APPENDIX F– Agriculture

Data from State Inventory Tool

INPUT:

Enteric Fermentation

Table F-1 Animal Populations for Enteric Fermentation Calculations ('000 head)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Dairy Cattle											
Dairy Cows	1,738.7	1,710.7	1,647.6	1,593.4	1,499.4	1,501.4	1,473.4	1,408.6	1,380.1	1,371.3	1,364.5
Dairy Replacement Heifers	798.2	800.6	787.0	729.3	709.1	671.5	647.6	632.2	628.1	611.0	606.4
Replacements 0-12 mos.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Replacements 12-24 mos.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Beef Cattle											
Beef Cows	181.2	167.2	172.3	194.4	192.7	192.5	206.1	211.0	221.7	211.3	221.2
Beef Replacement Heifers	29.2	34.2	34.9	38.7	48.2	47.1	47.2	46.9	42.0	37.3	37.1
Replacements 0-12 mos.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Replacements 12-24 mos.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heifer Stockers	63.2	50.6	51.6	51.4	56.9	50.1	46.9	45.6	44.4	42.3	41.9
Steer Stockers	209.1	190.1	191.2	244.3	239.1	196.4	194.2	190.3	179.0	158.0	167.6
Feedlot Heifers	26.3	29.7	27.9	22.7	25.2	29.0	25.6	26.5	27.8	29.6	30.0
Feedlot Steer	86.8	111.4	103.5	108.1	105.8	113.7	106.1	110.5	112.3	110.6	120.2
Bulls	35.3	35.0	34.7	34.4	34.9	35.1	35.1	34.6	29.5	29.5	28.7
Other											
Sheep	105.0	103.0	105.0	99.0	88.0	83.0	79.0	78.0	79.0	83.0	83.0
Goats	12.1	12.1	12.1	13.7	15.3	16.9	18.5	20.1	20.1	20.1	20.1
Swine	1,147.5	1,165.0	4,770.0	1,198.8	1,117.5	892.5	775.0	765.0	710.0	625.0	587.5
Horses	108.0	108.7	109.1	109.3	108.9	111.2	111.6	112.0	113.5	112.0	113.6

Table F-2 Emission Factors for Enteric Fermentation Calculations (kg CH_4 head)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Dairy Cattle											
Dairy Cows	105.2	106.2	108.4	107.2	107.9	105.2	107.9	109.8	112.0	113.2	115.0
Dairy Replacement Heifers	53.5	53.4	53.4	53.5	53.4	53.4	53.5	53.5	53.4	53.5	53.4
Replacements 0-12 mos.	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1
Replacements 12-24 mos.	60.0	59.9	59.9	59.9	59.9	60.0	59.9	59.9	59.9	59.9	59.9
Beef Cattle											
Beef Cows	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1	74.1
Beef Replacement Heifers	56.3	56.3	56.1	56.3	56.3	56.5	56.5	56.6	56.6	56.4	56.4
Replacements 0-12 mos.	40.3	40.3	40.3	40.3	40.3	40.4	40.4	40.4	40.4	40.3	40.3
Replacements 12-24 mos.	63.2	63.1	63.1	63.1	63.1	63.1	63.1	63.2	63.2	63.2	63.1
Heifer Stockers	48.2	48.2	48.6	48.8	48.8	49.0	48.8	48.8	48.8	48.6	48.5
Steer Stockers	54.5	54.3	54.7	54.8	54.6	54.9	54.7	54.7	54.6	54.4	54.3
Feedlot Heifers	37.4	36.5	35.7	34.7	33.5	32.6	31.7	31.5	31.9	31.4	31.5
Feedlot Steer	39.8	38.8	37.8	36.6	35.3	34.5	33.4	33.2	33.7	33.2	33.4
Bulls	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Other											
Sheep	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Goats	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Swine	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Horses	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0

Manure Management

Table F-3 Animal Populations for Manure Management Calculations ('000 head)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Dairy Cattle											
Dairy Cows	1,738.7	1,710.7	1,647.6	1,593.4	1,499.4	1,501.4	1,473.4	1,408.6	1,380.1	1,371.3	1,364.5
Dairy Replacement Heifers	798.2	800.6	787.0	729.3	709.1	671.5	647.6	632.2	628.1	611.0	606.4
Beef Cattle											
Feedlot Heifers	26.3	29.7	27.9	22.7	25.2	29.0	25.6	26.5	27.8	29.6	30.0
Feedlot Steer	86.8	111.4	103.5	108.1	105.8	113.7	106.1	110.5	112.3	110.6	120.2
Bulls	35.3	35.0	34.7	34.4	34.9	35.1	35.1	34.6	29.5	29.5	28.7
Calves	1,239.7	1,238.3	1,216.7	1,195.9	1,238.1	1,194.0	1,157.8	1,120.7	1,062.0	1,022.7	1,020.5
Beef Cows	181.2	167.2	172.3	194.4	192.7	192.5	206.1	211.0	221.7	211.3	221.2
Beef Replacement Heifers	29.2	34.2	34.9	38.7	48.2	47.1	47.2	46.9	42.0	37.3	37.1
Steer Stockers	209.1	190.1	191.2	244.3	239.1	196.4	194.2	190.3	179.0	158.0	167.6
Heifer Stockers	63.2	50.6	51.6	51.4	56.9	50.1	46.9	45.6	44.4	42.3	41.9
Swine											
Breeding Swine	168.8	170.0	700.0	175.0	158.8	126.3	126.3	126.3	96.3	76.3	67.5
Market Under 60 lbs	379.3	383.8	1,590.0	408.8	376.3	301.3	251.3	260.0	237.5	201.3	193.8
Market 60-119 lbs	245.0	248.8	1,030.0	260.5	248.8	191.3	155.0	146.3	143.8	128.8	118.8
Market 120-179 lbs	191.3	197.5	780.0	194.3	183.8	147.5	131.3	120.0	122.5	116.3	107.5
Market over 180 lbs	163.3	165.0	670.0	160.3	150.0	126.3	111.3	112.5	110.0	102.5	100.0
Poultry											
Layers											
Hens > 1 yr	2,425.0	1,870.0	1,865.0	1,120.0	2,253.0	1,380.0	1,922.0	1,994.0	1,289.0	2,020.0	2,291.0
Pullets	1,925.0	2,385.0	2,105.0	2,935.0	1,910.0	2,510.0	2,751.0	3,006.0	3,364.0	3,377.0	3,502.0
Chickens	30.0	40.0	35.0	55.0	30.0	20.0	20.0	25.0	34.0	40.0	30.0
Broilers	2,545.5	2,781.8	3,000.0	3,218.2	3,181.8	4,036.4	5,890.9	5,981.8	6,200.0	6,145.5	5,963.6
Turkeys	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other											
Sheep on Feed	15.0	18.0	20.0	15.0	14.5	13.7	13.0	12.9	13.0	13.7	13.7
Sheep Not on Feed	90.0	85.0	85.0	84.0	73.5	69.3	66.0	65.1	66.0	69.3	69.3
Goats	12.1	12.1	12.1	13.7	15.3	16.9	18.5	20.1	20.1	20.1	20.1
Horses	108.0	108.7	109.1	109.3	108.9	111.2	111.6	112.0	113.5	112.0	113.6

Table F-4 Calculation Values for Methane Emissions from Manure Management

	Typical Animal Mass (TAM) (kg)	**Maximim Potential Emissions (B_0)** (m^3 CH_4/ kg VS)
Dairy Cattle		
Dairy Cows	604	0.24
Dairy Replacement Heifers	476	0.17
Beef Cattle		
Feedlot Heifers	420	0.33
Feedlot Steer	420	0.33
Bulls	750	0.17
Calves	159	0.17
Beef Cows	590	0.17
Beef Replacement Heifers	420	0.17
Steer Stockers	318	0.17
Heifer Stockers	420	0.17
Swine		
Breeding Swine	198.0	0.48
Market Under 60 lbs	15.9	0.48
Market 60-119 lbs	40.6	0.48
Market 120-179 lbs	67.8	0.48
Market over 180 lbs	90.8	0.48
Poultry		
Layers		
Hens > 1 yr	1.8	0.39
Pullets	1.8	0.39
Chickens	1.8	0.39
Broilers	0.9	0.36
Turkeys	6.8	0.36
Other		
Sheep on Feed	27	0.36
Sheep Not on Feed	27	0.19
Goats	64	0.17
Horses	450	0.33

Table F-5 Volatile Solids for Calculation of Methane Emissions from Manure Management (kg VS/1000 kg animal mass/day)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Dairy Cattle											
Dairy Cows	8.7	8.8	8.9	8.3	8.4	8.5	7.8	8.0	8.1	8.2	8.4
Dairy Replacement Heifers	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Beef Cattle											
Feedlot Heifers	5.1	4.9	4.6	4.4	4.0	3.7	3.5	3.5	3.4	3.4	3.4
Feedlot Steer	5.0	4.8	4.5	4.3	3.9	3.7	3.4	3.4	3.4	3.3	3.3
Bulls	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Calves	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
Beef Cows	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Beef Replacement Heifers	7.0	7.0	7.0	7.0	7.0	7.1	7.1	7.1	7.1	7.1	7.0
Steer Stockers	7.4	7.5	7.3	7.3	7.4	7.3	7.2	7.3	7.4	7.4	7.5
Heifer Stockers	7.1	7.1	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.1
Swine											
Breeding Swine	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Market Under 60 lbs	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Market 60-119 lbs	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Market 120-179 lbs	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Market over 180 lbs	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Poultry											
Layers											
Hens > 1 yr	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Pullets	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Chickens	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Broilers	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15
Turkeys	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Other											
Sheep on Feed	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Sheep Not on Feed	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Goats	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Horses	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10

Table F-6 Weighted Methane Conversion Factors for Calculation of Methane Emissions from Manure Management

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Dairy Cattle											
Dairy Cows	0.070	0.074	0.066	0.074	0.082	0.091	0.090	0.095	0.103	0.100	0.098
Dairy Replacement Heifers	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Beef Cattle											
Feedlot Heifers	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Feedlot Steer	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Bulls	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Calves	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Beef Cows	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Beef Replacement Heifers	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Steer Stockers	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Heifer Stockers	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Swine											
Breeding Swine	0.252	0.262	0.232	0.246	0.258	0.276	0.256	0.259	0.265	0.281	0.269
Market Under 60 lbs	0.252	0.263	0.232	0.247	0.259	0.277	0.256	0.260	0.284	0.277	0.269
Market 60-119 lbs	0.252	0.263	0.232	0.247	0.259	0.277	0.256	0.260	0.284	0.277	0.269
Market 120-179 lbs	0.252	0.263	0.232	0.247	0.259	0.277	0.256	0.260	0.284	0.277	0.269
Market over 180 lbs	0.252	0.263	0.232	0.247	0.259	0.277	0.256	0.260	0.284	0.277	0.269
Poultry											
Layers											
Hens > 1 yr	0.026	0.027	0.025	0.026	0.027	0.028	0.027	0.027	0.028	0.028	0.028
Pullets	0.026	0.027	0.025	0.026	0.027	0.028	0.027	0.027	0.028	0.028	0.028
Chickens	0.026	0.027	0.025	0.026	0.027	0.028	0.027	0.027	0.028	0.028	0.028
Broilers	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Turkeys	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Other											
Sheep on Feed	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Sheep Not on Feed	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Goats	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Horses	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008

Table F-7 Animal Characteristic Data for Calculation of Nitrous Oxide Emissions from Manure Management

	TAM (kg)	Kjeldahl Nitrogen (kg /1000kg animal mass/ day)
Dairy Cattle		
Dairy Cows	604	0.44
Dairy Replacement Heifers	476	0.31
Beef Cattle		
Feedlot Heifers	590	0.33
Feedlot Steer	420	0.31
Bulls	159	0.3
Calves	318	0.31
Beef Cows	420	0.31
Beef Replacement Heifers	420	0.3
Steer Stockers	420	0.3
Heifer Stockers	750	0.31
Swine		
Breeding Swine	198	0.235
Market Under 60 lbs	15.9	0.6
Market 60-119 lbs	40.6	0.42
Market 120-179 lbs	67.8	0.42
Market over 180 lbs	90.8	0.42
Poultry		
Layers		
Hens > 1 yr	1.8	0.83
Pullets	1.8	0.62
Chickens	1.8	0.83
Broilers	0.9	1.1
Turkeys	6.8	0.74
Other		
Sheep on Feed	27	0.42
Sheep Not on Feed	27	0.42
Goats	64	0.45
Horses	450	0.3

Table F-8 Percentage Breakdown of Manure Management Systems for Dairy Cows

Year	Anaerobic Lagoon	Liquid/ Slurry	Daily Spread	Solid Storage	Pasture	Deep Pit
1990	4%	13%	22%	44%	13%	4%
1991	4%	13%	22%	44%	13%	4%
1992	4%	13%	22%	44%	13%	4%
1993	4%	14%	21%	44%	13%	4%
1994	5%	15%	20%	45%	12%	4%
1995	5%	16%	19%	45%	11%	4%
1996	6%	16%	18%	45%	11%	4%
1997	6%	17%	17%	46%	10%	4%
1998	6%	17%	17%	46%	10%	4%
1999	6%	17%	17%	46%	10%	4%
2000	6%	17%	17%	46%	10%	4%

Table F-9 Percentage Breakdown of Manure Management Systems for Dairy Heifers

Year	Managed	Pasture, Range & Paddock (PRP)	Daily Spread
1990	65%	13%	22%
1991	65%	13%	22%
1992	65%	13%	22%
1993	66%	13%	21%
1994	68%	12%	20%
1995	70%	11%	19%
1996	72%	11%	18%
1997	74%	10%	17%
1998	74%	10%	17%
1999	74%	10%	17%
2000	74%	10%	17%

Table F-10 Percentage Breakdown of Manure Management Systems for Swine

Year	Pasture	Solid Storage	Liquid/ Slurry	Anaerobic Lagoon	Deep Pit
1990	19%	4%	22%	16%	39%
1991	19%	4%	22%	16%	39%
1992	19%	4%	22%	16%	39%
1993	18%	4%	22%	16%	39%
1994	17%	4%	23%	17%	40%
1995	16%	4%	23%	17%	40%
1996	15%	4%	23%	17%	41%
1997	14%	4%	23%	17%	41%
1998	14%	4%	23%	17%	41%
1999	14%	4%	23%	17%	41%
2000	14%	4%	23%	17%	41%

Table F-11 Percentage Breakdown of Manure Management Systems for Layers

Year	Solid Storage	Liquid/ Slurry	Anaerobic Lagoon	Poultry without bedding
1990	40%	5%	0%	55%
1991	36%	4%	0%	60%
1992	31%	4%	0%	65%
1993	27%	3%	1%	69%
1994	22%	3%	1%	74%
1995	18%	2%	1%	79%
1996	13%	2%	1%	84%
1997	9%	1%	2%	88%
1998	4%	1%	2%	93%
1999	0%	0%	2%	98%
2000	0%	0%	2%	98%

Table F-12 Percentage Breakdown of Manure Management Systems for Other Animals

	Dry Lot	Pasture	Litter	Range	On Feed (PRP)	Not on Feed (PRP)	Pasture, Range & Paddock
Feedlot Beef	100%	-	-	-	-	-	-
NOF Beef		100%	-	-	-	-	-
Broilers	-	-	100%	-	-	-	-
Turkeys	-	-	88%	12%	-	-	-
Sheep	-	-	-	-	100%	100%	-
Goats	-	-	-	-	-	-	100%
Horses	-	-	-	-	-	-	100%

Soil Management

Table F-13 Fertilizer Use (kg N)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Synthetic	227,673,115	231,658,100	221,382,074	212,240,034	239,336,213	213,658,299	227,870,868	238,874,472	253,574,817	251,418,431	223,909,409
Organic	134,857	131,183	124,582	125,703	139,915	226,099	277,483	174,569	206,816	256,308	341,163

Table F-14 Crop Production

	Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Alfalfa	'000 tons	8400	8400	5290	5060	5750	5980	5250	5225	5320	6510	5400
Corn for Grain	'000 bushels	354000	380800	306800	216200	437100	347700	333000	402600	404150	407550	363000
All Wheat	'000 bushels	10085	6118	2640	4660	7940	8070	5940	8531	7635	7480	8730
Barley	'000 bushels	2700	3312	4160	3220	4452	3456	3975	3575	3380	3380	3200
Oats	'000 bushels	47570	26500	34410	24150	1200	18700	17400	20160	18300	18600	19040
Rye	'000 bushels	19040	465	435	330	260	875	480	384	432	360	384
Soybeans	'000 bushels	17630	23100	22080	20650	36105	34400	32190	44000	51700	59800	60000
Dry Edible Beans	'000 hundredweight	0	0	0	145	237	130	162	171	115	124	146

Table F-15 Residue to Crop Mass Ratio, Residue Dry Matter Fraction, Fraction Residue Applied, and Residue Nitrogen Content for Selected Crops

Crop	Residue to Crop Mass Ratio	Residue Dry Matter Fraction	Residue Retention Fraction	N Content of Residue (kg N/kg dry biomass)
Alfalfa	0	0.85	0	0.0300
Corn for Grain	1	0.91	0.90	0.0058
All Wheat	1.3	0.93	0.90	0.0062
Barley	1.2	0.93	0.90	0.0077
Sorghum for Grain	1.4	0.91	0.90	0.0108
Oats	1.3	0.92	0.90	0.0070
Rye	1.6	0.90	0.90	0.0048
Millet	1.4	0.89	0.90	0.0070
Rice	1.4	0.91	1.00	0.0072
Soybeans for Beans	2.1	0.87	0.90	0.0230
Peanuts for Nuts	1	0.86	0.90	0.0106
Dry Edible Beans	1.55	0.87	0.90	0.0062
Dry Edible Peas	1.55	0.87	0.90	0.0062
Austrian Winter Peas	1.55	0.87	0.90	0.0062
Lentils	1.55	0.87	0.90	0.0062
Wrinkled Seed Peas	1.55	0.87	0.90	0.0062

Agricultural Residue Burning

Table F-16 Crop-Specific Ratio, Proportion, and Efficiency Values

Crop Type	Residue/ Crop Ratio	Proportion of Residue Burned	Proportion of Dry Matter	Burning Efficiency	Combustion Efficiency
Barley	1.2	0.03	0.93	0.93	0.88
Corn	1.0	0.03	0.91	0.93	0.88
Peanuts	1.0	0.03	0.86	0.93	0.88
Rice	1.4	Variable[a]	0.91	0.93	0.88
Soybeans	2.1	0.03	0.87	0.93	0.88
Sugarcane	0.8	0.03	0.62	0.93	0.88
Wheat	1.3	0.03	0.93	0.93	0.88

Table F-17 Carbon/Nitrogen Contents and Emission Ratios

Crop Type	Carbon Content (metric tons C/ metric tons dry matter)	Nitrogen Content (metric tons N/ metric tons dry matter)	CH_4-C Emission Ratio	N_2O-N Emission Ratio	CO-C Emission Ratio	NOx-N Emission Ratio
Barley	0.4485	0.0077	0.005	0.007	0.060	0.121
Corn	0.4478	0.0058	0.005	0.007	0.060	0.121
Peanuts	0.4500	0.0106	0.005	0.007	0.060	0.121
Rice	0.3806	0.0072	0.005	0.007	0.060	0.121
Soybeans	0.4500	0.0230	0.005	0.007	0.060	0.121
Sugarcane	0.4235	0.0040	0.005	0.007	0.060	0.121
Wheat	0.4428	0.0062	0.005	0.007	0.060	0.121

OUTPUT:

Table F-18 Emissions (MMTCO2E)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Enteric Fermentation	5.622	5.564	5.602	5.356	5.146	4.966	4.961	4.856	4.837	4.779	4.839
Manure Management	2.266	2.320	2.913	2.144	2.134	2.205	2.068	2.065	2.113	2.060	2.033
Agricultural Soil Management	7.913	7.976	7.674	7.041	7.553	7.151	7.072	7.506	7.733	7.956	7.401
Burning of Agricultural Crop Waste	0.020	0.022	0.019	0.014	0.027	0.023	0.022	0.027	0.029	0.030	0.028
TOTAL	15.821	15.882	16.208	14.555	14.861	14.345	14.123	14.455	14.711	14.825	14.301

Table F- 19 Emissions by Gas (MMTCH$_4$ or MMTN$_2$O)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Methane	0.320	0.320	0.345	0.305	0.296	0.291	0.285	0.281	0.283	0.278	0.280
Enteric Fermentation	0.268	0.265	0.267	0.255	0.245	0.236	0.236	0.231	0.230	0.228	0.230
Manure Management	0.052	0.054	0.078	0.049	0.050	0.054	0.048	0.049	0.052	0.050	0.049
Nitrous Oxide	0.029	0.030	0.029	0.026	0.028	0.027	0.026	0.028	0.028	0.029	0.027
Manure Management	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Agricultural Soil Management	0.026	0.026	0.025	0.023	0.024	0.023	0.023	0.024	0.025	0.026	0.024

Table F-20 Nitrous Oxide Emissions from Agricultural Soil Management (MMTCO2E))

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Direct	5.734	5.797	5.424	4.991	5.446	5.167	5.054	5.480	5.674	5.927	5.474
Fertilizers	1.248	1.270	1.213	1.163	1.312	1.171	1.249	1.309	1.390	1.378	1.227
Crop Residues	0.435	0.453	0.394	0.314	0.563	0.497	0.470	0.599	0.646	0.699	0.669
N-Fixing Crops	1.420	1.493	1.041	0.993	1.299	1.307	1.175	1.330	1.445	1.722	1.568
Livestock	2.632	2.582	2.775	2.522	2.272	2.192	2.160	2.242	2.193	2.128	2.009
Indirect	2.179	2.179	2.251	2.049	2.107	1.984	2.019	2.026	2.059	2.029	1.927
Fertilizers	0.111	0.113	0.108	0.103	0.117	0.104	0.111	0.116	0.124	0.122	0.109
Livestock	0.278	0.275	0.298	0.263	0.253	0.248	0.244	0.237	0.232	0.227	0.228
Leaching/Runoff	1.790	1.792	1.845	1.683	1.737	1.632	1.664	1.673	1.704	1.679	1.590
TOTAL	7.913	7.976	7.674	7.041	7.553	7.151	7.072	7.506	7.733	7.956	7.401

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