genetic progress
- 1960-2010
  - Genetic progress
  - Reproduction and mastitis management
  - Herd profitability
- 2010…
  - Resource utilization
  - Environmental impact

Californians Against Waste

Conserving Resources. Preventing Pollution. Protecting the Environment.

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Other Issues W

- Plastic Bott California's Recycling L
- Bright Idea and Reduc Lighting Sc
- Keep Toxic Batteries o Stream
- Bringing th Recycle to
- Fast Food Marine Env Diversion R
- Zeroing In
- Extended P Responsibi Model
- Dairy Wast
- Dirty Butts Litter and P
- Food Wast

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New Mexico Dairy Pollution Sparks 'Manure War'

by JOHN BURNETT

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Morning Edition

[7 min 11 sec]

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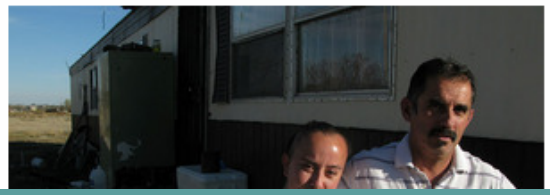
Transcript



December 9, 2009

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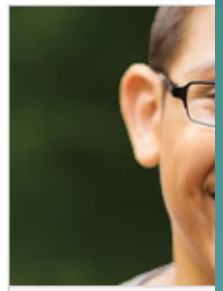
The picture on many milk cartons shows cows grazing on a pasture next to a country barn and a silo — but the reality is very different.

Support



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Position of U.S. Environmental Protection Agency

"Methane (CH4) is a greenhouse gas that remains in the atmosphere for approximately 9-15 years. Methane is over 20 times more effective in trapping heat in the atmosphere than carbon dioxide (CO2) over a 100-year period and is emitted from a variety of natural and human-influenced sources.

Human-influenced sources include landfills, natural gas and petroleum systems, ***agricultural activities****, coal mining, stationary and mobile combustion, wastewater treatment, and certain industrial process."*

The U.S EPA highlights that enteric fermentation and manure management comprised ***32.8 percent*** *of methane production in 2008.*

Should DHI play a role in reducing methane production?

How can DHI play a role in reducing methane production?

We already do!

DHI Production Advantage *(2006)*

- All U.S. 9.1m cows, 9048 kg milk
- DHI 4.5m cows, 10101 kg milk
- Non-DHI 4.6m cows, 7989 kg milk
- Advantage 26 %

Dry Matter Intake to Methane

- Dry Matter Intake – *Nat. Research Council, 2001*

$$DMI\ (kg/d) = (0.37 \times FCM + 0.097 \times BodyWeight^{0.75})$$

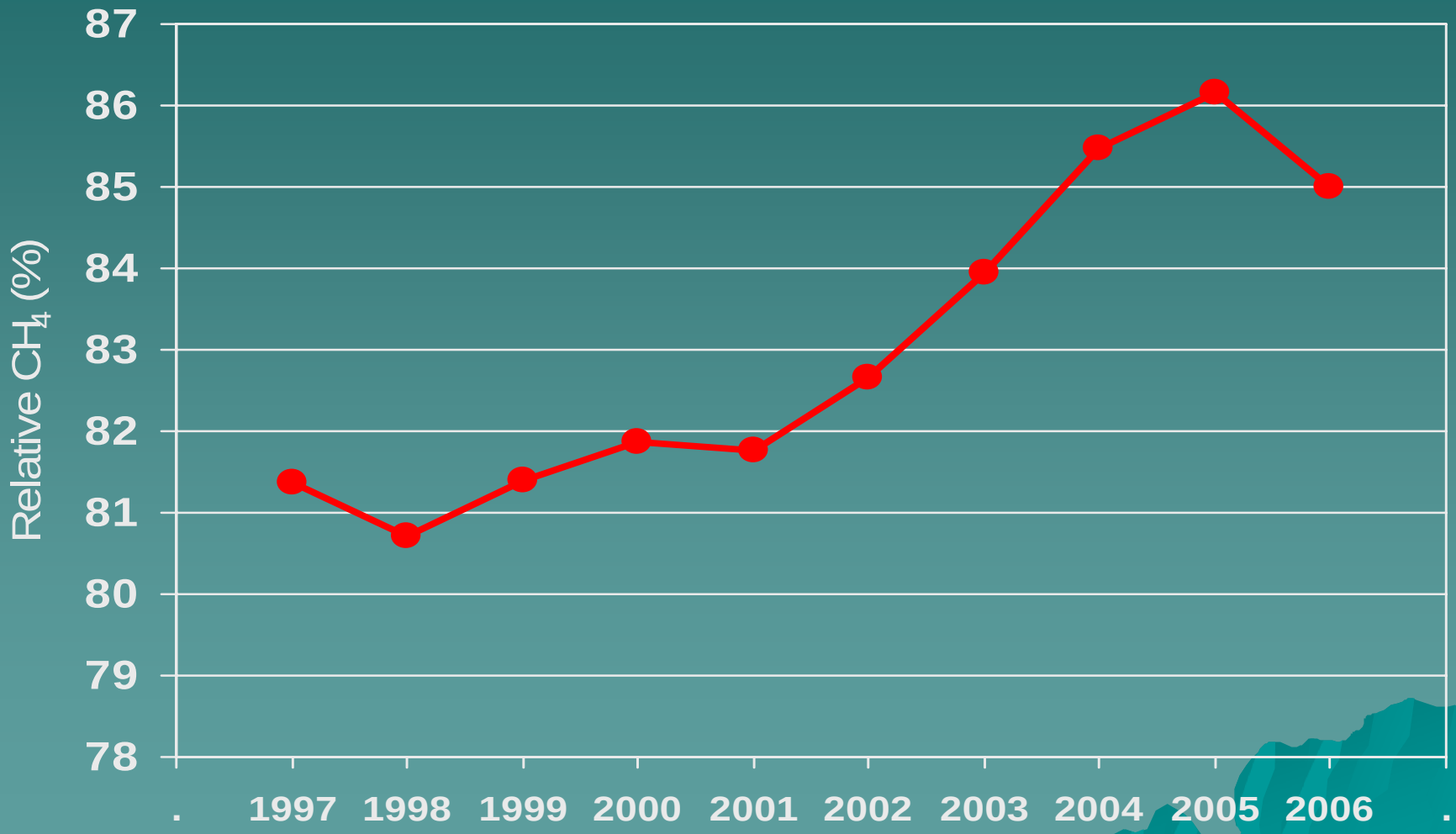
- DMI –to– Methane Output – *Ellis, 2007*

$$CH_4\ (Megajoules/d) = 3.23 + [0.81 \times DMI\ (in\ kg/d)]$$

Relative CH_4 Production

Year	If all cows on DHI recording				If no cows on DHI recording				Relative CH_4 Produced
	Milk (kg)	DMI (kg)	CH_4/cow MJ/d	Cows(m) Needed	Milk (kg)	DMI (kg)	CH_4/cow MJ/d	Cows(m) Needed	
1997	24.3	9.75	11.13	**7.99**	18.3	8.71	10.28	**10.63**	**81.37**
1998	24.8	9.84	11.20	**7.88**	18.4	8.71	10.28	**10.64**	**80.72**
1999	25.4	9.93	11.27	**7.95**	19.0	8.80	10.36	**10.63**	**81.40**
2000	25.9	10.02	11.35	**8.04**	19.5	8.93	10.47	**10.65**	**81.86**
2001	25.9	10.02	11.35	**7.93**	19.5	8.89	10.43	**10.55**	**81.76**
2002	26.4	10.11	11.42	**8.02**	20.1	9.02	10.54	**10.51**	**82.65**
2003	26.4	10.11	11.42	**8.02**	20.5	9.07	10.58	**10.32**	**83.94**
2004	26.4	10.11	11.42	**8.04**	21.0	9.16	10.65	**10.09**	**85.48**
2005	27.2	10.25	11.53	**8.10**	21.8	9.30	10.76	**10.07**	**86.15**
2006	27.7	10.34	11.61	**8.16**	21.9	9.34	10.80	**10.32**	**85.01**

Relative CH_4 Production DHI vs. Non-DHI U.S. Cows



Causes of Difference…

- …Between DHI and Non-DHI
  - *Fewer cows per unit of milk*
  - *Less maintenance, less dry matter intake !!!*
- …Over Time
  - Mastitis
  - Genetics
  - Reproductive management
  - Feed intake

Mastitis Progress

Year	Somatic Cell Count U.S. DHI Cows	Somatic Cell Count Cows in 14-State Federal Milk Order Study
2000	311,000	--
2001	322,000	--
2002	313,000	291,000
2003	319,000	283,000
2004	295,000	265,000
2005	296,000	257,000
2006	288,000	247,000
2007	276,000	258,000
2008	262,000	--
2009	233,000	--

Genetic Progress

Year	Service Sire Net Merit $ DRMS Holsteins
2000	324
2001	341
2002	362
2003	369
2004	398
2005	423
2006	422
2007	438
2008	472
2009	517

Contribution to Progress*

Mastitis	12 %
Sire-side Genetics	30 %
Cow-side Genetics	?
Reproduction	?
Nutrition	?
Disease	?
BST	?
Management	?
Total	100 %

** Rough estimate !*

JOHNE'S ANALYSIS

DHI-420

Test Date: 09-03-2009

Processed: 09-08-2009

55-99-9999

HENRY SMITH

Index	Barn Name	Sample Date	Result	Value	Purchased	Lact	DIM	Cur Milk	Prev Milk	Cur SCC	Prev SCC	SCC Tests Infected	305 ME Milk	ERPA Milk	Rating	Days to Calve	Repro Code	Recent Kept Calves
1626	1626	06-19-09	POS	1.28		3	345		3			3	22679	-753	E	14	P	3314, 2860
1433	1433	09-03-09	POS	.90		4	370	37	46	3.6	2.1		33814	+4558	A	106	P	3330, 2876
1427	1427	09-03-09	POS	.56	PD	4	272	68	112	0.2	2.7		29813	+4692	A	91	P	3454
1401	1401	06-19-09	POS	.53	P	4	426		43		3.5	1	26732	+1881	B	21	P	3208, 9465
2045	2045	07-28-09	POS	.40		2	446	3	3	2.5			28891	+2872	A	49	P	3221
2593	2593	09-03-09	POS	.38		1	253	68	75	1.2	0.1		28989	+1249	D	118	P	
2590	2590	09-03-09	POS	.32		1	276	74	80	1.2	0.1		29270	+1401	B	91	P	3448
2402	2402	06-19-09	POS	.22		1	420					1	27706	+277	B	7	P	
1295	1295	09-03-09	POS	.20	P	4	311	74	100	0.4	1.1		27774	-218	C	113	P	3412
1404	1404	09-03-09	POS	.20		4	355	65	72	3.4	3.3		27213	+214	A	117	P	
1248	1248	06-19-09	POS	.18		4	383						29098	+2768	A	3	P	3241
1544	1544	06-19-09	POS	.18		3	319		86		4.6	1	36996	+5931	A	29	P	
2323	2323	06-19-09	POS	.16		1	452					2	27205	+101	B	7	P	
1935	1935	07-28-09	POS	.13	P	2	318	68	46	0.1	0.5		27734	+427	C	50	P	2881
516	516	09-03-09	POS	.11		3	308	62	92	1.8	0.2		31975	+3708	A	119	P	3416
2482	2482	06-19-09	POS	.11	PD	1	316		43		2.4	1	24407	-1435	D	42	P	

Cows Tested Negative on Most Recent Johne's Sample Date:

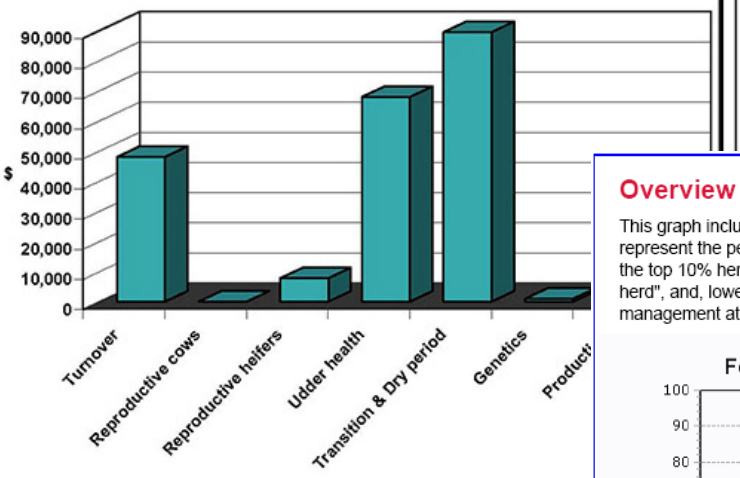
19	62	194	199	333	451	501	748	751	772	809	1026	1051	1333	1386	1416	1487
1521	1578	1594	1596	1649	1660	1666	1685	1722	1834	1866	1969	1987	2039	2044	2061	2062
2096	2099	2103	2105	2109	2116	2130	2137	2144	2149	2152	2159	2162	2189	2192	2197	2204
2208	2225	2243	2423	2447	2449	2455	2478	2487	2512	2519	2530	2536	2541	2545	2550	2556
2557	2559	2584	2599	2606	2609	2611	2612	2625	2629	2642	2648	2650	7013	7015	7021	7045
7073	7110	7137	7138	7151	7166											

Profit Opportunity Analyzer

AgSource Cooperative Services

Herd Owner: Example Dairy
Provided By: AgSource
Date: 05/29/09
Herd Code: 99999999

Profit Opportunities



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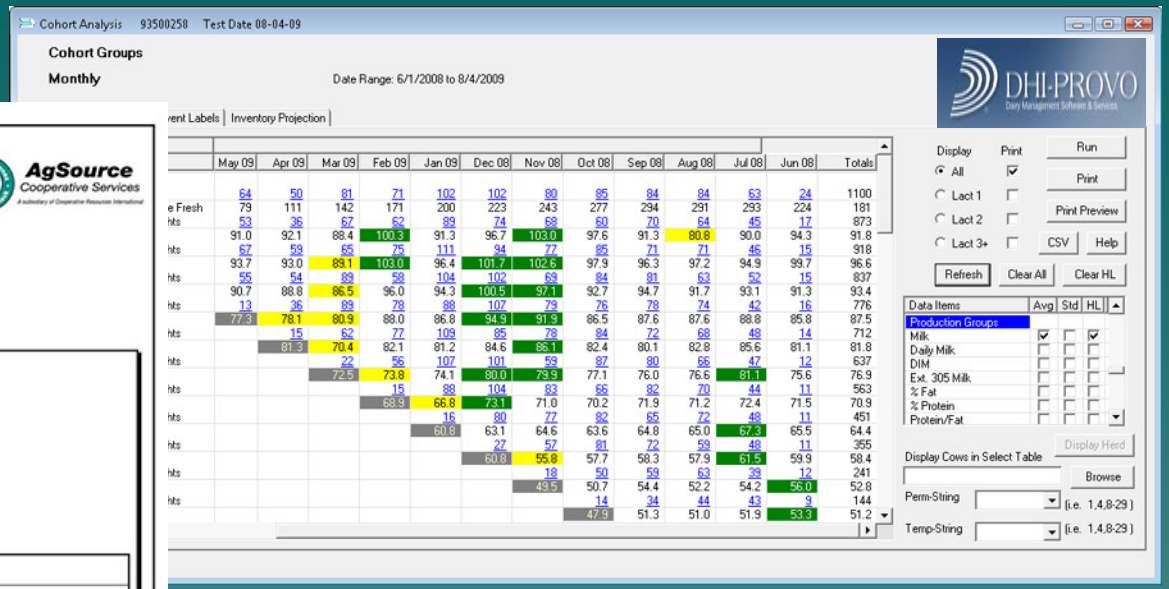
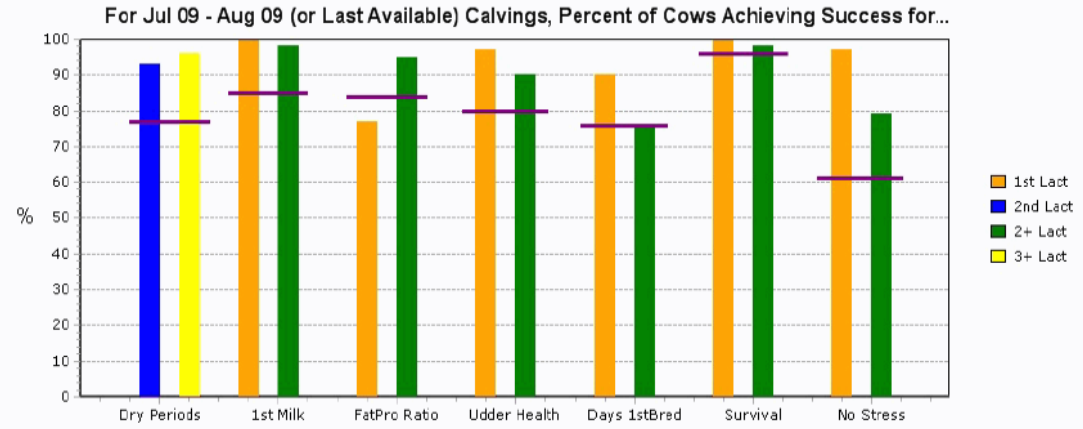


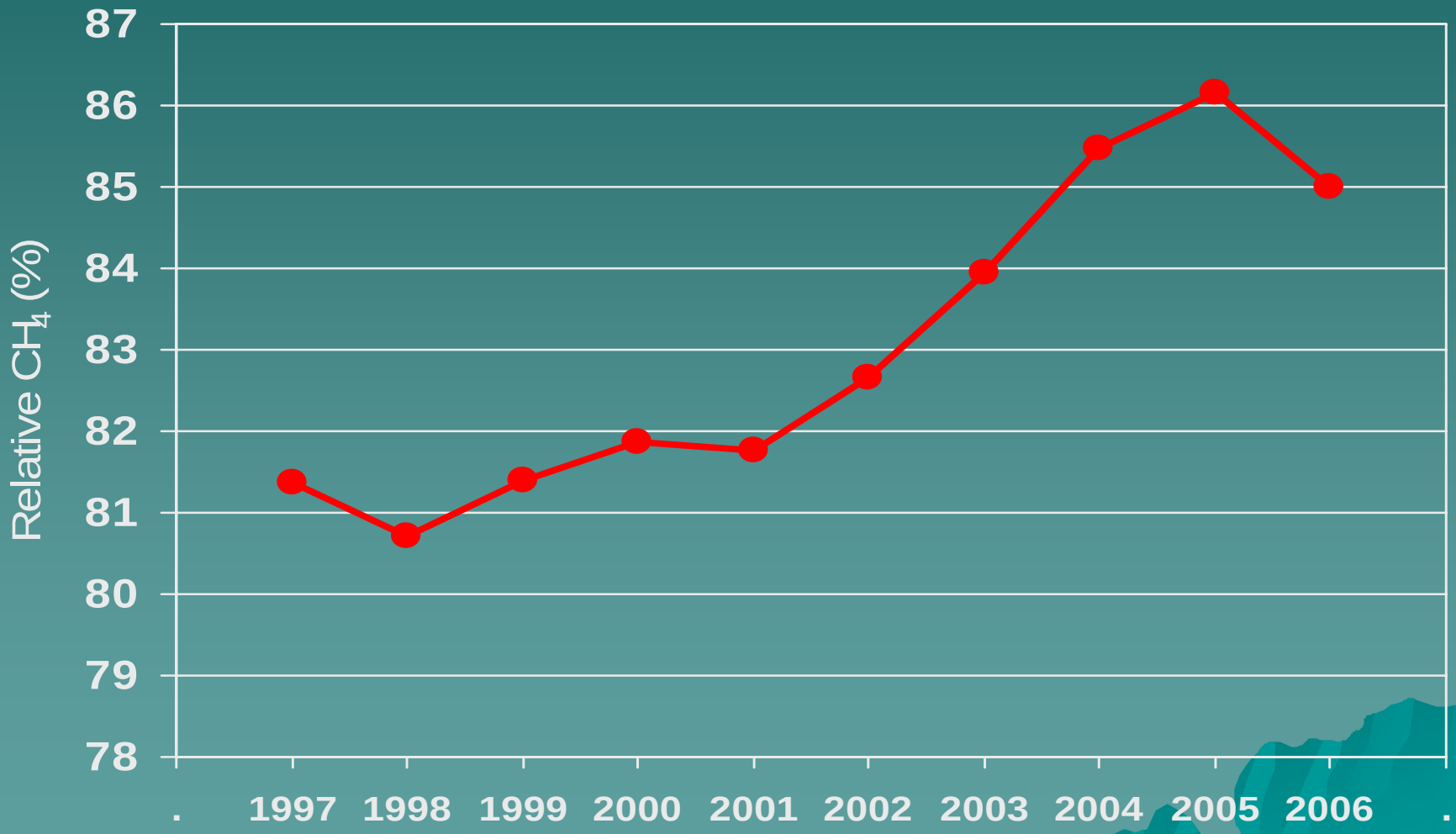
Overview — Which elements of Transition Cow Management are working well?

DRMS

This graph includes one set of bars for each of the seven Management Monitors on the following pages. The colored bars represent the performance for cows that calved in the most recent period. The purple line on each bar marks the performance of the top 10% herds for the specific Management Monitor. Performance higher than the purple line means that yours is a "top herd", and, lower performance indicates an opportunity for improvement. This graph should identify area(s) that deserve management attention in the most recent period. Use graphs and tables on the following pages for more information.



Relative CH_4 Production DHI vs. Non-DHI U.S. Cows (2)



Environmental Cost of DHI

- 1,200 Field technicians, laboratory, and management staff *(Full time?)*
- Average monthly cost = EUR 1.42 *(DRMS)*
- Saves 3,500 MJ/d per staff member per day
- Saves 486 tonnes CO_2 equivalent per year
- Average citizen produces 27 tonnes per year
- Each DHI worker offsets ~18 citizens
  - *Does not address genetics industry workers or full-time issue*

Advantages of DHI from an Environmental Perspective

- No capital investment
- Monthly fees easily offset by increased profitability
- Production increase without chemicals, additives, hormones
- No reduction in longevity
- Works in all styles of dairy farming
- Produces 15% reduction in methane

Opportunities

- Employee relations – DONE ✓
- Organizational image & public relations
- Public funding for enrollment efforts
- Prepare for carbon trading credits
- Measurement of organizational effectiveness
- Applies to all types of dairy farms
  - Intensive
  - Organic
  - Conventional

Further Reduction?

- More herds on DHI
- Better use of DHI tools
- Develop new tools to boost efficiency
  - Health
  - Sexed semen
- Encourage innovation at ICAR
  - Annual inquiry
  - Charter

Possible Addition to ICAR Aims and Objectives *(in bold type)*

"The Object of ICAR... shall be to promote the development and amelioration of performance recording for farm animals... (by) establishing definitions and standards for measuring characteristics having economic ***and ecological*** importance."

Thank you…

DRMS
Dairy Records Management Systems