

Silage and Dairy Farming: A Synergy for Closed Loop Systems

Silage Workshop, Clovis, NM, 22 March 2007



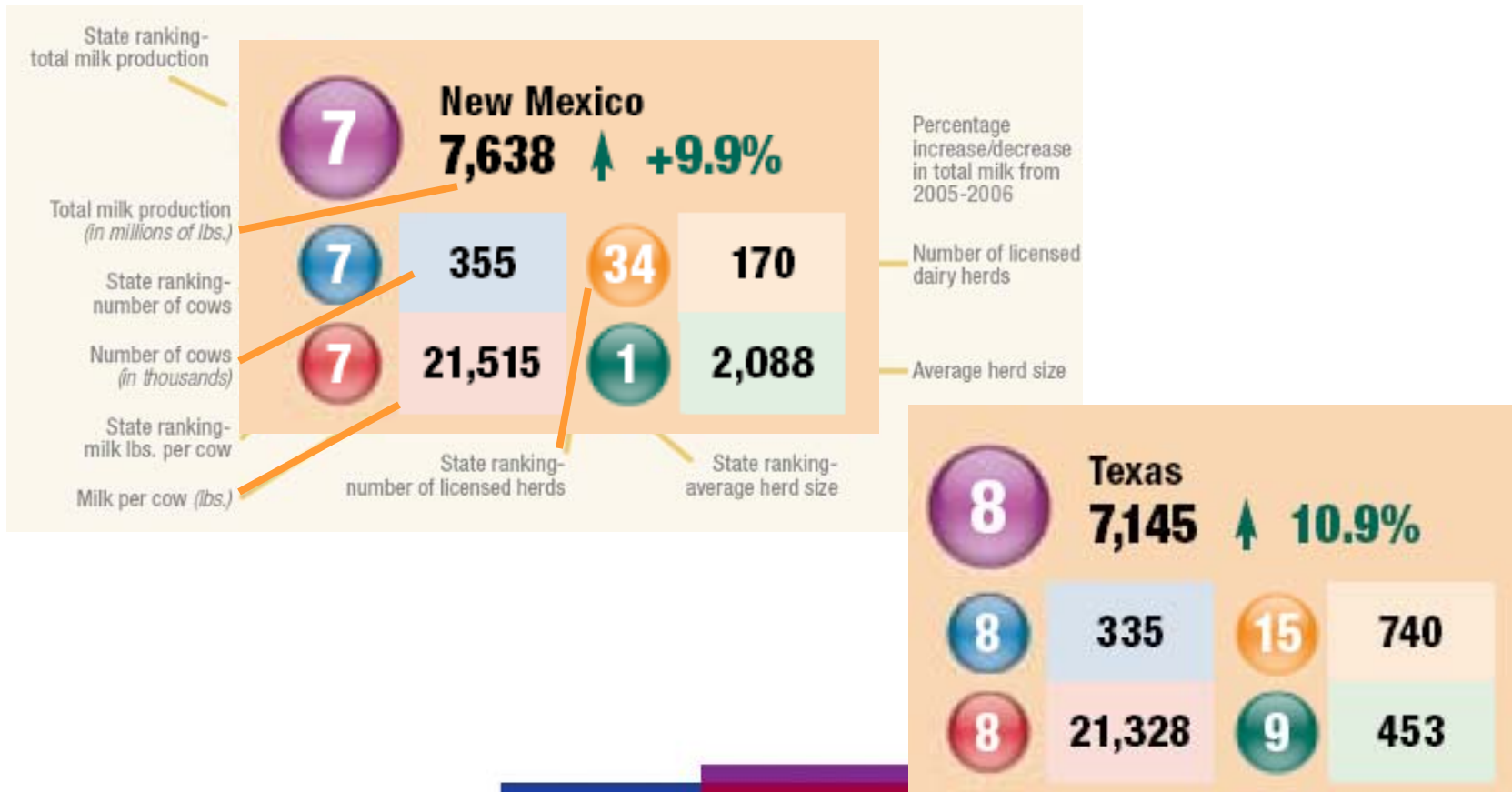
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New Mexico State University



Dairy Industry Statistics

2005-2006 Data

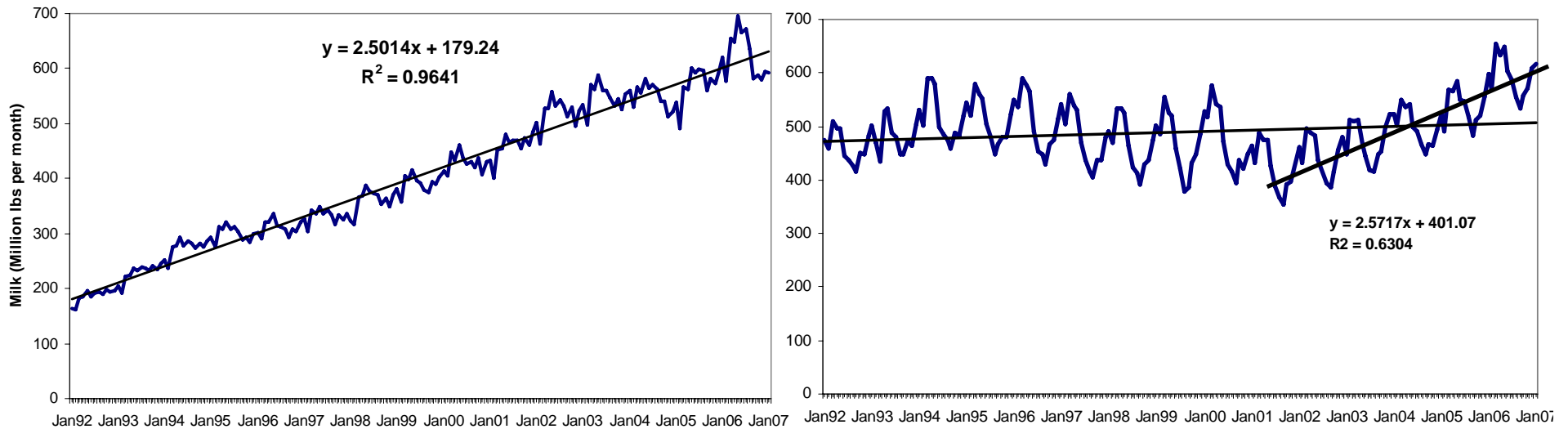


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Dairy Industry Growth

Monthly milk production (1992-2007)



NM

Producers: 175
Cows (1,000) 355
2006 lbs (Billion) 7.64
Cows/farm 2028

TX

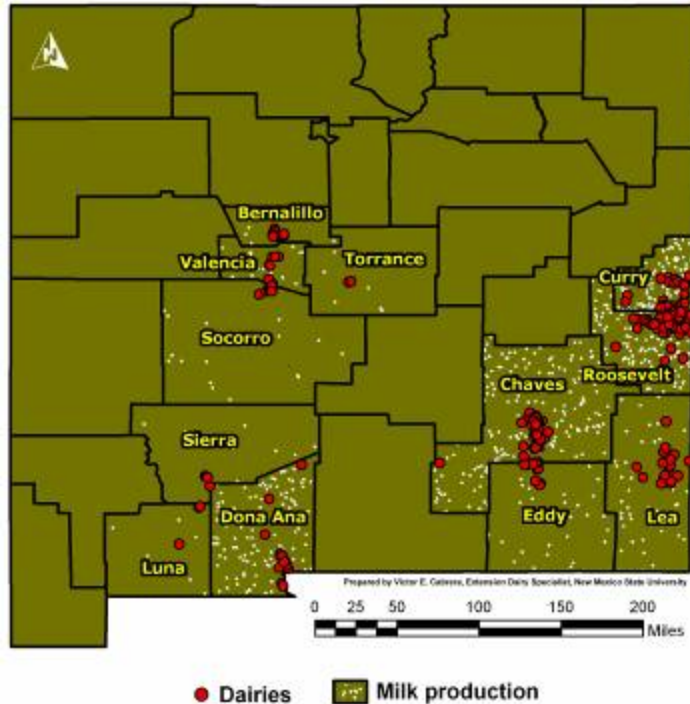
695
335
7.15
482

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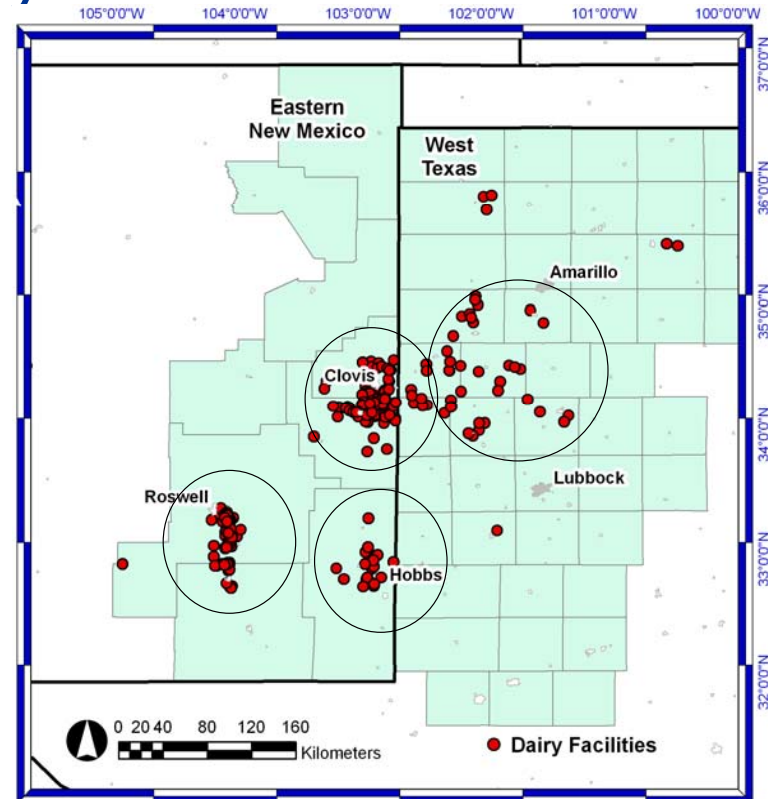


Dairy Industry Location

Concentration of dairy farms in NM-TX



**NM and West TX:
490K cows/218 producers**



400K cows/174 producers

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Silage and Dairy

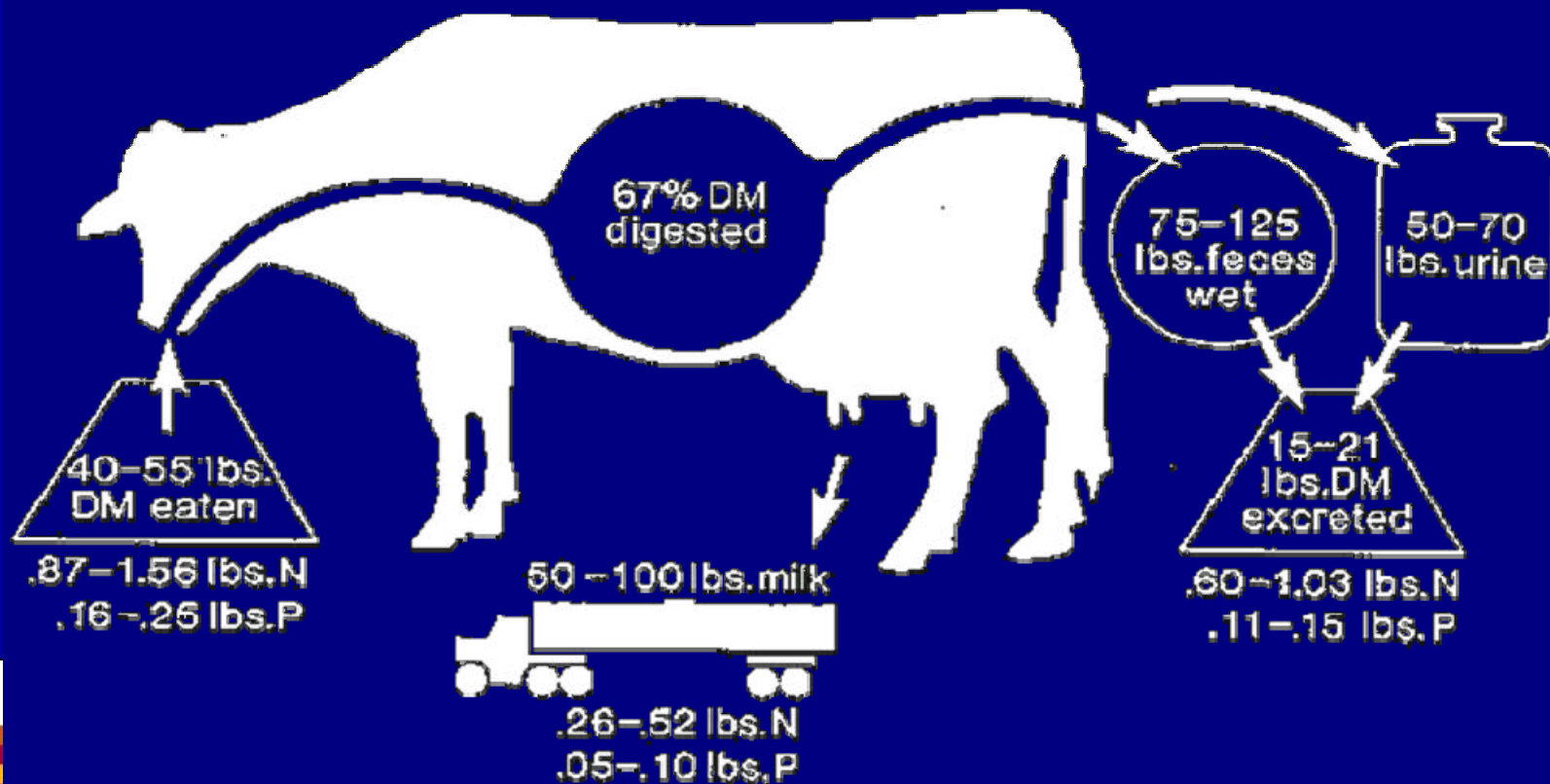


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N Cycle

Adapted from Van Horn et al., 1998



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N Cycle



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N Cycle

234
manure

316
Total Feed



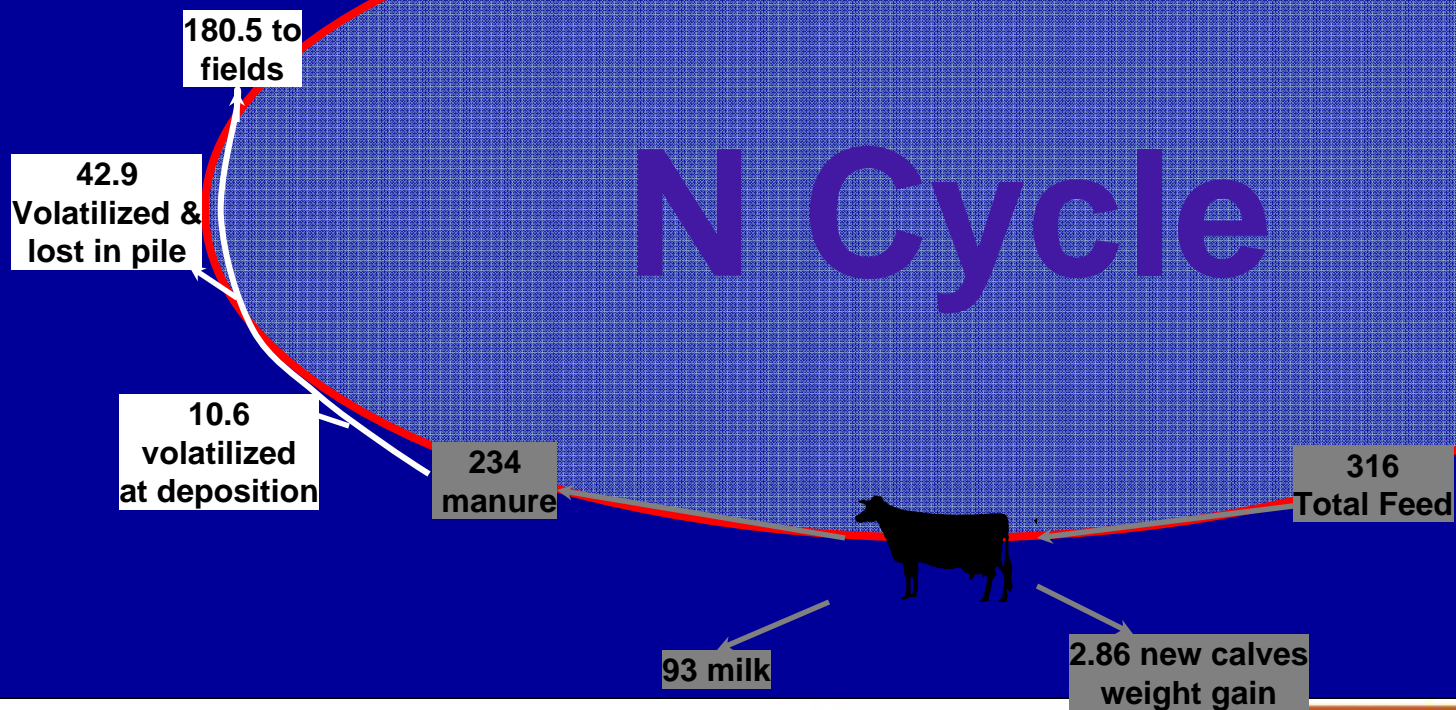
93 milk

2.86 new calves
weight gain

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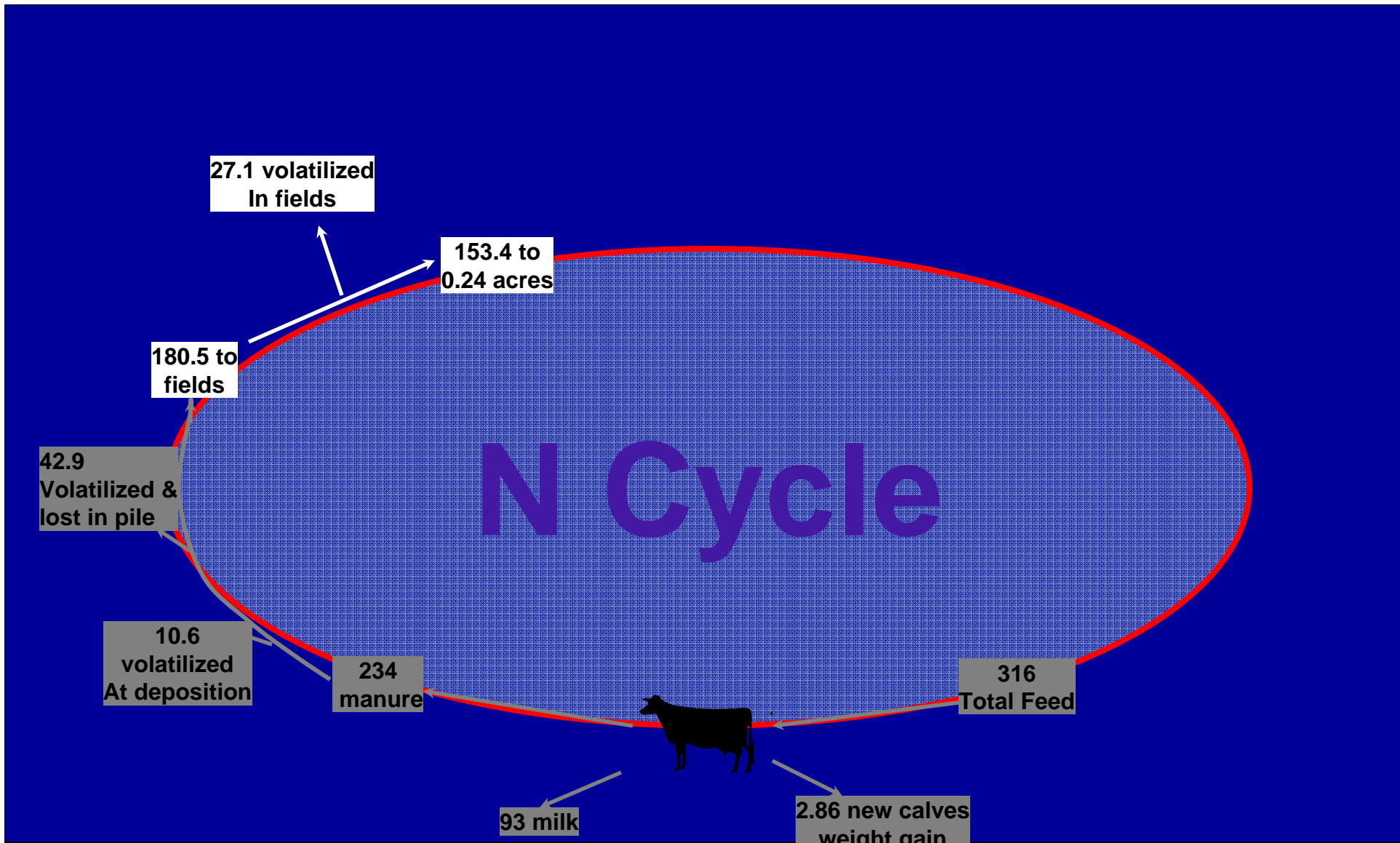


N Cycle



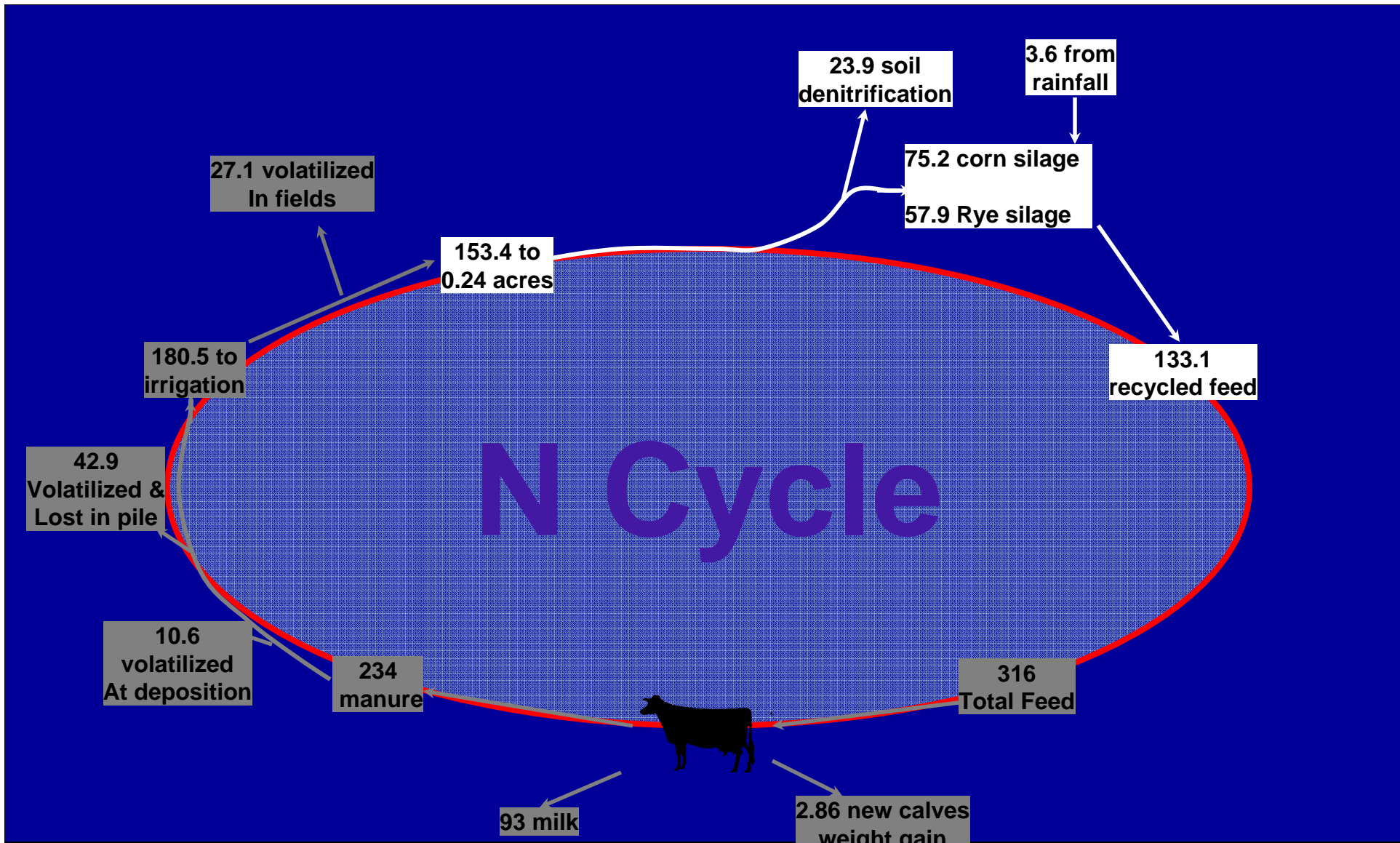
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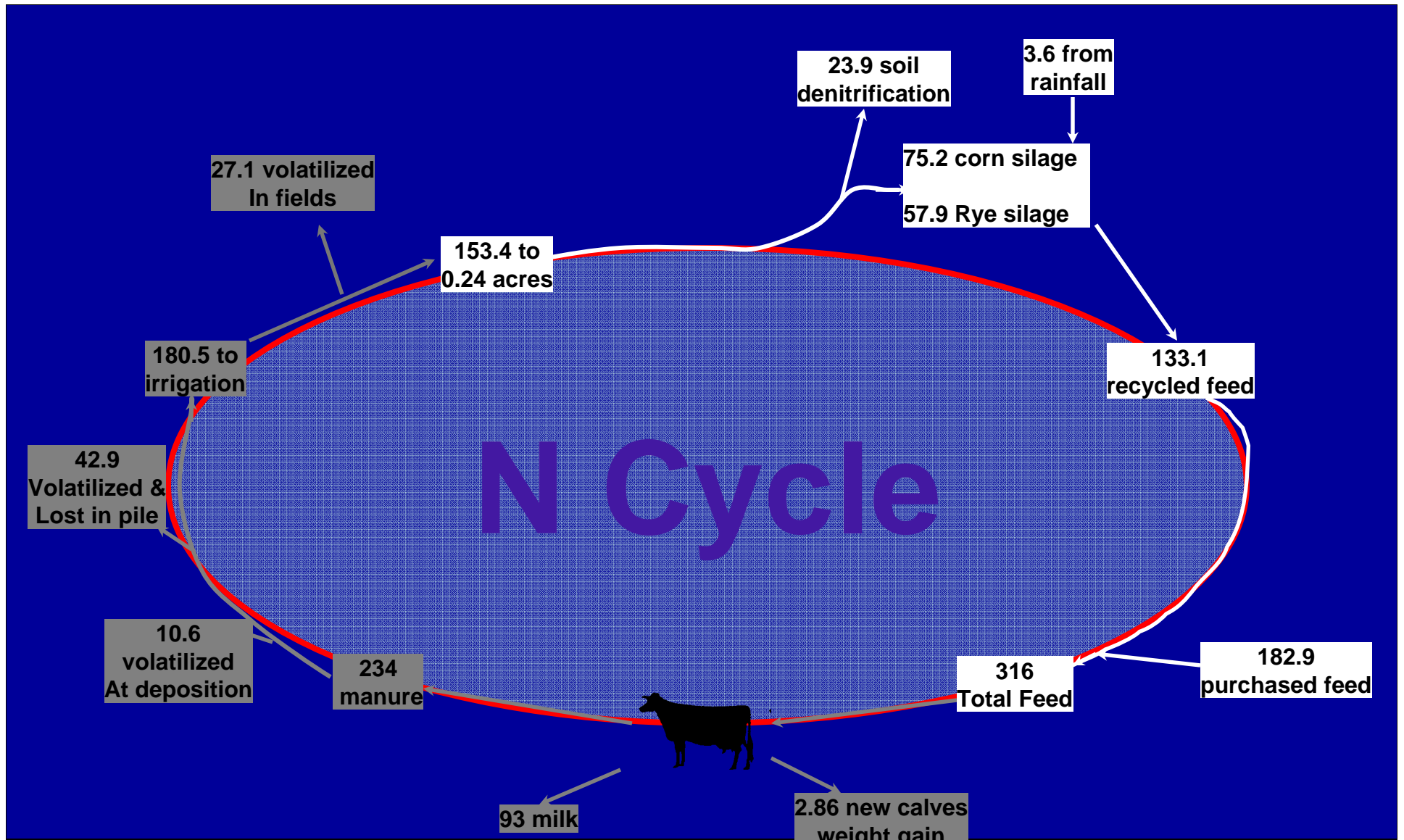
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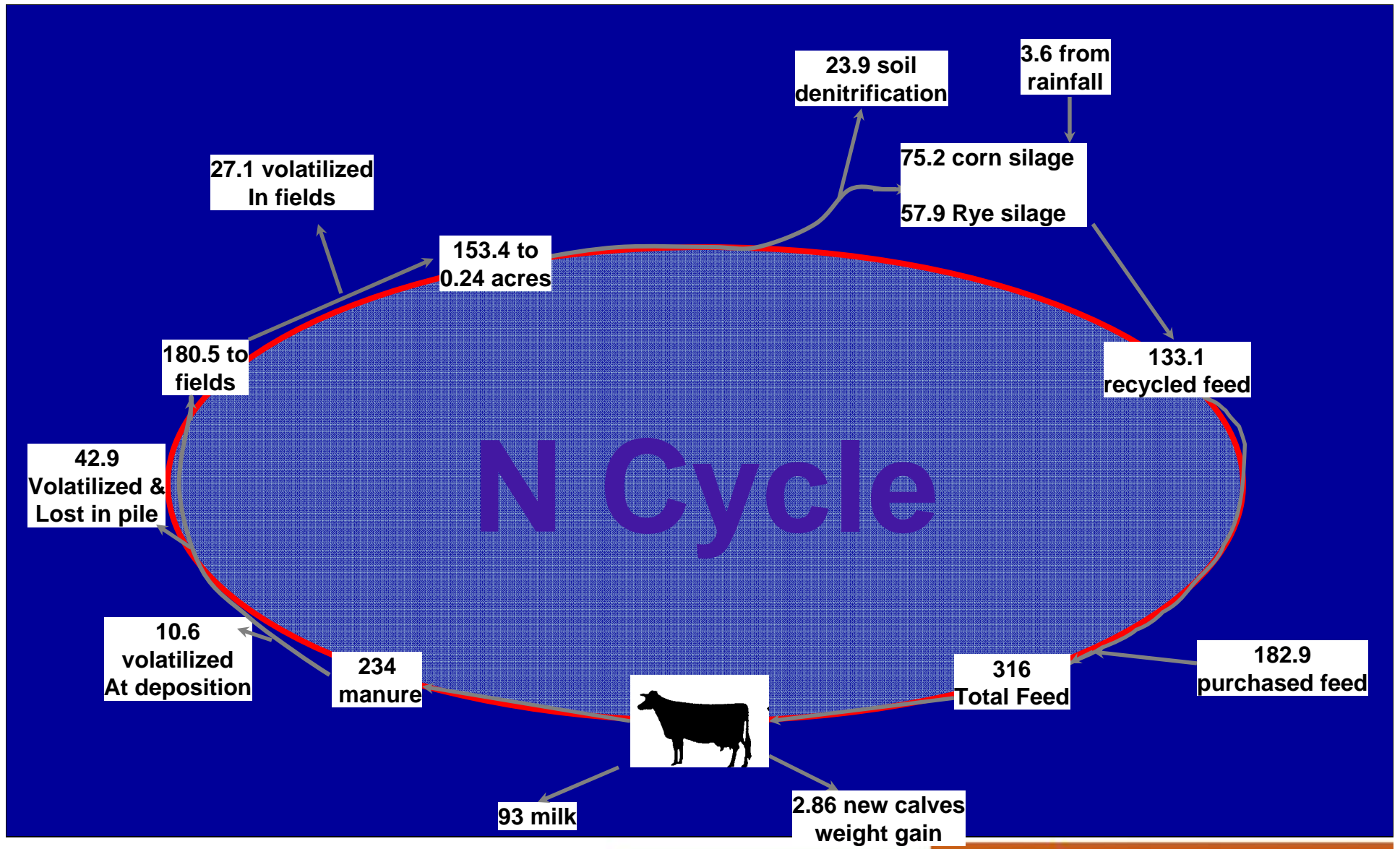
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Dairy Industry Silage Demands

How much silage a cow consumes?

It depends...

NRC (2001) some diet examples
(lbs/day @ 65% basis) :

Lactating Cows: 30 - 60

Dry Cows: 25 - 35

Dairy Industry Silage Demand

How much silage needed Eastern NM and West TX

Ton/year:

360K Lactating Cows: 2,956,500

40K Dry Cows: 219,000

Total: 3,175,500

Silage Production

How much silage an acre of land produces?

It depends...

NM Statistics (Ton/acre @ 65% basis)

Corn Silage: 20-30

Sorghum Silage: 13-20

Wheat: 8-12

Dairy Industry Silage Demand

How much land is needed?

It depends...

127,000 acres of corn or

192,000 acres of sorghum or

317,550 acres of wheat

Dairy Industry Silage Demand

How much silage was planted in 2005-2006?

Southern High Plains

161,000 acres of corn

70,000 acres of sorghum ?

100,000 acres of wheat ?

Dairy Industry Silage Demands

How much silage a cow consumes and how much nutrient excretes?

Dairy Cattle Consumption and Excretion		
Silage (Ton/year/cow) @ 65%	5.4	10.5
N (lbs/year/cow)	234	273
P (lbs/year/cow)	40	48
K (lbs/year/cow)	91	151

Nutrient Removals of Silage

N, P, K % of DM

Corn:

1.7, 0.35, 1.25

Sorghum

1.6, 0.33, 1.25

Wheat

2.95, 0.40, 0.11

Dairy Industry Silage Demand

How much silage produces and up-takes?

	Silage Production					
	Corn		Sorghum		Wheat	
Yield (Ton/acre) @						
65%	20	30	13	20	8	12
N (lbs/acre)	238	357	146	224	120	180
P (lbs/acre)	49	74	30	44	15	22
K (lbs/acre)	175	263	114	165	44	66
Price (\$/Ton)	30	32	28	28	31	31

Dairy Industry Silage Demand

Linear Programming Matrix

		Corn	Sorghum	Wheat	Dairy Cattle	RHS		SumProduct
		100,000	0	100,000	400,000			
Land	acre	1	1	1				200,000
Silage	Ton	-30	-20	-12	10.5		=	0
N	lbs	357	224	177	-234			-40,176,923
P	lbs	74	46	22	-40			-6,464,154
K	lbs	263	175	65	-91			-3,651,538
Dairy Cattle	#				-1	(400,000)	<=	-400,000
Price	\$/Ton	31	28	25				
Price	\$/acre	930	560	369				129,923,077
Cost								207,876,923
Fertilizer Value								18,817,692

Dairy Industry Silage Demand

Linear Programming Matrix

		Corn	Sorghum	Wheat	Dairy Cattle	RHS		SumProduct
		0	102,857	102,857	400,000			
Land	acre	1	1	1				205,714
Silage	Ton	-20	-13	-8	5.4		=	0
N	lbs	238	146	118	-234			-66,471,033
P	lbs	49	30	15	-40			-11,412,334
K	lbs	175	114	43	-91			-20,243,912
Dairy Cattle	#				-1	(400,000)	<=	-400,000
Price	\$/Ton	31	28	25				
Price	\$/acre	620	364	246				62,758,681
Cost								100,413,890
Fertilizer Value								34,587,023

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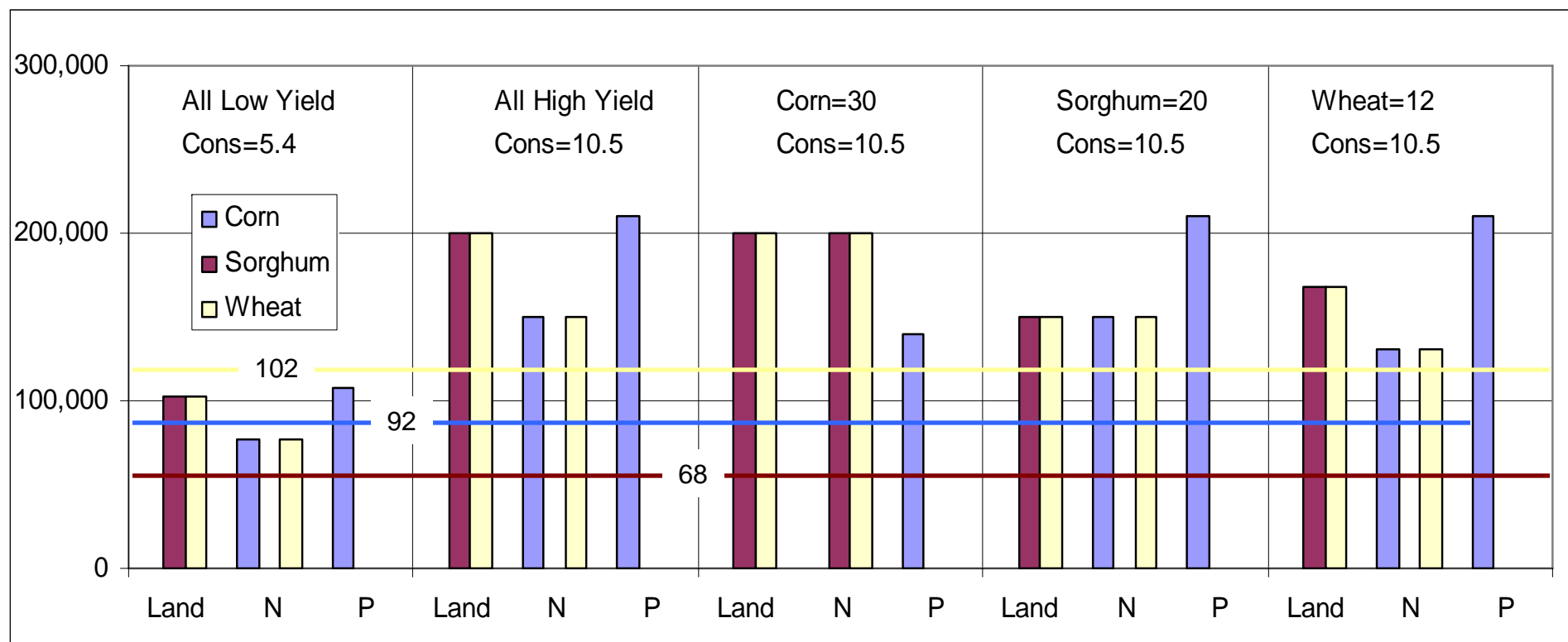
Dairy Industry Silage Demand

Linear Programming Matrix

		Corn	Sorghum	Wheat	Dairy Cattle	RHS		SumProduct
		0	131,250	131,250	400,000			
Land	acre	1	1	1				262,500
Silage	Ton	-30	-20	-12	10.5		=	0
N	lbs	357	224	177	-234			-40,938,462
P	lbs	74	46	22	-40			-7,067,327
K	lbs	263	175	65	-91			-4,902,019
Dairy Cattle	#				-1	(400,000)	<=	-400,000
Price	\$/Ton	31	28	25				
Price	\$/acre	930	560	369				121,961,538
Cost								195,138,462
Fertilizer Value								19,613,192

Balance of Nutrients

How much \$ silage brings

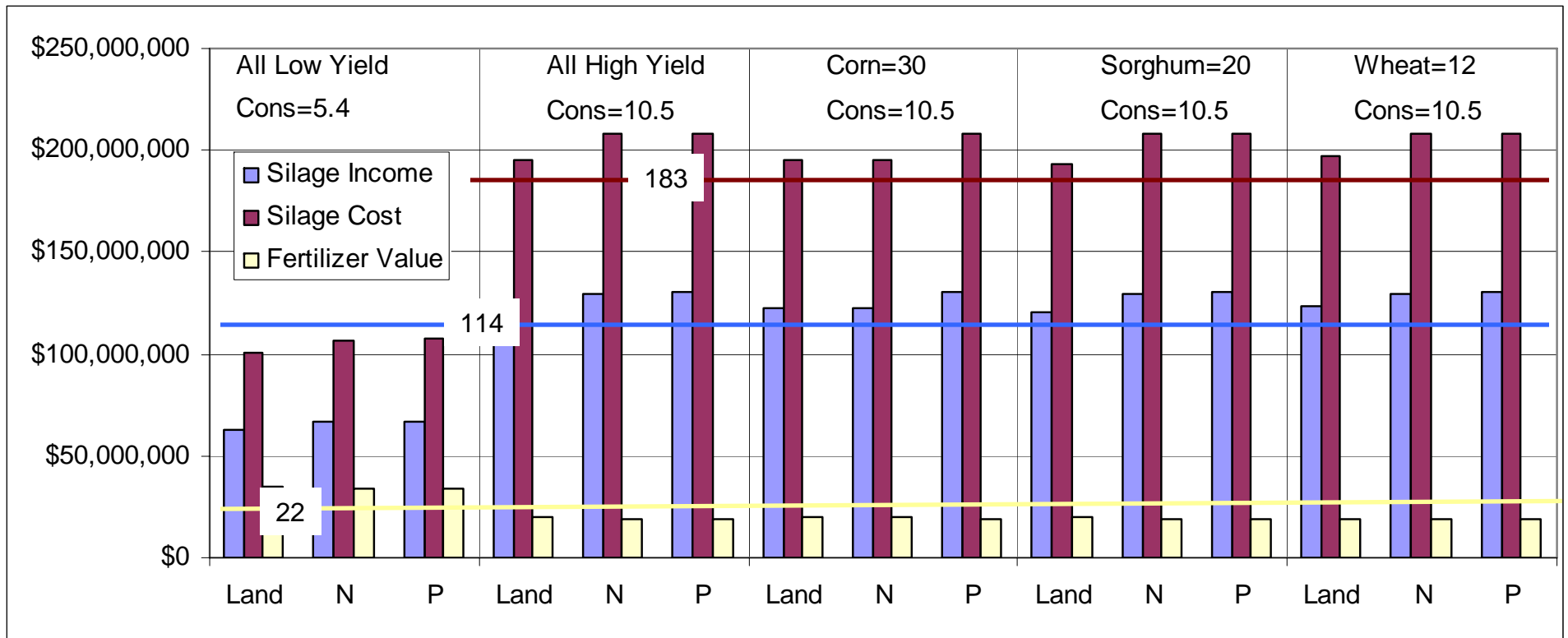


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Balance of Nutrients

How much area of silage is needed



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Thanks

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