BERICHTE BE-087a

Umweltbundesamt

STICKSTOFFBILANZ DER ÖSTERREICHISCHEN LANDWIRTSCHAFT NACH DEN VORGABEN DER OECD

Aktualisierte und erweiterte Fassung
(Stand: Juli 1998)

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Bettina Götz

BE-087a

Wien, Juli 1998

Bundesministerium für Umwelt, Jugend und Familie

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Impressum

Medieninhaber und Herausgeber: Umweltbundesamt, Spittelauer Lände 5, A-1090 Wien

Eigenvervielfältigung

ISBN 3-85457-450-9

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1 VORAUSSETZUNGEN FÜR DIESE ARBEIT

Im Rahmen der OECD wurde 1994 eine „Joint Working Party" (JWP) des Umweltkomitees und des Landwirtschaftskomitees gegründet, mit dem Ziel, die Wechselbeziehungen zwischen Agrar- und Umweltpolitik zu dokumentieren und abzubilden, um Umweltziele in die Agrarpolitik integrieren zu können. Dabei spielt das Bemühen um eine gemeinsame Definition von Umweltindikatoren in der Landwirtschaft eine entscheidende Rolle.

Das Bundesministerium für Land- und Forstwirtschaft (DI. Walter, Abt. II/B8) leitet die österreichische Delegation bei dieser „Joint Working Party" in Kooperation mit dem Umweltressort (DI. Zethner, Umweltbundesamt).

Vom Bundesministerium für Land- und Forstwirtschaft wurde österreichintern die Einladung der OECD zu Kommentaren und Ergänzungen zum OECD-Konzept für den Umweltindikator „Nationale Flächen-Nährstoffbilanz der Landwirtschaft" an mehrere Experten mit der Bitte um Beiträge ausgeschickt. Einige traten mit dem Bundesministerium für Land- und Forstwirtschaft bzw. dem Umweltbundesamt in Kontakt: das Bundesamt und Forschungszentrum für Landwirtschaft und die Bundesanstalt für alpenländische Landwirtschaft. Ihre Anmerkungen wurden in die vorliegende nationale N-Bilanz eingearbeitet. Mit dem ÖSTAT nahm das Umweltbundesamt bezüglich der Datengrundlagen Kontakt auf. Für den N-Entzug von Kulturpflanzen wurden Daten des Fachbeirates für Bodenfruchtbarkeit und Bodenschutz herangezogen.

2 DURCHFÜHRUNG UND ERGEBNISSE DER ARBEIT

Das Umweltbundesamt erarbeitete im Mai 1997 eine Stickstoffbilanz für die düngungswürdige Fläche Österreichs, welche für die Jahre 1987 bis 1995 einen durchschnittlichen jährlichen Stickstoff-Überschuß von 46 kg N/ha ergab (siehe S. 5 – 6 bzw. BE-087 (1997)). Die errechneten 46 kg N/ha N-Überschuß verteilen sich auf die Verlustpfade Denitrifikation und Nitratauswaschung sowie Ammoniakverluste.

Aufgrund der geänderten Vorgaben der OECD wurde nunmehr die Stickstoffbilanz für die gesamte landwirtschaftliche Nutzfläche Österreichs berechnet, welche über die düngungswürdige Fläche hinausgeht und zusätzlich die Almen und Bergmähder, Hutweiden, Streuwiesen und das nicht mehr genutzte Grünland beinhaltet. Durch die Vergrößerung der Fläche als Bezugsgröße der Stickstoffbilanz ergibt sich ein niedrigerer Stickstoffbilanz-Saldo. Weiters wurde von der OECD aufgrund von Interventionen die Methodik insofern geändert, als daß für Ammoniak-Verluste bei Wirtschaftsdüngern ein Abzug von 15 % des Gesamt-Stickstoff in Rechnung gestellt wird. Diese umweltrelevanten Stickstoffverluste scheinen damit im Bilanzsaldo nicht mehr auf. Als dritte Ergänzung wurden der OECD auch die Daten des Jahres 1996 übermittelt. Die derart berechnete Stickstoff-Flächenbilanz für die gesamte landwirtschaftliche Nutzfläche Österreichs und unter Abzug von 15 % Stickstoff-Verlusten bei Wirtschaftsdüngern ergibt für die Jahre 1985 - 1996 im Mittel einen Stickstoff-Überschuß von 30 kg N/ha. Das Schreiben an die OECD im November 1997 sowie die Datenblätter der Stickstoff-Bilanz sind in dieser aktualisierten Fassung des Berichtes enthalten (S. 7-36 und S. 50-51).

Sämtliche Anmerkungen und Literaturzitate zur dargestellten Stickstoffbilanz sind in den drei Schreiben an die OECD (32-68/97, 32-115/97 und 32-291/97) festgehalten (siehe S. 43-51).

Die von der OECD ausgesandten Tabellenblätter, welche vom Umweltbundesamt mit Daten und Koeffizienten gefüllt wurden, sind ab S. 77 in diesem Bericht enthalten. Die Numerierung der Tabellenblätter wurde von der OECD vorgegeben und vom Umweltbundesamt beibehalten.

Das Ergebnis der nationalen Stickstoffbilanz ist ein österreichischer Durchschnittswert, der mit den Ergebnissen anderer Länder verglichen werden kann, wenn die Stickstoffbilanzen mit derselben Methode errechnet wurden, wie es das Ziel der OECD ist. Die OECD will dies durch vorgegebene Datenblätter und Erläuterungen dazu (siehe S. 60 ff und S. 77 ff) erreichen. Die Schwierigkeiten liegen im Detail, so zum Beispiel in der Höhe der Stickstoff-Ausscheidungs-Koeffizienten der landwirtschaftlichen Nutztiere. Bedingt durch die unterschiedlichen Rassen, Futtermittel und Milchleistungen der Kühe geben z.B. Dänemark, Niederlande oder auch Deutschland deutlich höhere N-Ausscheidungskoeffizienten an (zwischen 98 und 132 kg N / Milchkuh und Jahr) als Österreich (68 kg N / Milchkuh und Jahr (BMLF, 1991)). Die Diskussion zu diesem Thema wird derzeit im Rahmen der OECD geführt. Das Umweltbundesamt hat sich bei der vorliegenden Stickstoffbilanz für die österreichische Landwirtschaft an die derzeit vorhandenen österreichischen Daten und N-Koeffizienten gehalten (siehe z.B. S. 39, 40 und Schreiben an die OECD, S. 43 - 51).

Für die extensiv genutzten Almen und Bergmähder im alpinen Bereich, welche nunmehr in der Bezugsgröße „gesamte landwirtschaftliche Nutzfläche" und damit in der Stickstoffbilanz enthalten sind, wurde der Stickstoff-Entzug abgeschätzt. Dazu wurden Bodennutzungsdaten des ÖSTAT, Daten der letzten Almerhebung des ÖSTAT aus dem Jahr 1986 und Stickstoff-Koeffizienten von der Bundesanstalt für alpenländische Landwirtschaft herangezogen (siehe S. 41-42).

Die zeitliche Entwicklung des Stickstoffbilanz-Ergebnisses von Österreich in den Jahren 1985 bis 1996 kann Abb. 2 (S. 37) entnommen werden.

Die nationale Stickstoffbilanz der Landwirtschaft ist ein geeignetes Instrument, um Veränderungen der Umweltsituation im Verlauf der Zeit zu erfassen und Vergleiche zwischen Ländern anstellen zu können. Die dabei auftretenden Schwierigkeiten werden derzeit im Rahmen der OECD diskutiert und werden der Weiterentwicklung dieses Umweltindikators dienen.

Eine regionale Betrachtung der Stickstoffflüsse in der Landwirtschaft erlaubt zusätzlich die Entwicklung konkreter Maßnahmen zur Reduktion des Nährstoffüberschusses entsprechend der eingesetzten Düngemengen, der Tierbestände und Anbauverhältnisse sowie der natürlichen Boden- und Klimavoraussetzungen (UMWELTBUNDESAMT, 1996).

Wien, im Juli 1998 Bettina Götz

BMLF (1991): Wirtschaftsdünger – Richtige Gewinnung und Anwendung. Fachbeirat für Bodenfruchtbarkeit und Bodenschutz. Sonderausgabe der Zeitschrift „Förderungsdienst".

Umweltbundesamt (1996): Regionale Stoffbilanzen in der Landwirtschaft - Der Nährstoffhaushalt im Hinblick auf seine Umweltwirkung am Beispiel des Einzugsgebietes Strem. Monographie Nr. 78. Wien.

3 STICKSTOFFBILANZ FÜR ÖSTERREICH, BEZOGEN AUF DIE DÜNGUNGSWÜRDIGE FLÄCHE, 1985-1995

Im Bericht BE-087 (1997) des Umweltbundesamtes wurde die Stickstoffbilanz der österreichischen Landwirtschaft bezogen auf die düngungswürdige Fläche bereits ausführlich dargestellt. Im folgenden werden in Abb. 1 und dem Tabellenblatt auf S. 6 nochmals die errechneten Daten wiedergegeben.

Die Bezeichnung des Tabellenblattes, „table 4.1.1", entspricht der vorgegebenen Numerierung der OECD (siehe S. 77 ff), die Daten sind sowohl in Tonnen Stickstoff als auch in kg Stickstoff pro Hektar düngungswürdiger Fläche dargestellt.

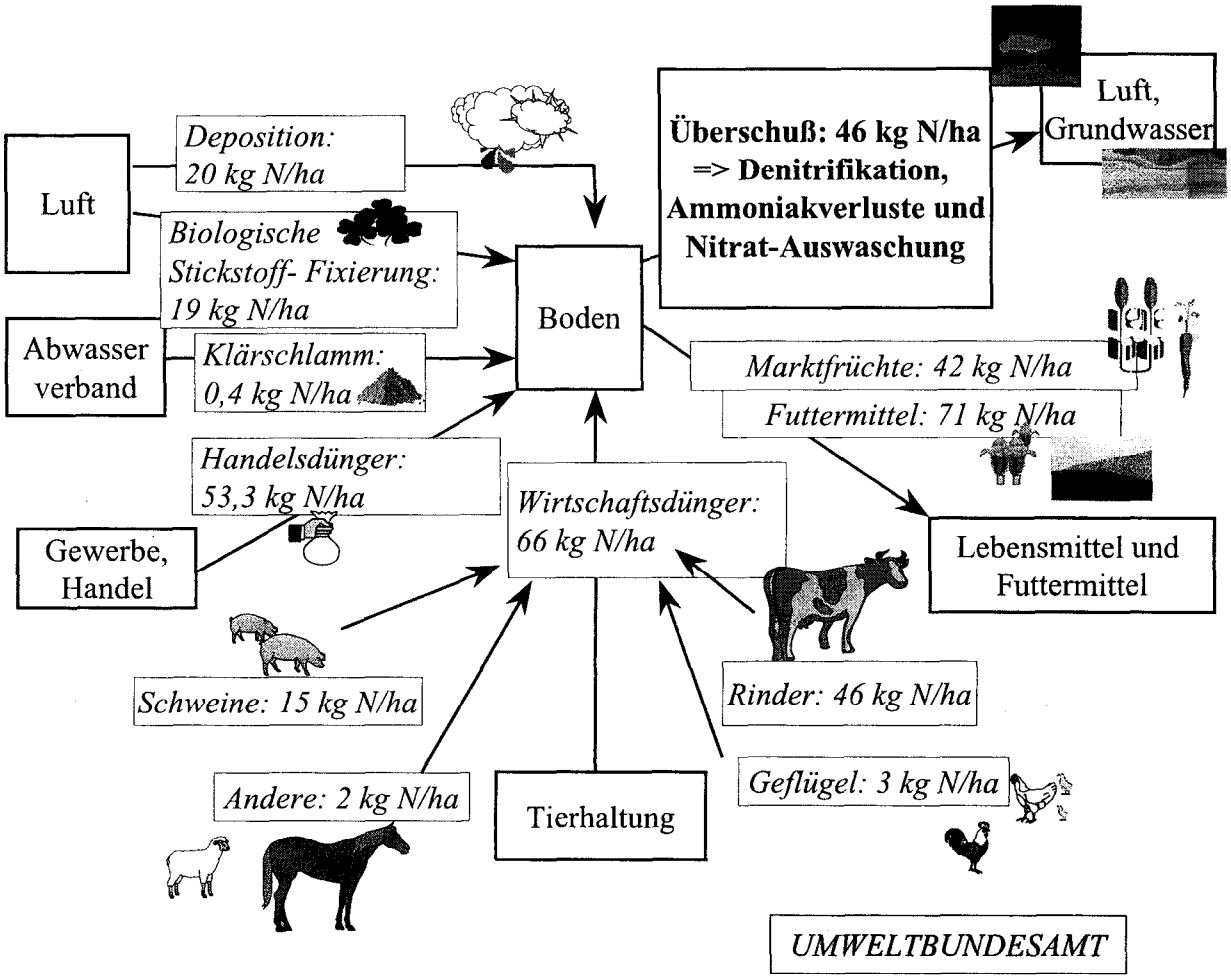


Abb. 1: Nationale N-Flächenbilanz der österreichischen Landwirtschaft im Durchschnitt der Jahre 1987 - 1995, Angaben in kg N/ha düngungswürdige Fläche (= Acker- und Grünlandfläche in Österreich, jedoch ohne Almen, Bergmähder, Hutweiden, Streuwiesen sowie nicht mehr genutztes Acker- und Grünland) und Jahr

Table 4.1.1 NITROGEN BALANCE IN KILOGRAMS PER HECTARE OF AGRICULTURAL LAND WHICH DESERVES FERTILISATION (1) (3)														
OECD Code	Description		1985, t N	1985, kg N/ha	1987, t N	1987, kg N/ha	1989, t N	1989, kg N/ha	1991, t N	1991, kg N/ha	1993, t N	1993, kg N/ha	1995, t N	1995, kg N/ha
	NITROGEN INPUTS													
F1	**Fertilisers**		**165.070**	**66**	**146.320**	**59**	**135.590**	**54**	**133.229**	**53**	**125.755**	**50**	**123.654**	**50**
F11		Inorganic Fertilisers	165.070	66	146.320	59	135.590	54	132.000	53	124.000	50	122.000	49
F12		Organic Products												
F121		Sewage Sludge							1.229	0	1.755	1	1.654	1
M1	**Net Input of Manure (M11-M21+ M22**		**173.617**	**69**	**170.768**	**68**	**167.098**	**66**	**163.875**	**66**	**161.421**	**65**	**161.481**	**65**
M11		Livestock Manure Production	173.617	69	170.768	68	167.098	66	163.875	66	161.421	65	161.481	65
M111		Cattle	121.723	49	118.514	47	116.937	46	114.386	46	111.332	45	111.642	45
M112		Pigs	40.767	16	40.810	16	38.659	15	37.352	15	37.546	15	36.973	15
M113		Sheep and Goats	2.215	1	2.515	1	2.778	1	3.152	1	3.284	1	3.619	1
M114		Poultry	6.976	3	6.963	3	6.644	3	6.482	3	6.457	3	6.100	2
M115		Other Livestock	1.936	1	1.966	1	2.080	1	2.502	1	2.802	1	3.147	1
M21		Withdrawals												
M22		Change in Manure Stocks												
M23		Manure Imports												
N1	**Other Nitrogen Inputs**		**92.338**	**37**	**94.912**	**38**	**99.889**	**40**	**96.384**	**39**	**97.475**	**39**	**94.322**	**38**
D1		Atmospheric Deposition	50.382	20	50.020	20	50.429	20	49.956	20	49.430	20	49.513	20
B1		Biological Nitrogen Fixation	41.956	17	44.892	18	49.460	20	46.428	19	48.045	19	44.809	18
C11		Seeds and Planting Material												
	NITROGEN OUTPUTS													
C21	**Total Harvested Crops**		**105.686**	**42**	**101.490**	**41**	**108.594**	**43**	**111.550**	**45**	**103.511**	**42**	**94.268**	**38**
C211		Cereals	95.414	38	85.676	34	86.048	34	86.634	35	71.730	29	68.110	28
C212		Oilcrops	609	0	3.102	1	5.420	2	9.476	4	16.390	7	13.308	5
C213		Pulses and Beans			4.218	2	8.432	3	6.379	3	5.106	2	2.898	1
C217		Industrial Crops	4.815	2	4.234	2	5.282	2	5.043	2	5.988	2	5.772	2
		Other Crops [2]	4.848	2	4.260	2	3.412	1	4.018	2	4.297	2	4.180	2
C22	**Total Forage**		**194.943**	**78**	**194.212**	**78**	**188.372**	**75**	**170.028**	**68**	**155.273**	**62**	**174.720**	**71**
C221		Harvested Fodder Crops	34.322	14	37.201	15	34.600	14	28.024	11	27.375	11	28.992	12
C222		Pasture	160.620	64	157.011	63	153.772	61	142.004	57	127.898	51	145.728	59
B	**BALANCE (Inputs minus Outputs)**		**130.397**	**52**	**116.297**	**47**	**105.611**	**42**	**111.910**	**45**	**125.867**	**50**	**110.468**	**45**

Notes:

1. Sub-totals may not add to totals due to rounding errors.
2. C214+C215+C216+C218+C219
3. Balance per hectare agricultural land which deserves fertlisation, calculated from unrounded data and using total agricultural land category L111 shown in Table 1.7.

4 STICKSTOFFBILANZ FÜR ÖSTERREICH, BEZOGEN AUF DIE GESAMTE LANDWIRTSCHAFTLICHE NUTZFLÄCHE, 1985-1996

Im folgenden sind nun die Tabellenblätter zur Stickstoffbilanz bezogen auf die gesamte landwirtschaftliche Nutzfläche und unter Abzug von 15 % Stickstoffverlusten des Wirtschaftsdünger-Stickstoffs durch Ammoniak-Abgasung dargestellt, welche im November 1997 an die OECD übermittelt wurden. Die Bezeichnung der Tabellenblätter entspricht der vorgegebenen Numerierung der OECD (siehe S. 77 ff), beginnend mit table 1.1 bis zu table 4.1.1 mit dem Ergebnis der Stickstoffbilanz. Abschließend, auf S. 37, sind die Ergebnisse der Stickstoffbilanz in Abb. 2 graphisch dargestellt.

Auf den Seiten 38- 42 sind österreichische Datengrundlagen und Koeffizienten angeführt.

Table 1.1 FERTILISERS : INORGANIC AND ORGANIC PRODUCTS (Apparent Agricultural Consumption excluding livestock manure) 1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
F11	**Total Inorganic Fertilisers**	**sub-total**		**256**	**214**	**271**	**178**	**208**	**215**	**266**	**148**	**188**	**250**	**188**	**167**
F111	Nitrogenous Fertilisers	OECD, AMA (1.)	Compendium	165	138	179	110	133	140	180	91	124	177	124	113
F112	Phosphate Fertilisers	OECD	Compendium	91	76	92	68	75	75	85	57	64	73	64	54
F113	Potassium Fertilisers														
F12	**Total Organic Products**														
F121	Sewage Sludge	2.								32		45		42	
F122	Urban Compost														
F123	Industrial Waste Products														
F129	Other Products														

1. since 1987: Source: AMA (Agrarmarkt Austria), in: Bundesministerium für Land- und Forstwirtschaft 1996, 1997

2. Bundesministerium für Land- und Forstwirtschaft 1993 and 1996, Umweltbundesamt 1994

Table 1.2 LIVESTOCK (Number of Live Animals) (1) — 1000 Head

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
A111EU	**Total Cattle**	**sub-total**		**2.651**	***2.620***	**2.590**	***2.576***	**2.562**	***2.548***	**2.534**	***2.434***	**2.334**	***2.330***	**2.326**	**2.222**
A111EU1	Bovine Animals <1 year	sub-total		854	*847*	840	*840*	840	*867*	894	*800*	706	698	691	670
A111EU11	Calves for Slaughter	ÖSTAT		285	*283*	281	*282*	284	*272*	260	*166*	71	*68*	65	73
A111EU12	Other Calves	sub-total		569	*564*	559	*558*	557	*595*	634	*634*	635	*631*	627	598
A111EU121	Male	ÖSTAT		313	*312*	310	*304*	299	*320*	341	*331*	322	*314*	307	287
A111EU122	Female	ÖSTAT		256	*252*	249	*254*	258	*276*	293	*303*	313	*316*	320	311
A111EU2	Bovine Animals 1-2 yrs	ÖSTAT		643	*636*	628	*621*	613	*584*	555	*564*	573	*569*	564	537
A111EU21	Male Cattle 1-2 yrs	ÖSTAT		324	*322*	320	*311*	302	*284*	265	*272*	278	*271*	264	240
A111EU22	Female Cattle 1-2 yrs	ÖSTAT		319	*314*	308	*309*	310	*300*	290	*293*	295	*298*	301	298
A111EU3	Bovine > 2 years	sub-total		164	*160*	156	*157*	158	*155*	151	*155*	158	*156*	153	154
A111EU31	Male Cattle >2yr	ÖSTAT		45	*43*	42	*42*	41	*39*	37	*32*	28	*27*	25	25
A111EU32	Heifers	sub-total		120	*117*	114	*116*	117	*116*	114	*122*	130	*129*	128	129
A111EU321	Breeding Heifers	ÖSTAT		83	*80*	78	*80*	82	*81*	80	*101*	122	*122*	121	122
A111EU322	Heifers for Slaughter	ÖSTAT		37	*37*	36	*36*	35	*35*	34	*21*	8	*7*	7	8
A111EU4	Dairy Cows	ÖSTAT		989	*977*	964	*938*	912	*894*	876	*852*	828	*767*	706	910
A111EU9	Other Cows (suckler cows and nurse cows)						*20*	39	*48*	57	*63*	69	*140*	210	
A112EU	**Total Pigs**	**sub-total**		**3.926**	***3.936***	**3.947**	***3.860***	**3.773**	***3.705***	**3.638**	***3.729***	**3.820**	***3.763***	**3.706**	**3.664**
A112EU1	Piglets	sub-total													2.003
A112EU11	Pigs <20kg (Live Weight)	ÖSTAT		1.166	*1.185*	1.203	*1.183*	1.162	*1.138*	1.114	*1.056*	998	*973*	948	953
A112EU12	Pigs 20 -50 kgs										*535*	1.071	*1.058*	1.045	1.050
A112EU2	Fattening Pigs >50kgs		(2)	2.366	*2.352*	2.337	*2.285*	2.233	*2.196*	2.160	*1.758*	1.355	*1.334*	1.312	1.262
A112EU3	Breeding Pigs >50 Kgs	sub-total													
A112EU31	Boars	ÖSTAT		16	*16*	16	*16*	15	*15*	15	*15*	15	*14*	14	13
A112EU32	Sows	ÖSTAT		378	*384*	390	*376*	362	*356*	349	*365*	381	*385*	388	385
A112EU9	Other Pigs														
A113	**Total Sheep and Goats**	**sub-total**		**277**	***286***	**294**	***310***	**325**	***346***	**367**	***374***	**381**	***400***	**419**	**435**
A1131	Sheep and Lambs	sub-total		245	*253*	261	*275*	289	*308*	326	*330*	334	*350*	365	381
A11311	Sheep	ÖSTAT		151	*174*	196	*207*	217	*233*	249	*252*	256	*268*	280	288
A11312	Lambs	ÖSTAT	(3)	93	*79*	64	*68*	72	*75*	77	*78*	78	*82*	85	93
A1132	Goats	ÖSTAT		33	*33*	34	*35*	36	*39*	41	*44*	47	*51*	54	54

Table 1.2 LIVESTOCK (Number of Live Animals) (1)

1000 Head

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
A114EU	**Total Poultry**	**sub-total**		14.862	*14.950*	15.038	*14.906*	14.774	*14.586*	14.399	*14.455*	14.510	*14.236*	13.961	14.516
A114EU1	Broilers	ÖSTAT		5.030	*5.151*	5.271	*5.330*	5.388	*5.326*	5.264	*5.330*	5.397	*5.380*	5.364	4.927
A114EU2	Layers	ÖSTAT		7.546	*7.470*	7.395	*7.091*	6.786	*6.610*	6.433	*6.378*	6.324	*6.131*	5.937	5.752
A114EU3	Other Chickens	sub-total		1.864	*1.851*	1.838	*1.904*	1.971	*1.877*	1.782	*1.825*	1.868	*1.862*	1.856	1.536
A114EU31	Young chicken < 6 months	ÖSTAT		1.864	*1.851*	1.838	*1.904*	1.971	*1.877*	1.782	*1.825*	1.868	*1.862*	1.856	1.536
A114EU9	Other Poultry	sub-total													
A114EU91	Ducks	ÖSTAT		153	*142*	130	*123*	115	*124*	132	*117*	102	*101*	100	102
A114EU92	Turkeys	ÖSTAT		244	*310*	377	*431*	485	*622*	759	*776*	793	*737*	681	643
A114EU99	Others	sub-total		23	*24*	25	*26*	26	*26*	27	*25*	24	*23*	22	21
A114EU991	Geese	ÖSTAT		23	*24*	25	*26*	26	*26*	27	*25*	24	*23*	22	21
A119	**Total Other Livestock**	**sub-total**		45	*45*	45	*47*	48	*53*	58	*61*	65	*69*	72	73
A1191	Horses	**sub-total**		45	*45*	45	*47*	48	*53*	58	*61*	65	*69*	72	73
A11911	foal < 1 year	**ÖSTAT**		4	*4*	4	*4*	4	*5*	5	*5*	6	*6*	6	5
A11912	young horses 1-3 years	**ÖSTAT**		8	*7*	7	*7*	7	*8*	9	*9*	10	*11*	11	11
A11913	horses > 3 years	**ÖSTAT**		34	*34*	35	*36*	37	*40*	44	*46*	49	*52*	55	57
A1192	Donkeys														
A1199	Others														
	1. 1986, 88, 90, 92, 94 : OECD Secretariat estimate														
	2. until 1993: including young pigs 2-6 month old														
	3. in 1985: lambs and sheeps < 1 year														

Table 1.3 LIVESTOCK MANURE WITHDRAWALS FROM AGRICULTURE, MANURE STOCKS AND IMPORTS

Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1.996
M21	**Total Manure Withdrawals**	**sub-total**		**27.278**	**27.014**	**26.839**	**26.524**	**26.125**	**29.931**	**35.584**	**39.955**	**41.290**	**40.185**	**42.570**	**41.974**
M211	Destruction and Evaporation of Manure	OECD	(3)	26.896	26.683	26.469	26.194	25.919	25.677	25.435	25.251	25.067	25.072	25.076	24.596
M212	Non-Agricultural use														
M213	Processed as industrial waste														
M214	Exported Organic Fertilisers	FAO [1] /ÖSTAT [2]	(4)	382	331	370	330	206	4.254	10.149	14.703	16.223	15.114	17.494	17.378
M219	Other Withdrawals														
M22	**Change in Manure Stocks**														
M221	Beginning Stocks														
M222	Ending Stocks														
M23	**Imported Organic Fertilisers**	FAO [1] /ÖSTAT [2]	(4)	**5.540**	**5.780**	**5.587**	**2.719**	**2.925**	**3.025**	**2.894**	**3.393**	**4.161**	**1.937**	**9.065**	**6.527**

Sources:

1. 1985-1991: FAO
2. 1985-1996: ÖSTAT
3. OECD Secretariat Estimate 15 % total manure calculated in table 3.1.2

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION

1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C2	**Total Harvested Crops and Forage**														
C21	**Total Harvested Crops**														
C211	**Total Cereals**	sub-total		5.551	5.108	4.965	5.358	5.009	5.290	5.045	4.323	4.206	4.436	4.365	4.498
C2111	Wheat	sub-total		1.563	1.415	1.451	1.560	1.363	1.404	1.375	1.325	1.018	1.255	1.301	1.240
C21111	Common Wheat	sub-total	except 95		1.415	1.451	1.560	1.363	1.404	1.375	1.325	1.018	1.255	1.265	1.198
C211111	Spring Wheat	ÖSTAT			97	100	100	92	98	85	74	62	71		
C211112	Winter Wheat	ÖSTAT			1.318	1.350	1.460	1.271	1.306	1.291	1.252	956	1.184		
C21112	Durum Wheat													37	42
C21119	Other Wheat														
C2112	Rice														
C2113	Coarse Grains	sub-total		3.871	3.586	3.419	3.695	3.543	3.782	3.574	2.923	3.107	3.096	3.015	3.127
C21131	Barley	EUROSTAT	c1160	1.521	1.292	1.179	1.366	1.422	1.521	1.427	1.342	1.100	1.184	1.065	1.083
C21132	Maize	EUROSTAT	c1200	1.727	1.740	1.685	1.700	1.491	1.620	1.571	1.118	1.524	1.421	1.474	1.736
C21133	Millet														
C21134	Oats	EUROSTAT	c1180	284	270	246	273	249	244	226	185	191	172	162	153
C21135	Rye	EUROSTAT	c1140	339	284	309	356	381	396	350	278	292	319	314	156
C21136	Sorghum														
C21139	Other Coarse Grains														
C2119	Other Cereals	sub-total		118	108	95	104	103	104	95	74	82	85	49	126
C21191	Triticale														76
C21192	Sommer	ÖSTAT		11	12	11	16	20	26	24	23	31	38	36	44
C21193	Wintermenggetreide	ÖSTAT		107	96	85	87	83	78	71	51	51	48	14	6
C21199	Others														
C212	**Total Oil Crops**	sub-total		18	22	93	150	163	177	244	299	355	415	362	201
C2121	Soybeans	EUROSTAT	c1470				9		18	37	92	125	105	31	27
C2122	Groundnuts														
C2123	Sunflowerseed	ÖSTAT		0	1	35	54	67	57	74	74	98	92	61	44
C2124	Rapeseed (winter rape)	ÖSTAT		17	21	58	87	96	97	128	128	128	212	263	119
C2125	Cottonseed														
C2126	Olives														
C2129	Other Oil Crops	sub-total			0	0	1	1	5	5	5	4	7	7	11
C21291	summer rape and bird rape								4	4	4	4	6	5	1
C21292	white poppy (Papaver somniferum)			0	0	0	1	1	1	0	0	1	1	2	1
	oil pumpkin (dried grain)														8

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION

1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C213	**Total Dried Pulses and Beans**	**sub-total**		**58**	**65**	**112**	**189**	**225**	**187**	**170**	**168**	**136**	**160**	**77**	**102**
C2131	Horse bean and field pea	FAO, (2)		58	65	112	189	225	187	170	168	136	160	77	102
C214	**Total Root Crops**	**sub-total**		**1.042**	**982**	**879**	**1.001**	**845**	**794**	**790**	**738**	**886**	**594**	**724**	**769**
C2141	Potatoes	EUROSTAT	c1360	1.042	982	879	1.001	845	794	790	738	886	594	724	769
C2142	Sweet Potatoes														
C2149	Other Root Crops														
C215	**Total Fruit**	**sub-total**		**591**	**719**	**511**	**779**	**649**	**562**	**487**	**484**	**631**	**553**	**657**	**591**
C2151	Citrus Fruit														
C2159	Other Fruit	EUROSTAT	c2009	591	719	511	779	649	562	487	484	631	553	657	591
C216	**Total Vegetables**	**EUROSTAT**	**c1600**	**262**	**261**	**275**	**301**		**302**	**304**	**243**	**252**	**280**	**395**	**395**
C217	**Total Industrial Crops**	**sub-total**		**2.408**	**1.572**	**2.118**	**2.058**	**2.642**	**2.494**	**2.522**	**2.606**	**2.995**	**2.561**	**2.886**	**3.131**
C2171	Sugar Crops	sub-total		2.407	1.571	2.117	2.058	2.641	2.494	2.522	2.605	2.994	2.561	2.886	3.131
C21711	Sugar Beet	EUROSTAT	c1370	2.407	1.571	2.117	2.058	2.641	2.494	2.522	2.605	2.994	2.561	2.886	3.131
C21712	Sugar Cane														
C2172	Fibre Crops														
C21721	Flax Straw														
C21722	Hemp Straw														
C21729	Other Fibre Crops														
C2179	Other Industrial Crops	sub-total		1	1	1	1	1	0	1	1	1	1	1	0
C21791	Tobacco	ÖSTAT		0	0	0	0	0		0	0	0	0	0	0
C21792	Chicory														
C21793	Hop	EUROSTAT	c1560	0	0	0	0	0	0	0	0	0	0	0	
C21799	Others														
C218	**Total Ornamental Crops**														
C219	**Total Other Harvested Crops**														

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION — 1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C22	**Total Forage**														
C221	**Total Harvested Fodder Crops**	**sub-total**		**7.715**	**7.416**	**7.087**	**6.372**	**6.143**	**4.917**	**4.888**	**3.979**	**4.793**	**4.786**	**4.613**	**4.439**
C2211	Fodder Root Crops	sub-total		371	471	309	261	237	171	173	119	129	103	85	61
C22111	Fodder Beets														
C22112	Other Fodder Roots: fodder beet, Swedish turnip, fodder carrot			371	471	309	261	237	171	173	119	129	103	85	61
C2212	Green Fodder (dried)	sub-total		7.344	6.945	6.778	6.111	5.906	4.746	4.715	3.859	4.664	4.683	4.528	4.478
C22121	Clover (clover hey)	ÖSTAT	(1)	209	188	185	181	205	157	140	126	165	168	112	108
	Clover-grass-hey			211	207	241	292	270	237	263	156	204	266	348	378
C22122	Alfalfa (lucerne hey)	ÖSTAT	(1)	102	86	89	85	79	63	59	54	76	97	89	74
C22123	Silage Maize (fresh matter)	ÖSTAT	(1)	6.822	6.464	6.263	5.552	5.351	4.289	4.252	3.523	4.219	4.152	3.979	3.918
C22129	Other Green Fodder														
C2219	Other Harvested Fodder Crops														
C222	**Total Pasture**	**sub-total**		**8.601**	**8.069**	**8.410**	**8.234**	**8.249**	**7.565**	**7.654**	**6.170**	**6.945**	**7.481**	**7.794**	**7.315**
C2221	Total Pasture Production (hey)	ÖSTAT		**8.601**	**8.069**	**8.410**	**8.234**	**8.249**	**7.565**	**7.654**	**6.170**	**6.945**	**7.481**	**7.794**	**7.315**
C22211	Temporary Pasture Production:	sub-total		477	378	445	496	468	261	334	251	183	212	274	298
C222111	ley grass hey (Egart)	ÖSTAT		477	378	445	496	468	261	334	251	183	212	274	298
C22212	Permanent Pasture Production:	sub-total		8.124	7.691	7.965	7.739	7.781	7.305	7.320	5.919	6.762	7.269	7.520	7.016
C222121	hey of one cut meadows	ÖSTAT		376	345	342	354	342	293	299	253	246	290	173	176
C222122	hey of two and more cut meadows	ÖSTAT		6.730	6.334	6.610	6.374	6.430	6.011	6.023	4.673	5.528	5.983	6.178	5.677
C222123	hey of cultivated pastures (estimation)	ÖSTAT		207	213	213	213	213	217	217	217	222	222	375	375
	hey of Litter meadows	ÖSTAT		57	45	46	43	42	34	31	27	29	36	62	57
	hey of Rough pastures (estimation)			65	70	70	70	70	62	62	62	49	49	41	41
	hey of alpine meadows (estimation)			232	227	227	227	227	231	231	231	232	232	234	234
	hey of alpine pastures (production, estimation)			1.406	1.377	1.377	1.377	1.377	1.403	1.403	1.403	1.407	1.407	1.422	1.422
	hey of alpine pastures (consumption, estimation)			457	457	457	457	457	457	457	457	457	457	457	457

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION — 1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C222A	Total Pasture Area (1 000 hectare)	sub-total		**1.061**	**1.100**	**1.115**	**1.125**	**1.120**	**1.052**	**1.076**	**1.067**	**1.036**	**1.061**	**1.067**	**1.071**
C222A1	Temporary Pasture (Area 1 000 ha):	sub-total		67	56	63	68	66	39	52	47	31	33	41	44
C222A11	ley grass (Egart)	ÖSTAT	(1)	67	56	63	68	66	39	52	47	31	33	41	44
C222A2	Permanent Pasture (Area 1 000 ha):	ÖSTAT	(1)	994	1.044	1.052	1.057	1.054	1.013	1.025	1.020	1.005	1.029	1.027	1.027
C222A21	one cut meadows	ÖSTAT	(1)	104	97	97	97	97	89	89	89	89	96	56	56
C222A22	two and more cut meadows	ÖSTAT	(1)	852	852	852	852	852	845	845	845	845	859	861	861
C222A23	cultivated pastures	ÖSTAT	(1)	38	39	39	39	39	39	39	39	40	40	68	68
	Litter meadows	ÖSTAT		14	11	11	11	11	11	11	11	10	10	16	16
	Rough pastures	ÖSTAT		130	141	141	141	141	123	123	123	98	98	81	81
	alpine meadows (estimation)			66	65	65	65	65	66	66	66	66	66	67	67
	alpine pastures (estimation)			781	765	765	765	765	780	780	780	782	782	790	790
	total: alpine meadows and pastures	ÖSTAT		847	830	830	830	830	846	846	846	848	848	857	857
C222Y1	Temporary Yield (tonnes / hectare)														
C222Y11	ley grass (Egart)	ÖSTAT		7	7	7	7	7	7	6	5	6	6	7	7
C222Y2	Permanent Yield (tonnes / hectare)														
C222Y21	one cut meadows	ÖSTAT		4	4	4	4	4	3	3	3	3	3	3	3
C222Y22	two and more cut meadows	ÖSTAT		7	7	8	7	8	7	7	6	7	7	7	7
C222Y23	cultivated pastures	ÖSTAT		5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5
	Litter meadows			4	4	4	4	4	3	3	2	3	4	4	4
	Rough pastures (estimation)			1	1	1	1	1	1	1	1	1	1	1	1
	alpine meadows (estimation)			3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
	alpine pastures (estimation)			1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8
C2222	Total Pasture Consumption														
C22221	Temporary Pasture Consumption														
C22222	Permanent Pasture Consumption														
C23	**Total Crop Residues (removed from the field)***														
	sugar beet (estimation: half amount is removed from the field)			963	628	847	823	1.056	998	1.009	1.042	1.198	1.024	1.154	1.253
	fodder beet (estimation: ¾ amount is removed from the field)			84	106	70	59	53	38	39	27	29	23	19	14
C231	Head Leaves and Stems														
C232	Straws														
C239	Other Crop Residues														

*** For the most part this should not be included into crop production, because in Austria it is used as litter**

1. 1985: OECD Secretariat estimate
2. 1987-1992: ÖSTAT

Table 1.5 QUANTITIES OF SEEDS AND PLANTING MATERIALS

1 000 Tonnes

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C11	**Total Seeds and Planting Materials**													
C111	**Total Cereals**	sub-total		162	153	142	146	148	143	129	126	125	126	123
C1111	Wheat	FAO		59	58	53	51	51	49	45	44	44	48	44
C1112	Rice													
C1113	Coarse Grains	sub-total		98	90	85	90	92	89	80	78	77	74	68
C11131	Barley	FAO		62	54	50	54	56	55	51	49	47	45	46
C11132	Maize	FAO		11	11	10	10	10	10	9	9	9	9	9
C11133	Millet													
C11134	Oats	FAO		12	12	12	12	12	11	9	9	9	9	
C11135	Rye	FAO		13	13	13	14	14	13	11	11	12	11	13
C11136	Sorghum													
C1119	Other Cereals	FAO		5	5	4	5	5	5	4	4	4	4	11
C112	**Total Oil Crops**	FAO				1	1	1	1	3	5	4	3	3
C1121	Soybeans	FAO							1	2	4	4	2	2
C1122	Groundnuts													
C1123	Sunflowerseed													
C1124	Rapeseed													
C1125	Cottonseed													
C1129	Other Oil Crops	Difference				1	1	1		1	1		1	1
C113	**Total Root Crops**	sub-total		87	85	83	81	78	94	93	72	69	60	68
C1131	Potatoes	FAO		87	85	83	81	78	94	93	72	69	60	68
C1132	Sweet Potatoes													
C1139	Other Root Crops													
C119	**Total Other Crops**													

Table 1.6 AREA OF LEGUME CROPS — **1 000 Hectares**

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C12	**Total Area of Legume Crops**														
C121	Pulses	ÖSTAT	(1)	7	17	33	59	69	54	52	58	55	49	26	37
C122	Soybeans	ÖSTAT							9	15	53	54	47	14	13
C123	Clover	ÖSTAT		24	23	22	22	21	19	18	23	24	22	14	13
C124	Alfalfa	ÖSTAT		11	10	10	9	9	8	8	9	11	12	10	9
C129	Other Legume Crops	sub-total		23	24	27	31	30	28	33	27	29	34	42	47
	Clover-grass	ÖSTAT		23	24	27	31	30	28	33	27	29	34	42	47
	1. Horse bean and field pea														

Table 1.7 TOTAL AND AGRICULTURAL LAND USE AREA

1 000 Hectares

OECD Code	Description	Source	Notes	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
L1	**TOTAL AREA**														
L11	**Total Land Area**														
L111	Agricultural Land			3.549	3.526	3.528	3.547	3.548	3.500	3.519	3.511	3.482	3.483	3.430	3.429
L1111	Arable and Permanent Crop Land	sub-total		1.525	1.511	1.513	1.532	1.533	1.505	1.525	1.516	1.497	1.498	1.490	1.489
L11111	Arable Land	ÖSTAT		1.430	1.418	1.420	1.440	1.441	1.406	1.426	1.417	1.401	1.402	1.403	1.403
L11112	Permanent Crops	ÖSTAT	(1)	95	92	92	92	92	99	99	99	97	97	86	86
L1112	Permanent Pasture	sub-total		1.986	1.970	1.970	1.970	1.970	1.953	1.953	1.953	1.951	1.951	1.940	1.940
L11121	one cut meadows	ÖSTAT		104	97	97	97	97	89	89	89	96	96	56	56
L11122	two and more cut meadows	ÖSTAT		852	852	852	852	852	845	845	845	859	859	861	861
L11123	cultivated pastures	ÖSTAT		38	39	39	39	39	39	39	39	40	40	68	68
L11124	Litter meadows	ÖSTAT		14	11	11	11	11	11	11	11	10	10	16	16
L11125	Rough pastures	ÖSTAT		130	141	141	141	141	123	123	123	98	98	81	81
L11126	alpine meadows and pastures	ÖSTAT		847	830	830	830	830	846	846	846	848	848	857	857
L11127	Not utilized grassland	ÖSTAT		38	45	45	45	45	40	40	40	30	30		
	Agricultural Land which deserves fertilisation			2.519	2.499	2.501	2.521	2.521	2.479	2.498	2.489	2.493	2.494	2.476	2.475
	Permanent Pasture which deserves fertilisation			994	988	988	988	988	973	973	973	996	996	986	986
L112 L119	Forest Other Land														
L2	**OTHER LAND USE CATEGORIES**														
L21	Irrigated Agricultural Area	FAO		4	4	4	4	4	4	4	4	4	4	4	4

1. (horticultural land, vineland, fruit-growing area and tree nursery areas)
2. 1985: OECD Secretariat estimate

Table 2.1 FERTILISER NUTRIENT CONVERSION COEFFICIENTS

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
F11	**Total Inorganic Fertilisers**					
F111	Nitrogenous Fertilisers			1000	--	--
F112	Phosphate Fertilisers			--		--
F113	Potassium Fertilisers			--	--	
F12	**Total Organic Products**					
F121	Sewage Sludge			39		
F122	Urban Compost					
F123	Industrial Waste Products					
F124	Imported Organic Fertilisers					
F129	Other Products					
Notes:						
-- : Not applicable						

Table 2.2	COEFFICIENTS TO CONVERT LIVESTOCK NUMBERS INTO MANURE NUTRIENT QUANTITY AND COMPOSITION			Kilograms / Head/ Year
OECD Code	**Description**	**Source**	**Code Used by Source**	**coefficients**
M111EU	**Total Cattle**			
M111EU1	Bovine Animals <1 year			
M111EU11	Calves for Slaughter		Austria	10,2
M111EU12	Other Calves			
M111EU121	Male		Austria	27,2
M111EU122	Female		Austria	27,2
M111EU2	Bovine Animals 1-2 yrs			
M111EU21	Male Cattle 1-2 yrs		Austria	47,6
M111EU22	Female Cattle 1-2 yrs		Austria	47,6
M111EU3	Bovine > 2 years			
M111EU31	Male Cattle >2yr		Austria	68
M111EU32	Heifers		Austria	68
M111EU321	Breeding Heifers		Austria	68
M111EU322	Heifers for Slaughter		Austria	68
M111EU4	Dairy Cows		Austria	68
M111EU9	Other Cows		Austria	68
M112EU	**Total Pigs**			
M112EU1	Piglets			
M112EU11	Pigs <20kg (Live Weight)			
M112EU12	Pigs 20 -50 kgs		Austria	8,27
M112EU2	Fattening Pigs >50kgs		Austria	12
M112EU3	Breeding Pigs >50 Kgs		Austria	
M112EU31	Boars		Austria	41,33
M112EU32	Sows (incl. piglets <20kg)		Austria	31
M112EU9	Other Pigs		Austria	12
M113	**Total Sheep and goats**			
M1131	Sheep and Lambs			
M11311	Sheep		Austria	9,6
M11312	Lambs		Austria	4,8
M1132	Goats		Austria	9,6
M114EU	**Total Poultry**			
M114EU1	Broilers		Austria	0,14
M114EU2	Layers		Austria	0,72
M114EU3	Other Chicken			
A114EU31	Young chicken < 6 months		Austria	0,33
M114EU9	Other Poultry	EUROSTAT	Germany	1,52
M114EU91	Ducks		Austria	0,44
M114EU92	Turkeys		Austria	0,6
M114EU99	Others			
M114EU991	Geese		Austria	0,44
M119	**Total Other Livestock**			
M1191	Horses			
M11911	foal < 1 year		Austria	19,2
M11912	young horses 1-3 years		Austria	33,6
M11913	horses > 3 years		Austria	48
M1192	Donkeys			
M1199	Others			

Table 2.3 COEFFICIENTS TO CONVERT LIVESTOCK MANURE WITHDRAWN FROM AGRICULTURE, MANURE STOCKS AND IMPORTS INTO NUTRIENT QUANTITY AND COMPOSITION

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
M21	**Total Manure Withdrawals**					
M211	Destruction and Evaporation of Manure			1000		
M212	Non-agricultural use					
M213	Processed as industrial waste					
M214	Exported Organic Fertilisers	(1)		10		
M219	Other Withdrawals					
M22	**Change in Manure Stocks**					
M221	Beginning Stocks					
M222	Ending Stocks					
M23	**Imported Organic Fertilisers**	**(1)**		**10**		

(1): estimation for "animal and plant fertilizer": Guano, excrements and dung (including wool and hair shavings), rotten plant products and composts of rotten plant wastes, products from leather treatment, mixtures from dried blood and bone-meal.

Wirtschaftsdünger: 0,4-0,8 % N

Kompost: 0,6-1 % N

Blut-, Knochenmehl: 5-14 % N

Guano: 4-6 % N

Table 2.4	COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION			Kilograms / Tonne
OECD Code	Description	Source	Code Used by Source	N contents
C2	**Total Harvested Crops and Forage**			
C21	**Total Harvested Crops**			
C211	**Total Cereals**			
C2111	Wheat		Austria	20
C21111	*Common* Wheat		Austria	20
C211111	Spring Wheat			
C211112	Winter Wheat			
C21112	Durum Wheat			
C21119	Other Wheat			
C2112	Rice			
C2113	Coarse Grains			
C21131	Barley		Austria	16
C21132	Maize		Austria	16
C21133	Millet			
C21134	Oats		Austria	17
C21135	Rye		Austria	16
C21136	Sorghum			
C21139	Other Coarse Grains			
C2119	Other Cereals			
C21191	Triticale			
C21192	Sommermenggetreide		Austria	18
C21193	Wintermenggetreide		Austria	18
C21199	Others			
C212	**Total Oil Crops**			
C2121	Soybeans		Austria	48
C2122	Groundnuts			
C2123	Sunflowerseed		Austria	32
C2124	Rapeseed (winter rape)		Austria	34
C2125	Cottonseed			
C2126	Olives			
C2129	Other Oil Crops			
	summer rape and bird rape		Austria	34
	white poppy (Papaver somniferum)		Austria	32
	oil pumpkin (dried grain)			?
C213	**Total Dried Pulses and Beans**		Austria	38
	Horse bean and field pea			
C214	**Total Root Crops**			
C2141	Potatoes		Austria	3,5
C2142	Sweet Potatoes			
C2149	Other Root Crops			
C215	**Total Fruit**			
C2151	Citrus Fruit			
C2159	Other Fruit	OECD		1,0
C216	**Total Vegetables**	OECD		3,0

Table 2.4	COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION			Kilograms / Tonne
OECD Code	**Description**	**Source**	**Code Used by Source**	**N contents**
C217	**Total Industrial Crops**			
C2171	Sugar Crops			
C21711	Sugar Beet		Austria	1,8
C21712	Sugar Cane			
C2172	Fibre Crops			
C21721	Flax (corn)		Austria	38
C21722	Hemp (corn)		Austria	29
C21729	Other Fibre Crops			
C2179	Other Industrial Crops			
C21791	Tobacco			
C21792	Chicory			
C21793	Hop	OECD		32
C21794	Tea			
C21799	Others			
C218	**Total Ornamental Crops**			
C219	**Total Other Harvested Crops**			
C22	**Total Forage**			
C221	**Total Harvested Fodder Crops**			
C2211	Fodder Root Crops			
C22111	Fodder beets		Austria	2,14
C22112	Other Fodder Roots (fodder beet, Swedish turnip, fodder carrot)		Austria	2,14
C2212	Green Fodder			
C22121	Rotklee- und sonstige Kleeheuarten		Austria	30
C22122	Kleegrasheu			26
C22123	Luzerneheu		Austria	32,5
C22124	Silage Maize		Austria	3,8
C22129	Other Green Fodder			
C2219	Other Harvested Fodder Crops			
C222	**Total Pasture**			
C2221	Total Pasture Production (hey)			
C22211	Temporary Pasture Production:			
C222111	ley grass hey (Egart)	ÖSTAT	Austria	20
C22212	Permanent Pasture Production:			
C222121	hey of one cut meadows	ÖSTAT	Austria	20
C222122	hey of two and more cut meadows	ÖSTAT	Austria	20,5
C222123	hey of cultivated pastures	ÖSTAT	Austria	27
	hey of Litter meadows			16
C2222	Total Pasture Consumption			
C22221	Temporary Grassland Consumption			
C22222	Permanent Grassland Consumption			
	Rough pastures		Austria	20
	alpine meadows and pastures		Austria	20
C23	**Total Crop Residues (removed from the field)**			
	sugar beet		Austria	3,20
	fodder beet		Austria	2,80
C231	**Head Leaves and Stems**			
C232	**Straws**			
C239	**Other Crop Residues**			

Table 2.5	COEFFICIENTS TO CONVERT QUANTITIES OF SEEDS AND PLANTING MATERIALS INTO NUTRIENT UPTAKE AND COMPOSITION					Kilograms / Tonne
OECD Code	Description	Source	Code Used by Source	N	P	K
C11	**Total Seeds and Planting Materials**					
C111	**Total Cereals**					
C1111	Wheat			20,00		
C1112	Rice					
C1113	Coarse Grains					
C11131	Barley			16,00		
C11132	Maize			16,00		
C11133	Millet					
C11134	Oats			17,00		
C11135	Rye			16,00		
C11136	Sorghum					
C1119	Other Cereals			18,00		
C112	**Total Oil Crops**					
C1121	Soybeans			48,00		
C1122	Groundnuts					
C1123	Sunflowerseed					
C1124	Rapeseed					
C1125	Cottonseed					
C1129	Other Oil Crops			35,00		
C113	**Total Root Crops**					
C1131	Potatoes			3,50		
C1132	Sweet Potatoes					
C1139	Other Root Crops					
C119	**Total Other Crops**					

Table 2.6	COEFFICIENTS TO CALCULATE BIOLOGICAL NITROGEN FIXATION FROM THE AREA OF LEGUME CROPS			Kilograms / Hectare
OECD Code	Description	Source	Code Used by Source	N
B1	**Biological Nitrogen Fixation**			
B11	**Leguminous Crops**			
B111	Pulses and Beans		Austria	120
B112	Soybeans			
B113	Clover		Austria	200
B114	Alfalfa		Austria	250
B119	Other Legume Crops			
B1191	Kleegras		Austria	160
	Permanent Pasture			20
B12	**Free Living Organisms**			
B121	Arable Land		Austria	4
B122	Permanent Crops		Austria	4
B123	Permanent pasture		Austria	4

Table 2.7 COEFFICIENTS TO CALCULATE ATMOSPHERIC DEPOSITION OF NUTRIENT QUANTITY AND COMPOSITION ON AGRICULTURAL LAND

Kilograms / Hectare

OECD	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
D1	**Agricultural Land**	Federal Environment Agency		19,39	18,76	19,02	17,92	19,86	17,99	18,29	17,74	16,62	16,44	17,36	16,6
D11	Arable and Permanent Crop Land														
D111	Arable Land														
D112	Permanent Crops														
D12	Permanent Pasture														

Table 3.1.1 FERTILISERS : NITROGEN CONTENT OF INORGANIC AND ORGANIC PRODUCTS (excluding livestock manure)														Tonnes
OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
F1	Total Fertilisers	165.070	137.770	178.573	110.134	133.304	140.379	181.617	91.154	125.389	177.266	125.299	112.641	
F11	Total Inorganic Fertilisers	165.070	137.770	178.573	110.134	133.304	140.379	180.388	91.154	123.634	177.266	123.645	112.641	
F111	Nitrogenous Fertilisers	165.070	137.770	178.573	110.134	133.304	140.379	180.388	91.154	123.634	177.266	123.645	112.641	
F112	Phosphate Fertilisers													
F113	Potassium Fertilisers													
F12	Total Organic Products							1.229		1.755		1.654		
F121	Sewage Sludge							1.229		1.755		1.654		
F122	Urban Compost													
F123	Industrial Waste Products													
F124	Imported Organic Fertilisers													
F124	Other Products													

Table 3.1.2 NITROGEN CONTENT OF LIVESTOCK MANURE PRODUCTION — Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
M11	**Livestock Manure Production**	**179.310**	**177.885**	**176.461**	**174.626**	**172.791**	**171.180**	**169.568**	**168.341**	**167.114**	**167.144**	**167.174**	**163.976**
M111EU	**Total Cattle**	**127.415**	**125.811**	**124.207**	**123.418**	**122.630**	**121.355**	**120.079**	**118.552**	**117.025**	**117.180**	**117.335**	**114.939**
M111EU1	Bovine Animals <1 year	18.388	18.232	18.076	18.058	18.040	18.965	19.891	18.938	17.985	17.848	17.710	16.998
M111EU11	Calves for Slaughter	2.910	2.888	2.867	2.879	2.892	2.775	2.657	1.690	723	691	658	743
M111EU12	Other Calves	15.479	15.344	15.210	15.179	15.147	16.191	17.234	17.248	17.263	17.157	17.052	16.255
M111EU121	Male	8.513	8.477	8.440	8.281	8.121	8.695	9.268	9.008	8.748	8.549	8.349	7.795
M111EU122	Female	6.966	6.868	6.770	6.898	7.026	7.496	7.966	8.240	8.515	8.608	8.702	8.461
M111EU2	Bovine Animals 1-2 yrs	30.607	30.261	29.914	29.543	29.172	27.805	26.439	26.855	27.271	27.067	26.863	25.579
M111EU21	Male Cattle 1-2 yrs	15.400	15.322	15.244	14.818	14.393	13.514	12.635	12.924	13.212	12.882	12.553	11.412
M111EU22	Female Cattle 1-2 yrs	15.207	14.939	14.671	14.725	14.779	14.291	13.803	13.931	14.059	14.185	14.311	14.167
M111EU3	Bovine > 2 years	11.172	10.903	10.633	10.693	10.753	10.518	10.282	10.512	10.741	10.574	10.407	10.467
M111EU31	Male Cattle >2yr	3.042	2.953	2.865	2.831	2.798	2.649	2.500	2.199	1.899	1.802	1.705	1.667
M111EU32	Heifers	8.130	7.949	7.769	7.862	7.955	7.869	7.783	8.312	8.842	8.772	8.702	8.800
M111EU321	Breeding Heifers	5.629	5.464	5.299	5.434	5.568	5.510	5.453	6.885	8.318	8.274	8.230	
M111EU322	Heifers for Slaughter	2.501	2.485	2.469	2.428	2.387	2.359	2.330	1.427	524	498	471	
M111EU4	Dairy Cows	67.248	66.415	65.582	63.783	61.983	60.781	59.580	57.947	56.314	52.178	48.042	61.895
M111EU9	Other Cows				1.341	2.682	3.285	3.887	4.300	4.713	9.513	14.313	
M112EU	**Total Pigs**	**40.767**	**40.788**	**40.810**	**39.734**	**38.659**	**38.006**	**37.352**	**37.449**	**37.546**	**37.260**	**36.973**	**36.323**
M112EU1	Piglets								4.427	8.854	8.746	8.639	8.680
M112EU11	Pigs <20kg (Live Weight)								4.427	8.854	8.746	8.639	8.680
M112EU12	Pigs 20 -50 kgs												
M112EU2	Fattening Pigs >50kgs	28.398	28.223	28.047	27.422	26.797	26.357	25.917	21.090	16.264	16.006	15.748	15.149
M112EU3	Breeding Pigs >50 Kgs	12.369	12.566	12.762	12.312	11.862	11.648	11.435	11.932	12.429	12.508	12.586	12.494
M112EU31	Boars	656	661	665	646	626	615	604	608	612	586	560	545
M112EU32	Sows (incl. piglets <20kg)	11.713	11.905	12.097	11.666	11.236	11.034	10.831	11.324	11.817	11.922	12.026	11.949
M112EU9	Other Pigs												
M113	**Total Sheep and goats**	**2.215**	**2.365**	**2.515**	**2.646**	**2.778**	**2.965**	**3.152**	**3.218**	**3.284**	**3.451**	**3.619**	**3.732**
M1131	Sheep and Lambs	1.902	2.048	2.193	2.310	2.428	2.594	2.760	2.795	2.830	2.964	3.098	3.209
M11311	Sheep	1.454	1.669	1.884	1.983	2.082	2.236	2.389	2.422	2.455	2.572	2.690	2.762
M11312	Lambs	448	379	309	327	346	358	371	373	375	392	408	447
M1132	Goats	313	317	322	336	350	371	393	423	454	487	521	523

Table 3.1.2 NITROGEN CONTENT OF LIVESTOCK MANURE PRODUCTION

Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
M114EU	Total Poultry	6.976	6.970	6.963	6.804	6.644	6.563	6.482	6.470	6.457	6.278	6.100	5.877
M114EU1	Broilers	704	721	738	746	754	746	737	746	756	753	751	690
M114EU2	Layers	5.433	5.379	5.324	5.105	4.886	4.759	4.632	4.592	4.553	4.414	4.275	4.141
M114EU3	Other Chicken	615	611	606	628	650	619	588	602	617	615	612	507
A114EU31	Young chicken < 6 months	615	611	606	628	650	619	588	602	617	615	612	507
M114EU9	Other Poultry	224	259	294	324	353	439	526	529	532	497	462	439
M114EU91	Ducks	67	62	57	54	51	55	58	52	45	44	44	45
M114EU92	Turkeys	146	186	226	258	291	373	456	466	476	442	408	386
M114EU99	Others	10	11	11	11	12	12	12	11	11	10	10	9
A114EU991	Geese	10	11	11	11	12	12	12	11	11	10	10	9
M119	Total Other Livestock	1.936	1.951	1.966	2.023	2.080	2.291	2.502	2.652	2.802	2.975	3.147	3.205
M1191	Horses	1.936	1.951	1.966	2.023	2.080	2.291	2.502	2.652	2.802	2.975	3.147	3.205
M11911	foal < 1 year	73	70	68	74	79	89	98	105	111	113	115	100
M11912	young horses 1-3 years	253	243	233	235	238	265	291	318	345	359	372	374
M11913	horses > 3 years	1.610	1.638	1.665	1.714	1.762	1.937	2.113	2.230	2.346	2.503	2.660	2.731
M1192	Donkeys												
M1199	Others												

Table 3.1.3 NITROGEN CONTENT OF LIVESTOCK MANURE WITHDRAWN FROM AGRICULTURE, MANURE STOCKS AND IMPORTS Tonnes														
OECD Code	Description	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
M21	**Total Manure Withdrawals**		**26.900**	**26.686**	**26.473**	**26.197**	**25.921**	**25.719**	**25.537**	**25.398**	**25.229**	**25.223**	**25.251**	**24.770**
M211	Destruction and Evaporation of Manure		26.896	26.683	26.469	26.194	25.919	25.677	25.435	25.251	25.067	25.072	25.076	24.596
M212	Non Agricultural use													
M213	Processed as industrial waste													
M214	Exported Organic Fertilisers		4	3	4	3	2	43	101	147	162	151	175	174
M219	Other Withdrawal													
M22	**Change in Manure Stocks**													
M221	Beginning Stocks													
M222	Ending Stocks													
M23	**Imported Organic Fertilisers**		**55**	**58**	**56**	**27**	**99**	**30**	**29**	**34**	**42**	**19**	**81**	**65**

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE — Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C2	**Total Harvested Crops and Forage**	**329.473**	**306.448**	**316.185**	**323.122**	**318.031**	**301.280**	**300.818**	**254.767**	**276.465**	**294.381**	**296.148**	**284.136**
C21	**Total Harvested Crops**	**107.767**	**98.881**	**101.284**	**113.672**	**108.382**	**112.707**	**110.476**	**100.969**	**100.418**	**105.912**	**100.445**	**98.075**
C211	**Total Cereals**	**95.588**	**87.875**	**85.676**	**92.456**	**86.048**	**90.713**	**86.634**	**74.796**	**71.730**	**76.338**	**75.312**	**77.260**
C2111	Wheat	31.256	28.292	29.015	31.200	27.259	28.089	27.505	26.508	20.360	25.102	26.029	24.794
C21111	Common Wheat												
C211111	Spring Wheat												
C211112	Winter Wheat												
C21112	Durum Wheat												
C21119													
C2112	Rice												
C2113	Coarse Grains	62.213	57.638	54.946	59.392	56.935	60.752	57.415	46.956	49.898	49.700	48.394	50.190
C21131	Barley	24.336	20.672	18.864	21.856	22.746	24.336	22.832	21.474	17.594	18.950	17.043	17.325
C21132	Maize	27.632	27.840	26.960	27.200	23.856	25.924	25.142	17.891	24.392	22.730	23.582	27.769
C21133	Millet												
C21134	Oats	4.826	4.589	4.177	4.642	4.234	4.150	3.834	3.146	3.245	2.919	2.747	2.596
C21135	Rye	5.419	4.538	4.944	5.694	6.099	6.342	5.608	4.445	4.666	5.101	5.021	2.500
C21136	Sorghum												
C21139	Other Coarse Grains												
C2119	Other Cereals	2.119	1.945	1.715	1.863	1.853	1.872	1.714	1.332	1.472	1.536	890	2.277
C21191	Triticale												1.376
C21192	Sommermenggetreide	194	214	190	292	353	473	440	416	558	680	641	790
C21193	Wintermenggetreide	1.925	1.731	1.525	1.572	1.500	1.399	1.273	916	914	856	249	111
C21199	Others												
C212	**Total Oil Crops**	**609**	**760**	**3.102**	**5.128**	**5.420**	**6.162**	**8.667**	**11.293**	**13.634**	**15.404**	**12.624**	**6.824**
C2121	Soybeans				440		849	1.765	4.429	6.012	5.038	1.493	1.285
C2122	Groundnuts												
C2123	Sunflowerseed	15	46	1.131	1.713	2.150	1.839	2.370	2.353	3.137	2.942	1.957	1.397
C2124	Rapeseed	588	709	1.961	2.958	3.249	3.300	4.365	4.358	4.345	7.193	8.944	4.059
C2125	Cottonseed												
C2126	Olives												
C2129	Other Oil Crops	7	5	11	17	21	174	167	153	140	231	231	82
C21291	Summer Rape & Bird Rape						151	153	142	123	187	155	46
C21292	White Poppy (papaver somniferum)	7	5	11	17	21	23	14	11	17	44	77	36
C213	**Total Dried Pulses and Beans**	**2.204**	**2.470**	**4.274**	**7.190**	**8.545**	**7.088**	**6.464**	**6.386**	**5.168**	**6.080**	**2.926**	**3.886**
C2131	Horse bean and field pea												

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE													Tonnes
OECD Code		Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C214		**Total Root Crops**	**3.648**	**3.438**	**3.078**	**3.504**	**2.958**	**2.777**	**2.765**	**2.584**	**3.100**	**2.078**	**2.535**	**2.691**
C2141		Potatoes	3.648	3.438	3.078	3.504	2.958	2.777	2.765	2.584	3.100	2.078	2.535	2.691
C2142		Sweet Potatoes												
C2149		Other Root Crops												
C215		**Total Fruit**	**591**	**719**	**511**	**779**	**649**	**562**	**487**	**484**	**631**	**553**	**657**	**591**
C2151		Citrus Fruit												
C2159		Other Fruit	591	719	511	779	649	562	487	484	631	553	657	591
C216		**Total Vegetables**	**787**	**784**	**825**	**904**		**906**	**912**	**728**	**755**	**841**	**1.185**	**1.186**
C217		**Total Industrial Crops**	**4.341**	**2.835**	**3.818**	**3.712**	**4.762**	**4.498**	**4.547**	**4.698**	**5.400**	**4.619**	**5.205**	**5.636**
C2171		Sugar Crops	4.333	2.828	3.811	3.704	4.754	4.490	4.539	4.690	5.389	4.609	5.194	5.636
C21711		Sugar Beet	4.333	2.828	3.811	3.704	4.754	4.490	4.539	4.690	5.389	4.609	5.194	5.636
C21712		Sugar Cane												
C2172		Fibre Crops												
C21721		Flax Straw												
C21722		Hemp Straw												
C21729		Other Fibre Crops												
C2179		Other Industrial Crops	8	7	7	8	8	8	8	8	11	10	11	
C21791		Tobacco												
C21792		Chicory												
C21793		Hop	8	7	7	8	8	8	8	8	11	10	11	
C21794		Tea												
C21799		Others												
C218		**Total Ornamental Crops**												
C219		**Total Other Harvested Crops**												

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE — Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C22	**Total Forage**	**221.706**	**207.567**	**214.901**	**209.450**	**209.650**	**188.574**	**190.342**	**153.798**	**176.047**	**188.468**	**195.703**	**186.061**
C221	**Total Harvested Fodder Crops**	**41.781**	**39.398**	**39.172**	**37.459**	**36.595**	**29.578**	**29.510**	**23.238**	**29.030**	**31.110**	**30.608**	**30.488**
C2211	Fodder Root Crops	794	1.008	662	559	508	365	370	255	276	221	182	132
C22111	Fodder Beets												
C22112	Other Fodder Roots	794	1.008	662	559	508	365	370	255	276	221	182	132
C2212	Green Fodder	40.987	38.391	38.510	36.900	36.087	29.213	29.140	22.982	28.754	30.889	30.426	30.356
C22121	Clover	6.256	5.650	5.550	5.434	6.149	4.723	4.211	3.787	4.953	5.049	3.362	3.243
C22122	Clover-grass	5.486	5.386	6.264	7.601	7.026	6.154	6.844	4.044	5.303	6.911	9.040	9.834
C22123	Alfalfa	3.321	2.792	2.898	2.768	2.578	2.037	1.928	1.762	2.463	3.153	2.906	2.391
C22124	Silage Maize	25.923	24.563	23.798	21.098	20.334	16.299	16.157	13.389	16.034	15.776	15.118	14.888
C22129	Other Green Fodder												
C2219	Other Harvested Fodder Crops												
C222	**Total Pasture**	**176.610**	**165.861**	**172.824**	**169.192**	**169.525**	**155.696**	**157.495**	**127.150**	**143.104**	**154.016**	**161.348**	**151.527**
C2221	Total Pasture Production (hey)	176.610	165.861	172.824	169.192	169.525	155.696	157.495	127.150	143.104	154.016	161.348	151.527
C22211	Temporary Pasture Production:	9.533	7.559	8.900	9.913	9.359	5.213	6.689	5.013	3.656	4.237	5.486	5.967
C222111	ley grass hey (Egart)	9.533	7.559	8.900	9.913	9.359	5.213	6.689	5.013	3.656	4.237	5.486	5.967
C22212	Permanent Pasture Production:	167.077	158.303	163.924	159.279	160.166	150.483	150.807	122.136	139.448	149.780	155.862	145.559
C222121	hey of one cut meadows	7.527	6.899	6.850	7.080	6.836	5.852	5.977	5.056	4.920	5.805	3.464	3.517
C222122	hey of two and more cut meadows	137.960	129.849	135.501	130.671	131.817	123.228	123.474	95.801	113.319	122.647	126.655	116.377
C222123	hey of cultivated pastures (estimation)	5.600	5.761	5.761	5.761	5.761	5.864	5.864	5.864	6.003	6.003	10.124	10.124
	hey of Litter meadows	918	714	734	688	673	547	501	425	458	576	987	908
	hey of Rough pastures (estimation)	1.303	1.407	1.407	1.407	1.407	1.232	1.232	1.232	976	976	813	813
	hey of alpine meadows (estimation)	4.633	4.537	4.537	4.537	4.537	4.623	4.623	4.623	4.637	4.637	4.685	4.685
C2222	Total Pasture Consumption (hey)												
	hey of alpine pastures (consumption, estimation)	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135
C22221	Temporary Grassland Consumption												
C22222	Permanent Grassland Consumption												
C23	**Total Crop Residues (removed from the field)**	**3.315**	**2.307**	**2.905**	**2.798**	**3.530**	**3.300**	**3.337**	**3.410**	**3.913**	**3.343**	**3.747**	**4.047**
	sugar beet	3.081	2.011	2.710	2.634	3.380	3.193	3.228	3.335	3.832	3.278	3.694	4.008
	fodder beet	234	297	195	165	149	107	109	75	81	65	54	39
C231	Head Leaves and Stems												
C232	Straw												
C239	Other Crop Residues												

Table 3.1.5 NITROGEN CONTENT OF SEEDS AND PLANTING MATERIALS **Tonnes**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C11	**Total Seeds and Planting Materials**	**3.155**	**3.000**	**2.830**	**2.881**	**2.902**	**2.882**	**2.718**	**2.688**	**2.627**	**2.566**	**2.688**	**2.576**
C111	**Total Cereals**	**2.850**	**2.702**	**2.504**	**2.562**	**2.594**	**2.505**	**2.261**	**2.209**	**2.193**	**2.225**	**2.319**	
C1111	Wheat	1.180	1.160	1.060	1.020	1.020	980	900	880	880	960	880	
C1112	Rice												
C1113	Coarse Grains	1.580	1.452	1.372	1.452	1.484	1.435	1.289	1.257	1.241	1.193	1.241	
C11131	Barley	992	864	800	864	896	880	816	784	752	720	736	
C11132	Maize	176	176	160	160	160	160	144	144	144	144	144	
C11133	Millet												
C11134	Oats	204	204	204	204	204	187	153	153	153	153	153	
C11135		208	208	208	224	224	208	176	176	192	176	208	
C11136	Sorghum												
C1119	Other Cereals	90	90	72	90	90	90	72	72	72	72	198	
C112	**Total Oil Crops**			**35**	**35**	**35**	**48**	**131**	**227**	**192**	**131**	**131**	
C1121	Soybeans						48	96	192	192	96	96	
C1122	Groundnuts												
C1123	Sunflowerseed												
C1124	Rapeseed												
C1125	Cottonseed												
C1129	Other Oil Crops			35	35	35		35	35		35	35	
C113	**Total Root Crops**	**305**	**298**	**291**	**284**	**273**	**329**	**326**	**252**	**242**	**210**	**238**	
C1131	Potatoes	305	298	291	284	273	329	326	252	242	210	238	
C1132	Sweet Potatoes												
C1139	Other Root Crops												
C119	**Total Other Crops**												

Table 3.1.6 NITROGEN INPUT FROM BIOLOGICAL NITROGEN FIXATION — **Tonnes**

OECD Code	Description	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
B1	**BIOLOGICAL NITROGEN FIXATION**		**45.923**	**46.662**	**48.819**	**52.417**	**53.387**	**49.857**	**50.346**	**51.265**	**52.385**	**52.343**	**48.625**	**50.377**
B11	**Total Area Legume Crops**		**31.880**	**32.739**	**34.888**	**38.407**	**39.374**	**36.024**	**36.436**	**37.391**	**38.591**	**38.545**	**34.907**	**36.659**
B111	Pulses		788	2.093	3.971	7.042	8.279	6.450	6.271	6.926	6.560	5.870	3.122	4.381
B112	Soybeans													
B113	Clover		4.714	4.507	4.343	4.319	4.295	3.772	3.529	4.559	4.772	4.414	2.742	2.672
B114	Alfalfa		2.748	2.466	2.449	2.299	2.210	1.885	1.893	2.125	2.688	2.906	2.614	2.293
B119	Other Legume Crops													
B1191	Kleegras		3.750	3.903	4.355	4.978	4.820	4.452	5.278	4.314	4.654	5.437	6.709	7.593
	Permanent Pasture		19.880	19.770	19.770	19.770	19.770	19.466	19.466	19.466	19.917	19.917	19.720	19.720
B12	**Free Living Organisms**		**14.043**	**13.923**	**13.931**	**14.010**	**14.013**	**13.833**	**13.909**	**13.875**	**13.794**	**13.798**	**13.719**	**13.717**
B121	Arable Land		5.722	5.672	5.680	5.759	5.762	5.626	5.702	5.668	5.603	5.607	5.613	5.611
B122	Permanent Crops		378	370	370	370	370	396	396	396	386	386	346	346
B123	Permanent pasture		7.942	7.881	7.881	7.881	7.881	7.811	7.811	7.811	7.805	7.805	7.760	7.760

Table 3.1.7 NITROGEN ATMOSPHERIC DEPOSITION ON AGRICULTURAL LAND **Tonnes**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
D1	**Total Atmospheric Deposition on Agricultural Land**	**68.806**	**66.137**	**67.099**	**63.582**	**69.773**	**62.987**	**64.381**	**62.297**	**57.884**	**57.277**	**59.548**	**56.883**
D11	Arable and Permanent Crop Land												
D111	Arable Land												
D112	Permanent Crops												
D12	Permanent Pasture												

Table 4.1.1 NITROGEN BALANCE [1] [2]													Tonnes of Nitrogen
OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
	NITROGEN INPUTS	**435.419**	**404.825**	**447.364**	**377.469**	**406.265**	**401.595**	**443.122**	**350.381**	**380.210**	**431.392**	**378.173**	**361.748**
F1	Fertilisers	165.070	137.770	178.573	110.134	133.304	140.379	181.617	91.154	125.389	177.266	125.299	112.641
F111	Nitrogenous Inorganic Fertilisers	165.070	137.770	178.573	110.134	133.304	140.379	180.388	91.154	123.634	177.266	123.645	112.641
F12	Organic Products							1.229		1.755		1.654	
	Net Input of Manure (M11-M21+M22+M23)	152.465	151.257	150.044	148.456	146.899	145.490	144.060	142.977	141.926	141.940	142.013	139.271
M11	Livestock Manure Production	179.310	177.885	176.461	174.626	172.791	171.180	169.568	168.341	167.114	167.144	167.174	163.976
M111	Cattle	127.415	125.811	124.207	123.418	122.630	121.355	120.079	118.552	117.025	117.180	117.335	114.939
M112	Pigs	40.767	40.788	40.810	39.734	38.659	38.006	37.352	37.449	37.546	37.260	36.973	36.323
M113	Sheep and Goats	2.215	2.365	2.515	2.646	2.778	2.965	3.152	3.218	3.284	3.451	3.619	3.732
M114	Poultry	6.976	6.970	6.963	6.804	6.644	6.563	6.482	6.470	6.457	6.278	6.100	5.777
M115	Other Livestock	1.936	1.951	1.966	2.023	2.080	2.291	2.502	2.652	2.802	2.975	3.147	3.205
M21	Withdrawals	-26.900	-26.686	-26.473	-26.197	-25.921	-25.719	-25.537	-25.398	-25.229	-25.223	-25.251	-24.770
M22	Change in Manure Stocks												
M23	Manure Imports	55	58	56	27	29	30	29	34	42	19	91	65
	Other Nitrogen Inputs	117.884	115.798	118.747	118.879	126.062	115.726	117.444	116.250	112.896	112.186	110.861	109.836
D1	Atmospheric Deposition	68.806	66.137	67.099	63.582	69.773	62.987	64.381	62.297	57.884	57.277	59.548	56.883
B1	Biological Nitrogen Fixation	45.923	46.662	48.819	52.417	53.387	49.857	50.346	51.265	52.385	52.343	48.625	50.377
C11	Seeds and Planting Material	3.155	3.000	2.830	2.881	2.902	2.882	2.718	2.688	2.627	2.566	2.688	2.576
	NITROGEN OUTPUTS	**329.473**	**306.448**	**316.185**	**323.122**	**318.031**	**301.280**	**300.818**	**254.767**	**276.465**	**294.381**	**296.148**	**284.136**
C21	Total Harvested Crops	107.767	98.881	101.284	113.672	108.382	112.707	110.476	100.969	100.418	105.912	100.445	98.073
C211	Cereals	95.588	87.875	85.676	92.456	86.048	90.713	86.634	74.796	71.730	76.338	75.312	77.260
C212	Oilcrops	609	760	3.102	5.128	5.420	6.162	8.667	11.293	13.634	15.404	12.624	6.824
C213	Pulses and Beans	2.204	2.470	4.274	7.190	8.545	7.088	6.464	6.386	5.168	6.080	2.926	3.886
C217	Industrial Crops	4.341	2.835	3.818	3.712	4.762	4.498	4.547	4.698	5.400	4.619	5.205	5.636
	Other Crops [3]	5.025	4.942	4.414	5.187	3.607	4.245	4.164	3.796	4.486	3.471	4.377	4.468
C22	Total Forage	221.706	207.567	214.901	209.450	209.650	188.574	190.342	153.798	176.047	188.468	195.703	186.061
C221	Harvested Fodder Crops	41.781	39.398	39.172	37.459	36.595	29.578	29.510	23.238	29.030	31.110	30.608	30.488
C222	Pasture	176.610	165.861	172.824	169.192	169.525	155.696	157.495	127.150	143.104	154.016	161.348	151.527
	Crop Residues	3.315	2.307	2.905	2.798	3.530	3.300	3.337	3.410	3.913	3.343	3.747	4.047
	BALANCE (Inputs minus Outputs)	**105.945**	**98.378**	**131.179**	**54.347**	**88.234**	**100.315**	**142.303**	**95.614**	**103.745**	**137.012**	**82.025**	**77.613**
	Nitrogen Balance in Kilograms per Hectare of Total Agricultural Land [4]	**30**	**28**	**37**	**15**	**25**	**29**	**40**	**27**	**30**	**39**	**24**	**23**
Notes:													

1. Sub-totals may not add to totals due to rounding errors.
2. Balances for 1985-95 are not calculated due to significant lock of data
3. C214+C215+C216+C218+C219
4. Balance per hectare calculated from unrounded data and using total agricultural land category L111 shown in Table 1.7.

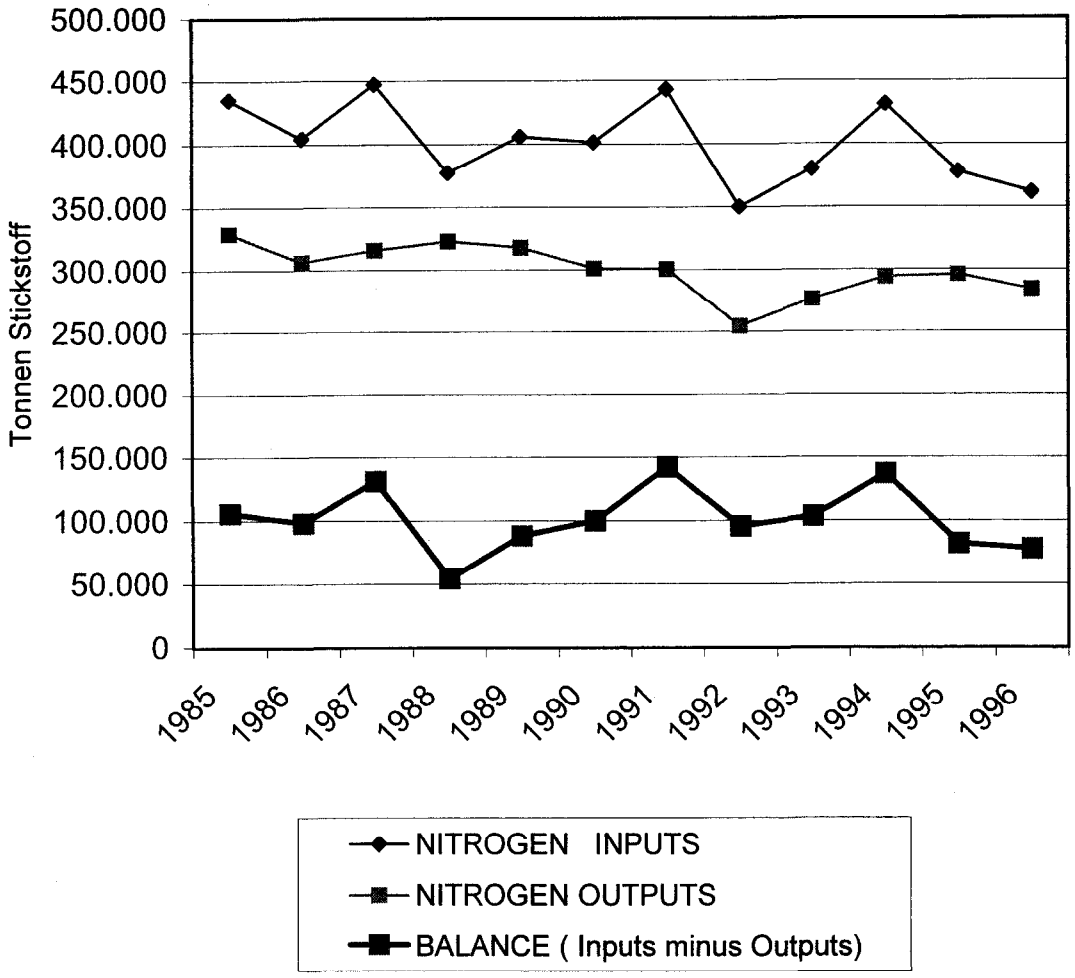


Abb. 2: Nationale N-Flächenbilanz der österreichischen Landwirtschaft 1985 - 1996, bezogen auf die gesamte landwirtschaftliche Nutzfläche, Angaben in Tonnen Stickstoff

Tab. 5: Klärschlamm - Anfall und landwirtschaftliche Verwertung in Österreich

	1991			1993		
	Schlammanfall in t TS	Landwirtschaftliche Verwertung in %	Landwirtschaftliche Verwertung in t TS	Schlammanfall in t TS	Landwirtschaftliche Verwertung in %	Landwirtschaftliche Verwertung in t TS
Burgenland	8.998	68	6.119	8.000	62,5	5.000
Kärnten	5.947	15	892	7.000	14,3	1.000
Niederösterreich	18.400	12	2.208	53.000	5,7	3.000
Oberösterreich	20.982	34	7.134	82.000	13,4	11.000
Salzburg	8.200	27	2.214	8.000	25	2.000
Steiermark	18.720	18,7	3.501	50.000	8	4.000
Tirol	13.420	19	2.550	20.000	60	12.000
Vorarlberg	10.600	65	6.890	10.000	70	7.000
Wien	56.669	0	-	62.000	0	-
Österreich	**161.936**	**19,5**	**31.507**	**300.000**	**15**	**45.000**

	1995		
	Schlammanfall in t TS	Landwirtschaftliche Verwertung in %	Landwirtschaftliche Verwertung in t TS
Burgenland	8.000	75,00	6.000
Kärnten	7.300	12,33	900
Niederösterreich	57.000	10,53	6.000
Oberösterreich	103.000	10,29	10.600
Salzburg	25.400	16,14	4.100
Steiermark	89.500	5,59	5.000
Tirol	29.100	8,25	2.400
Vorarlberg	9.900	73,74	7.300
Wien	61.300	-	-
Österreich	**390.500**	**10,86**	**42.400**

Tab. 6: Stickstoffanfall pro Tier (nach BMLF, 1991)

	Österreichische Vieheinheiten (gem. Bewertungsgesetz über die Landwirtschaft)	Stickstoffanfall/GVE, 1 GVE = 500 kg Lebendgewicht	Stickstoff-anfall / Tier
PFERDE			
Fohlen unter 1 Jahr	0,4	48,00	19,20
Jungpferde 1 bis unter 3 Jahre	0,7	48,00	33,60
Hengste und Wallachen ab 3 Jahre	1	48,00	48,00
Stuten ab 3 Jahre	1	48,00	48,00
RINDER			
Jungvieh bis unter 1 Jahr alt:			
Schlachtkälber bis 220 kg	0,15	68,00	10,20
And. Kälber und Jungrinder	0,4	68,00	27,20
Jungvieh 1 Jahr bis unter 2 Jahre	0,7	68,00	47,60
Rinder 2 Jahre alt und älter:			
Stiere und Ochsen	1	68,00	68,00
Kalbinnen	1	68,00	68,00
Milchkühe	1	68,00	68,00
Mutter- und Ammenkühe	1	68,00	68,00
SCHWEINE			
Ferkel bis unter 20 kg	0,02	103,33	2,07
Jungschweine bis unter 50 kg	0,08	103,33	8,27
Mastschweine:			
50 bis unter 80 kg	0,15	80,00	12,00
80 bis unter 110 kg	0,15	80,00	12,00
110 kg und mehr	0,15	80,00	12,00
Zuchtschweine 50 kg und mehr:			
Jungsauen	0,3	103,33	31,00
ältere Sauen	0,3	103,33	31,00
Zuchteber	0,4	103,33	41,33
SCHAFE			
Lämmer bis unter 1/2 Jahr	0,05	96,00	4,80
Schafe:			
1/2 Jahr bis unter 1 Jahr	0,05	96,00	4,80
1 Jahr und älter, männl.	0,1	96,00	9,60
1 Jahr und älter, weibl.	0,1	96,00	9,60
ZIEGEN (einschl. Kitze)	0,1	96,00	9,60
HÜHNER	DGVE gemäß WRG	Nährstoffanfall/DGVE	
Kücken und Junghennen für Legezwecke unter 6 Mon.	0,006	55,38	0,33
Legehennen:			
1/2 bis unter 1 Jahr	0,013	55,38	0,72
1 Jahr und älter	0,013	55,38	0,72
Hähne	0,004	35,00	0,14
Mastkücken und Jungmasthühner	0,004	35,00	0,14
GÄNSE und ENTEN	0,008	54,55	0,44
TRUTHÜHNER	0,011	54,55	0,60

Tab. 7: N-Entzug in kg N durch verschiedene Ackerkulturen bei mittlerer Ertragslage

(Q: Fachbeirat für Bodenfruchtbarkeit und Bodenschutz)

Kulturart	K:S Verhältnis *	Entzug an kg N pro		
		t Korn [1]	t Stroh [2]	t Korn 1) inkl. dazugehörendem Stroh [2]
Qualitätsweizen	1:1	21	4	25
Futterweizen	1:1	18	5	23
Roggen	1:1,4	16	4	22
Wintergerste	1:1,1	16	5	21
Sommergerste, Braugerste	1:1,1	14	6	20
Hafer	1:1,5	17	5	24
Körnermais	1:1,4	15	7	25
Futtererbsen	1:1	35	15	50
Raps	1:21	34	8	51
Sonnenblume	1:2,5	32	8	52
Zuckerrübe	1:0,8	1,8	3,2	4,4
Futterrübe	1:0,3	1,7	2,8	2,6
Spät- und Industriekartoffel	1:0,3	3,3	3,5	4,4
Sojabohne [3]	1:1,5	48	12	66
Ackerbohne	1:1,5	40	10	55
Silomais	je 10 t Grünmasse			38
Luzerne				65
Rotklee				60

*) = Ungefähres Verhältnis von abgeernteter Frucht zu Ernterückstand (Korn: Stroh, Rübe: Blatt, Kartoffel: Kraut ...);

diese Relation stellt einen Richtwert dar, der nach Standort, Sorte, Erntezeitpunkt u.a. starken Schwankungen unterliegt.

[1] = bzw. Rübe, Kartoffel u. dgl.

[2] = bzw. Blatt, Kraut u. dgl.

[3] = vorläufiger Wert

Tab. 8: Erträge und N-Entzüge einzelner Grünlandnutzungsformen und einiger Kulturarten

(Q: Dr. Erich M. Pötsch, Bundesanstalt für alpenländische Landwirtschaft Gumpenstein)

grassland category	Ø Erträge / ha	Ø N-Entzüge in kg/ha
One cut meadows	30 dt TM	60 kg
two cut meadows	45 dt TM	90 kg
more cut meadows	70 dt TM	150 kg
litter meadows	45 dt TM	70 kg
cultivated pastures	55 dt TM	150 kg

Kulturart	Ø N-Entzüge in kg/ha
Sojabohne	150
Ackerbohne	150
Erbse	210
Silomais	150
Luzerne	200
Rotklee	200

Anmerkung: Ein grundlegendes Problem liegt darin, daß es sich hierbei um Durchschnittsangaben mit sehr großen Variationsbreiten handelt und damit bei einer Hochrechnung auf regionale Ebene aufgrund fehlender Gewichtung eine Verzerrung der Situation stattfindet. Diese Daten können sehr stark schwanken und sind daher unter Vorbehalt zu sehen. Immerhin ist es aber ein Ansatz, der zumindest die Größenordnung darstellt.

Tab. 9: Berechnung der N-Abfuhr von Hutweiden, Almwiesen und Bergmähdern: Annahmen für Trockenmasse-Erträge und Stickstoffgehalte

	TM-Erträge in kg TM/ha	% Rohprotein	% N	kg N/ha
Hutweiden (rough pastures)	500	12,5	2	10
Bergmähder (alpine meadows)	3500	12,5	2	70
Almen (alpine pastures)	1800	12,5	2	36

Tab. 10: Flächen von Hutweiden, Almwiesen und Bergmähdern in ha. Die Flächenaufteilung zwischen Almen und Bergmähdern, welche vom ÖSTAT in einer Kategorie zusammengefaßt erhoben werden, erfolgte auf Basis der letzten getrennten Erhebung dieser Flächenkategorien aus dem Jahr 1972, wo 92,2 % der Gesamtfläche auf Almen und 7,8 % auf Bergmähder entfielen.

	1985	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
Rough pastures	130.289	140.682	140.682	140.682	140.682	123.163	123.163	123.163	97.591	97.591	81.313
alpine meadows (estimation)	66.190	64.818	64.818	64.818	64.818	66.044	66.044	66.044	66.243	66.243	66.926
alpine pastures (estimation)	781.287	765.095	765.095	765.095	765.095	779.570	779.570	779.570	781.921	781.921	789.982
total: alpine meadows and pastures (ÖSTAT)	847.477	829.913	829.913	829.913	829.913	845.614	845.614	845.614	848.164	848.164	856.908

Tab. 11: Ertrag von Hutweiden, Almwiesen und Bergmähdern in t Heu

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Rough pastures (estimation)	65.145	70.341	70.341	70.341	70.341	61.582	61.582	61.582	48.796	48.796	40.657
alpine meadows (estimation)	231.664	226.863	226.863	226.863	226.863	231.155	231.155	231.155	231.852	231.852	234.242
alpine pastures (production, estimation)	1.406.317	1.377.171	1.377.171	1.377.171	1.377.171	1.403.225	1.403.225	1.403.225	1.407.457	1.407.457	1.421.967
alpine pastures (consumption, estimation)	456.773	456.773	456.773	456.773	456.773	456.773	456.773	456.773	456.773	456.773	456.773

Tab. 12: Stickstoff-Abfuhr mit Heu von Hutweiden, Almwiesen und Bergmähdern in t

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Rough pastures	1.303	1.407	1.407	1.407	1.407	1.232	1.232	1.232	976	976	813
alpine meadows (estimation)	4.633	4.537	4.537	4.537	4.537	4.623	4.623	4.623	4.637	4.637	4.685
alpine pastures (production, estimation)	28.126	27.543	27.543	27.543	27.543	28.065	28.065	28.065	28.149	28.149	28.439
alpine pastures (consumption, estimation)	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135	9.135

Tab. 13: Abschätzung der mittleren Futteraufnahme (alpine pastures: „consumption" in Tab. 11 und 12) der gealpten Tiere mittels Daten der Almerhebung 1986 (Q: ÖSTAT, 1988: Die Almwirtschaft in Österreich im Jahre 1986)

durchschnittl. Anzahl der Weidetage pro Alm	durchschnittl. Anzahl der GVE/Alm	Summe aller bestossenen Almen in Österreich	Futteraufnahme in kg TM/GVE/Tag	Gesamt-Futteraufnahme in t TM	% N	t N Entzug durch Alpung
108,88	26,23	12.069	13,25	456.773 *	2	9.135

* → Die Gesamt-Futteraufnahme (= alpine pastures: „consumption" in *Tab. 11 und 12*) entspricht im Mittel 32,7% des Gesamtertrages (= alpine pastures: „production" in *Tab. 11 und 12*).

5 1. SCHREIBEN AN DIE OECD (32-68/97)

To Mr. Wilfried Legg
Head of Division,
Country Studies II and Environment Division
Directorate for Food, Agriculture and
Fisheries

Datum	26. March 1997
Zahl	32- 68/97
Sachb./Tel.	Götz / 3661

2, rue André Pascal
F - 75775 Paris CEDEX 16

Subject: OECD NATIONAL SOIL SURFACE NUTRIENT BALANCES

Dear Mr Legg,

Thank you for sendig us the preliminary nitrogen balance tables provided in the Secretariat document OECD Agri-environmental Indicators: Stocktaking Report [COM/AGR/CA/ENV/EPOC(96)149].

I want to make a few remarks to the data sheets for AUSTRIA.

1. Table 1.1 FERTILISERS: Data about amounts of sewage sludge are available for Austria. Please find enclosed Excel datasheet with the amounts for the year 1991, 1993 and 1995. Used literature:

   - Bundesministerium für Land- und Forstwirtschaft (1993): Gewässerschutzbericht 1993
   - Bundesministerium für Land- und Forstwirtschaft (1996): Gewässerschutzbericht 1996
   - Umweltbundesamt (1994): Kommunaler Klärschlamm in Österreich. UBA-IB-449.

2. Table 1.2 LIVESTOCK (Number of Live Animals): Please find enclosed Excel data sheet with the number of heads for the years 1985, 1987, 1989, 1991, 1993 and 1995 (each two years the number of animals is counted in Austria). Verified new figures are written in bold type.

For the categories

- Bovine Animals 1-2 years,
- Diary Cows,
- Total Sheep and Goats and
- Horses

the number of total animals is reduced by the number of animals which are during summer on alpine grassland.

3. Table 1.3 LIVESTOCK MANURE WITHDRAWALS FROM AGRICULTURE; MANURE STOCKS AND IMPORTS: Data for ex- and imported fertiliser from animal or plant origin are available from the Austrian foreign trade statistics. Used literature:

   - ÖSTAT (Österreichisches Statistisches Zentralamt Österreich) (1993): Aussenhandelsstatistik 1992
   - ÖSTAT (Österreichisches Statistisches Zentralamt Österreich) (1994): Aussenhandelsstatistik 1993 and
   - ÖSTAT (Österreichisches Statistisches Zentralamt Österreich) (1995): Aussenhandelsstatistik 1994

For 1995, no data are available, yet.

4. Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION: In Austria also data about Other Cereals, Sunflowerseed, Other Root Crops are available. Please find enclosed Excel data sheet with the amounts for the year 1986-1995. Verified new figures are written in bold type, the others were considered to be correct.

As for the Green Fodder, for clover and alfalfa only dry matter (hey) data are available. These figures are inserted into the Excel-table.

As for Total Pasture Production, also only dry matter production data are available. They are inserted into enclosed Excel data sheet.

It is the Austrian point of view that in this category the production of meadows (one, two ore more cut meadows), cultivated pastures and ley grass farming should be included. Rough pastures, alpine pastures and alpine meadows are excluded.

Following Category of Temporary Pasture Production is included:

- ley grass hey (Egart): These are cultivated areas with naturally grown or seeded fodder crops (grass, legumes) which are part of the crop rotation on arable land.

Following Categories of Permanent Pasture Production are included:

- hey of meadows of one cut per year,
- hey of meadows of two and more cuts per year and
- hey of cultivated pastures.

Also the areas of these categories are considered (see also Table 1.7).

For these areas it can be assumed that production = consumption.

Litter meadows („Streuwiesen") are not included, because these areas are not fertilised in Austria. These are sour, wet meadows, mainly with Phragmites australis, which is used as litter.

5. Table 1.6: AREA OF LEGUME CROPS: In Austria data about the total areas of Clover, Clover-Gras-Mixtures and Alfalfa are available, too. Please find enclosed Excel data sheet with the areas for the years 1986-1995.

6. Table 1.7: TOTAL AND AGRICULTURAL LAND USE AREA: As postulated at the EUROSTAT/OECD-meeting from 13.-14. February in Luxembourg, it is the Austrian opinion that the alpine meadows and pastures and the not utilised grassland should not be included into the area for the nitrogen soil surface balance. Therefore we present different figures in the enclosed Excel data sheet for the area of „permanent pasture". Following areas are included:

   – one cut (per year) meadows

   – two and more cut (per year) meadows

   – cultivated pastures

   – ley grass farming areas (Egarte): these areas are included here, because they are not included in the category „Arable Land" (L11111).

The verified figures are for the years 1986-1995 and are written in bold type. Please take these figures into consideration.

7. Table 2.1: FERTILISER NUTRIENT CONVERSION COEFFICIENTS: For sewage sludge the average Nitrogen content is considered as 39 g N/kg dry matter. Used literature:

   – AICHBERGER (1991): Situation of Sewage sludge in Austria - Use in Agriculture, National Guidelines and Laws, Future aspects, in: Treatment and Use of Sewage Sludge and Liquid Agricultural Wastes, Herausgeber Elsevier Science Publisher, Essex, GB.

8. Table 2.2: COEFFICIENTS TO CONVERT LIVESTOCK NUMBERS INTO MANURE NUTRIENT QUANTITY AND COMPOSITION: There is the problem of comparability of e.g. average diary cattle in different countries. It depends on the animal weight and milk performance, how much nutrient amounts they „produce" by excrement. Please find enclosed Excel-sheet about the average nutrient supply for Austrian husbandry. The amounts were calculated on base of the Austrian large animal units and the average nutrient amounts from manure written down in:

   – BUNDESMINISTERIUM FÜR LAND- UND FORSTWIRTSCHAFT Wien (1991): Wirtschaftsdünger - Richtige Gewinnung und Anwendung. Fachbeirat für Bodenfruchtbarkeit und Bodenschutz. Sonderausgabe der Zeitschrift „Förderungsdienst".

   One further remark:

In table 2.2 the unit for the manure coefficients is Kilograms / Head / year. It would be more correct and unmistakable to say Kilograms / stable place / year, because e.g. for pigs the number of pigs / year is often much bigger than the number of stable places / year, because they are living only about 100 days. In this case the coefficients represent the amount of nitrogen associated with the stable place of one pig / year.

9. Table 2.4: COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSTITION: For Austria it is the case that crop residues either are incorporated in the soil or are removed from the field, but used as litter and brought back onto the fields with manure. So they should not be included in the „crop production" of the surface balance. This has to be applied for cereals, maize and rape. Please find enclosed Excel-sheet about the average coefficients to convert crop and forage production into nutrient export by crops.

   Please keep in mind that „nutrient export" or „net removal of nutrients by crops" or „nutrient withdrawal by crops" should be used instead of „nutrient uptake", because this term includes also the nutrient amounts in roots and crop residues.

10. Table 2.5: COEFFICIENTS TO CONVERT QUANTITIES OF SEEDS AND PLANTING MATERIALS INTO NUTRIENT UPTAKE AND COMPOSTITION: Coefficients in this group are the same as those for crops given in table 2.4, because the AUSTRIAN coefficients do not include crop residues (see 5., enclosed Excel-sheet).

11. Table 2.6: COEFFICIENTS TO CALCULATE BIOLOGICAL NITROGEN FIXATION FROM THE AREA OF LEGUME CROPS: Please find enclosed Excel-sheet about AUSTRIAN coefficients for legume N-Fixation.

    Used Literature:

- Hege & Weigelt (1991): Nährstoffbilanzen alternativ wirtschaftender Betriebe. Landwirtschaftliches Jahrbuch 68.Jhrg., Heft 4/91.
- DGB (Deutsche Bodenkundliche Gesellschaft) (1992): Strategien zur Reduzierung standort- und nutzungsbedingter Belastungen des Grundwassers mit Nitrat. AG Bodennutzung in Wasserschutz- und -schongebieten. Oktober 1992.
- SCHALVO (1987): Schutz- und Ausgleichsverordnung für Wasserschutzgebiete. Baden-Württemberg.
- Werner, D. (1987): Pflanzliche und mikrobielle Symbiosen. Georg Thieme Verlag, Stuttgart.
- TAB (Büro für Technikfolgenabschätzung des Deutschen Bundestages) (1992): TA-Projekt „Grundwasserschutz und Wasserversorgung". Zwischenbericht zur Studie „Qualitative Analysen von Vorsorgestrategien zum Schutz des Grundwassers im Verursacherbereich Landwirtschaft".
- UBA Berlin (Hrsg.) (1994): Stoffliche Belastung der Gewässer durch die Landwirtschaft und Maßnahmen zu ihrer Verringerung. Berlin: Erich Schmidt Verlag GmbH & Co. Berichte Umweltbundesamt; 94,2.

- Braun et al. (1994): Phophor- und Stickstoffüberschüsse in der Landwirtschaft und Para-Landwirtschaft. Hrsg.: Eidg. Forschungsanstalt für Agrikulturchemie und Umwelthygiene.
- Siebeneicher, E. (1985): Ratgeber für den biologischen Landbau. Südwest München.

12.Table 2.7: COEFFICIENTS TO CALCULATE ATMOSPHERIC DEPOSITION ON AGRICULTURAL LAND: For Austria an average deposition of 20 kg N per hectar and year has to be taken into the N-balance.

These comments were worked out with assistance of Dr. Wolfgang Bittermann (Österreichisches Statistisches Zentralamt, Dr. Erich M. Pötsch (Bundesanstalt für alpenländische Landwirtschaft Gumpenstein) and HR Dipl.-Ing. A. Köchl (Bundesamt und Forschungszentrum für Landwirtschaft).

Thank you for taking our remarks into your consideration.

With kind regards,

Mag. Bettina Götz
(Dep. Terrestrial Ecology)

Dipl.-Ing. Gerhard Zethner
(Dep. Terrestrial Ecology)

enclosure: Excel datasheets

6 2. SCHREIBEN AN DIE OECD (32-115/97)

To Mr Kevin Parris and
Mr Seiichi Yokoi
Environment Division
Agricultural Directorate
OECD

2, rue André Pascal
F - 75775 Paris CEDEX 16

Datum 7. Mai 1997
Zahl 32- 115/97
Sachb./Tel. Götz / 3661

Subject: Verification of the data for the OECD NATIONAL SOIL SURFACE NUTRIENT BALANCES

Dear Mr Parris and Mr Yokoi,

Thank you for your grateful remarks to the Austrian balance data sheets. In the course of working with these data and trying to work out the Austrian N-balance it turned out that a few remarks are necessary. So I send you the verified Excel data sheets with explaining comments and hope it is not too late to take them into consideration.

1. Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION: For the Category „Temporary Pasture Production" one correction is necessary: the area of ley grass farming (Egart) is included in the arable land area, so it should not be taken into account extra (see also table 1.7).

2. Table 1.6 AREA OF LEGUME CROPS: Areas with clover-grass-maslin have been separated from the category „Clover", because of smaller biological nitrogen fixation values (see also Table 2.6).

3. Table 1.7 TOTAL AND AGRICULTURAL LAND USE AREA: the comment for ley grass farming areas (Egarte) should be deleted, because these areas <u>are</u> included in the category „Arable Land" (L11111).

4. Table 2.4 COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION: In this table a few coefficients changed a little bit because of new data from the Austrian Technical Advisory Board for Soil Fertility and Soil Conservation (Fachbeirat für Bodenschutz und Bodenfruchtbarkeit). You find them in the enclosed excel-datasheet.

5. Table 2.6 COEFFICIENTS TO CALCULATE BIOLOGICAL NITROGEN FIXATION FROM THE AREA OF LEGUME CROPS: I recognised that the areas of permanent pasture are missing in the Category „Biological Nitrogen Fixation of leguminous crops". It depends on the share of leguminous plants in grassland, how much nitrogen is fixed by legumes, but an average amount of about 20 kg N/ha (my proposal) must be part of the N-balance.

In counter-move the values for asymbiotic biological N-fixation through free living organisms were reduced to 4 kg N/ha, like the Belgish values. In this field values between 0,3 - 10 kg N/ha are found in literature.

6. In addition to the verified excel-datasheets we send you our results of the N-balances for Austria. An average N-surplus of 46 kg N/ha was calculated. This result seems not so much at the first sight, but regional considerations would be necessary to evaluate the environmental effects of the agricultural fertilisation regime. According to natural facts there are some regions in Austria where the agricultural fertilisation regime stresses the environmental situation.

Thank you for taking our remarks into your consideration. Do not hesitate to contact us to clarify any outstanding issues.

We are looking forward to your results.

With kind regards,

Mag. Bettina Götz
(Dep. Terrestrial Ecology)

Dipl.-Ing. Gerhard Zethner
(Dep. Terrestrial Ecology)

enclosure:
Excel datasheets

7 3. SCHREIBEN AN DIE OECD (32-291/97)

To Mr. Kevin Parris and
Mr. Seiichi Yokoi

Agricultural Directorate OECD
Environmental Division

2, rue Andrè Pascal
F - 75775 Paris CEDEX 16

Datum 14. November 1997
Zahl 32 - 291/97
Sachb./Tel. Götz / 3661

Subject: Verification of the OECD National Soil Surface Nutrient Balance for Austria

Dear Mr Parris and Mr Yokoi,

As promised I am sending you the verified Austrian N-balance sheets in this week following the e-mail from 7th of November.

The main points which are "new" in these balance sheets are:

- The N-surplus is related to the whole agricultural land in Austria, not only to the areas which deserve fertilisation.
- 15 % N losses were calculated for destruction and evaporation of manure (like OECD estimation).

  The Austrian Federal Office and Research Center for Agriculture made an annotiation that in Austria it is usual to calculate 25 % of total N in manure as ammonia losses. In our opinion there are two possible ways to decide this question:

  - homogenous coefficients for ammonia losses in the N-balances of all OECD countries
  - individual coefficients for ammonia losses for each country. Then for Austria it should be 25%.

  In both cases we think that it is necessary to visualize the amount of the N-losses in the N-balance-sheet (table 4.1.1), because they are environmental relevant and can be influenced by the farmer´s management.

- More differentiated values for average N-deposition for each year were taken into account (Data from Federal Environment Agency Austria according to EMEP).
- The Austrian Inorganic Fertiliser sales data from the AMA (Agrarmarkt Austria), which are slightly different from the data from the OECD Compendium, were put down in table 1.1.
- We updated the nitrogen balance including data for 1996, except the data for seeds and planting materials.

We hope these updated and verified points and the new N-balance results will be taken into consideration for the Synthesis Report COM/AGR/ENV/(97)114 (Figure box 4, p.10).

Thank you again for your efforts.

With kind regards,

Gerhard Zethner
(Dep. Terrestrial Ecology)

Bettina Götz
(Dep. Terrestrial Ecology)

enclosure: Diskette with EXCEL-file „AUT_new.xls“ (Austrian N-balance data)
N-Balance sheets for Austria (pp. 36)

8 UNTERLAGEN DER OECD: BEGLEITBRIEF

OCDE
ORGANISATION DE COOPÉRATION ET
DE DÉVELOPPEMENT ÉCONOMIQUES

OECD
ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

DIRECTION DE L'ALIMENTATION, DE L'AGRICULTURE, ET DES PECHERIES
DIRECTORATE FOR FOOD, AGRICULTURE, AND FISHERIES

Division des Etudes Nationales II et Environnement
Country Studies Division II and Environment

21 January, 1997

DAA/CSE (97)3

Subject: **OECD NATIONAL SOIL SURFACE NUTRIENT BALANCES**
Sujet: **BILANS NATIONAUX DES ELEMENTS FERTILISANTS DE L'OCDE**

Please note that attached to this letter is a French copy of the text.
Veuillez trouver ci joint la version française du texte

Dear Delegate,

This letter follows-up on the Email/FAX message sent to you on Monday the 20 January 1997 concerning the OECD national soil surface nutrient balances (please find attached the distribution list used for the Email/FAX message circulated on the 20 January). Accompanying the enclosed letter are both a paper copy and diskette version of the explanatory notes and datasheets relevant to the calculation of a nutrient balance for your country. This set of information supports the preliminary nitrogen balance tables provided in the Secretariat document **OECD Agri-environmental Indicators: Stocktaking Report** [COM/AGR/CA/ENV/EPOC(96)149], discussed by the Joint Working Party of the Committee for Agriculture and the Environment Policy Committee (JWP) at its last meeting in December 1996.

The Secretariat invites Delegations to verify and complete the enclosed datasheets, by:

- making any corrections and/or additions to the datasheets, together with supporting notes if necessary, preferably through the OECD electronic indicator information exchange facility (as detailed below) or on a diskette;

- incorporating updated data for 1996 and nutrient conversion coefficients for phosphate and potassium to complete soil surface nutrient balances for these nutrients;

Delegations are invited to provide this information to the OECD Secretariat during the EUROSTAT meeting of the Sub-Group on Nitrate Balances in Luxembourg on the 13-14 February 1997, to which all OECD member countries were invited at the JWP meeting in December 1996. The EUROSTAT meeting will also provide the opportunity for discussion of outstanding methodological issues concerning the calculation of nutrient balances. For those Delegations not attending this meeting they should provide the information requested above to the Secretariat by **Friday 28 February**.

2, rue André Pascal 75775 PARIS CEDEX 16 Tél. : 01 45 24 82 00 Ligne directe/ Direct line : (33-1) 45 24 93 27
TÉLÉGRAMMES DÉVELOPÉCONOMIE / TÉLEX 640048 / TÉLÉFAX (33-1) 45 24 18 90
Internet Address : leo.maier@oecd.org OECD Web Site : http://www.oecd.org/

It should be emphasised that the Secretariat would be grateful to receive as much information as Delegations can provide by the 28 February, even if it is not possible to complete all data entries. Also data entries should preferably draw on national data sources rather than secondary data sources such as FAO.

Delegations should note that the diskette enclosed with this letter is formatted for IBM and compatible personal computers; the explanatory notes are given as a WORD document (MS WORD version 6.0); and the data sheets are contained in an EXCEL file (MS EXCEL version 5.0). It is also drawn to the attention of colleagues using French as their working language that the Secretariat, due to resource constraints, is unfortunately unable to circulate the explanatory notes and datasheets in French.

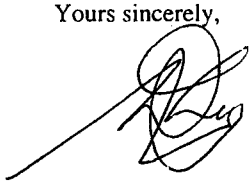
Delegations seeking any further information or clarification of the notes and data enclosed with this letter should not hesitate to contact the Secretariat, preferably through the OECD electronic agri-environmental indicator information exchange facility as follows:

Email: AGR.environment@oecd.org

FAX: (33) 1 44 30 63 53 (Attention Mr Seiichi YOKOI)

May I thank you in advance for your cooperation in advancing the OECD work on agri-environmental indicators.

Yours sincerely,



Wilfrid Legg

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9 UNTERLAGEN DER OECD: EXPLANATORY NOTES

OECD NATIONAL SOIL SURFACE NUTRIENT BALANCES:

EXPLANATORY NOTES

OECD SECRETARIAT 1996

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OECD NATIONAL SOIL SURFACE NUTRIENT BALANCES: EXPLANATORY NOTES

1. INTRODUCTION

1. A "nutrient balance" is one of the priority issues in developing an OECD set of agri-environmental indicators, as part of the contribution to the analysis of the interactions between agriculture and the environment and impact of changes in agricultural policy on the environment. The reader is referred to the OECD publication: ***Environmental Indicators for Agriculture*** (Paris, 1997), which provides the overall framework in which this and other agri-environmental indicators are being developed

2. The data sheets attached to these explanatory notes provide provisional basic data for the calculation of a national soil surface nitrogen balance. The method of calculation used here is largely based on the work by the Belgium authorities, as a "lead" country in developing the OECD work in this area, described in more detail in Bomans, E. et al (1996) ***Development of an Indicator for Agricultural Nutrient Balances for the OECD***, Soil Service of Belgium, Ministry of the Flemish Community, Leuven-Heverlee, Belgium.

3. The data and coefficients provided in the attached sheets draw on national sources to the extent possible, although for European Union Member States EUROSTAT is usually the source of basic data, and in some cases FAO data has been used.

4. Following this introduction, **Section 2** provides a brief overview of the method used to calculate a national soil surface balance. **Section 3** examines the structure of the data sheets including their coverage, table conventions and format. **Section 4** outlines the requirements needed to verify and complete the data sheets. **Section 5** completes the explanatory notes with some country specific comments and possible areas of future work.

5. A summary of the tables contained in the main set of data sheets is provided in Figure 1 below.

2. METHOD OF CALCULATION

6. The ***soil surface balance*** calculates the difference between the total quantity of nutrient inputs entering the soil and the quantity of nutrient outputs leaving the soil annually. The calculation of the soil surface balance, as defined here, is a modified version of the so called *"gross balance"*, which provides information about the complete surplus (deficit) of nutrients into the soil, water and air from an agricultural system.

7. The estimate of the annual total quantity of ***nutrients inputs*** for the soil surface nitrogen balance, includes the addition of :

- *inorganic or chemical nitrogen fertiliser*: quantity consumed by agriculture;
- *livestock manure nitrogen production*: total numbers of live animals (cattle, pigs, sheep, goats, poultry, horses, and other livestock) in terms of different categories according to species (e.g. chickens, turkeys), sex, age and purpose (e.g. milk cow, beef cattle), multiplied by respective coefficients of the quantity of nitrogen contained in manure/animal/year;
- *atmospheric deposition of nitrogen:* total agricultural land area multiplied by a single coefficient of nitrogen deposited/hectare (not included in a phosphorus balance);
- *biological nitrogen fixation:* area of harvested legume crops (e.g. field beans, soybeans, clover, alfalfa) multiplied by respective coefficients of nitrogen fixation/ha, plus the nitrogen fixation by free living soil organisms computed from the total agricultural land area multiplied by a single coefficient of nitrogen fixation/ha (not included in a phosphorus balance);
- *nitrogen from recycled organic matter:* quantity of sewage sludge applied to agricultural land multiplied by a single coefficient of nitrogen content of sewage sludge;
- *nitrogen contained in seeds and planting materials:* quantity of seeds and planting materials (e.g. cereals, potato tubers) multiplied by respective coefficients of nitrogen content of seeds/planting materials.

8. The estimate of the annual total quantity of ***nutrient outputs,*** or nutrient uptake, for the soil surface nitrogen balance, includes the addition of:

- *harvested crops:* quantity of harvested crop production (e.g. cereals, root crops, pulses, fruit, vegetables and industrial crops) multiplied by respective coefficients of nitrogen uptake to produce a tonne of harvested crop;
- *forage crops:* quantity of forage crop production (e.g. fodder beets, hay, silage, and grass from temporary and permanent pasture) multiplied by respective coefficients of nitrogen uptake to produce a tonne of forage.

Figure 1 Summary of Data Sheet Tables

Part I: BASIC DATA :		**Part II:** COEFFICIENTS TO CONVERT BASIC DATA INTO NUTRIENT CONTENT / COMPOSITION :		**Part III:** QUANTITY OF NITROGEN (BASIC DATA × COEFFICIENTS)		**Part IV:** NUTRIENT BALANCE	
Table 1.1	Fertilisers: Inorganic and organic products (excluding livestock manure)	**Table** 2.1	Fertilisers kg nutrient / t of fertiliser	**Table** 3.1.1	Fertilisers	**Table** 4.1.4	Calculation of the total nitrogen balance and the balance per hectare of total agricultural land
1.2	Livestock (Number of live animals)	2.2	Livestock manure kg nutrient / head /year	3.1.2	Livestock manure	4.1.2	Percentage of major components in total nitrogen inputs and outputs respectively
1.3	Livestock manure withdrawals from agriculture, manure stocks and imports	2.3	Manure withdrawals, stocks and imports kg nutrient / t of manure	3.1.3	Manure withdrawals, stocks and imports		
1.4	Harvested Crops and Forage Production	2.4	Harvested crops and forage kg nutrient uptake / t of crop-forage	3.1.4	Nitrogen uptake by harvested crops and forage		
1.5	Quantities of Seeds and Planting Materials	2.5	Seeds and planting materials kg nutrient / t of material	3.1.5	Nitrogen contained in seeds and planting materials		
1.6	Area of Legume Crops	2.6	Biological nitrogen fixation kg of N / ha of legume crop area and total agricultural area respectively	3.1.6	Biological nitrogen fixation		
1.7	Total and Agricultural Land Use Area	2.7	Atmospheric deposition kg nutrient / ha of agricultural land	3.1.7	Nitrogen fixed from atmospheric deposition		

3. STRUCTURE OF THE DATA SHEETS

3.1 Coverage

9. The set of data sheets consist of 4 parts (see summary Figure 1):

- Part I - Tables 1.1 to 1.7 : ***basic data*** to calculate the nutrient balance, covering the nutrient inputs and outputs in the soil surface balance, listed in section 2 above.

- Part II - Tables 2.1 to 2.7 : ***coefficients*** to convert basic data (e.g. livestock numbers) into nutrient equivalents (the reader is also referred to the set of 7 tables, attached to the end of these explanatory notes, which show the coefficients used by different countries);

- Part III - Tables 3.1.1 to 3.1.7 : ***nitrogen content***, involving the multiplication of the *basic data* by the *nitrogen coefficients*, to provide *total nitrogen contents* for the nutrient input and output items listed above in section 2. Additional tables will be added to Part III once phosphorus and potassium coefficients are available to calculate respective balances for these nutrients.

- Part IV - Tables 4.1.1 and 4.1.2 : ***nitrogen balance*** covering the main categories of nitrogen inputs and outputs, the nitrogen balance calculation (inputs – outputs), and the expression of the nitrogen balance in kg of nitrogen per hectare of agricultural land. Table 4.1.2, expresses the main nitrogen input and output components as respective percentage shares of total nitrogen inputs and outputs.

10. The four sets of tables described above are linked electronically in the database provided in the diskette accompanying these explanatory notes. Hence, when data are modified in one table, for example the wheat production data, then the nutrient content and balance tables are automatically updated. However, this may not apply to new data entries where previously the entry was blank.

Figure 2 Conventions and format of the data sheets

COUNTRY:XXXXX ← Name of country

Unit of measure →

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION													1 000 Tonnes
OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
C2	Total Harvested Crops and Forage												
C21	Total Harvested Crops			70,240	63,753	66,298	70,633	73,521	71,803	77,525	76,929	70,263	68,677
C211	Total Cereals			55,829	50,517	52,687	56,114	57,609	55,130	60,353	60,657	55,653	53,426
C2111	Wheat			28,823	26,472	27,221	29,038	31,823	33,346	34,345	32,546	29,220	30,501
C21111	Common Wheat	EUROSTAT	c1120	28,091	25,429	25,834	27,874	30,432	31,374	31,798	30,655	28,332	29,463
C211111	Spring Wheat												
C211112	Winter Wheat												
C21112	Durum Wheat	EUROSTAT	c1130	732	1,043	1,387	1,164	1,391	1,972	2,546	1,890	888	1,038
C21119	Other Wheat												
C2112	Rice	EUROSTAT	c1250	62	60	60	75	106	121	114	125	128	124
C2113	Coarse Grains			26,186	23,283	24,477	26,182	24,824	20,784	24,902	26,895	25,312	21,774

Descriptor of item

Code used by data source to identify data

Data:
0 : less than 0.5
blank : not available

OECD Code to identify item

National or other source of data

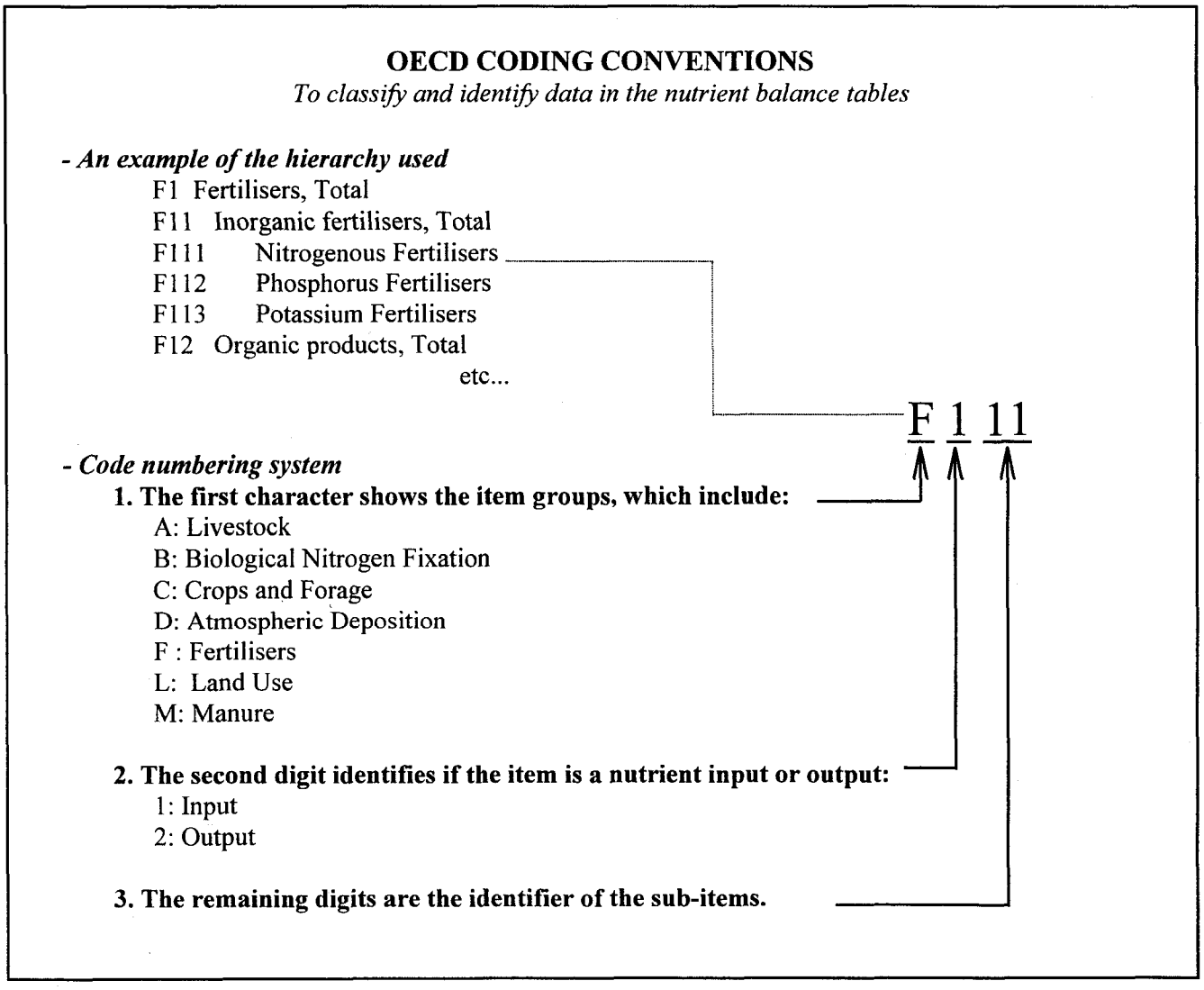
3.2 Table Conventions and Format

11. The conventions and format are the same for all tables. Figure 2 provides a brief general overview of the table conventions and format, using cereals as an example.

3.3 The OECD Coding Conventions

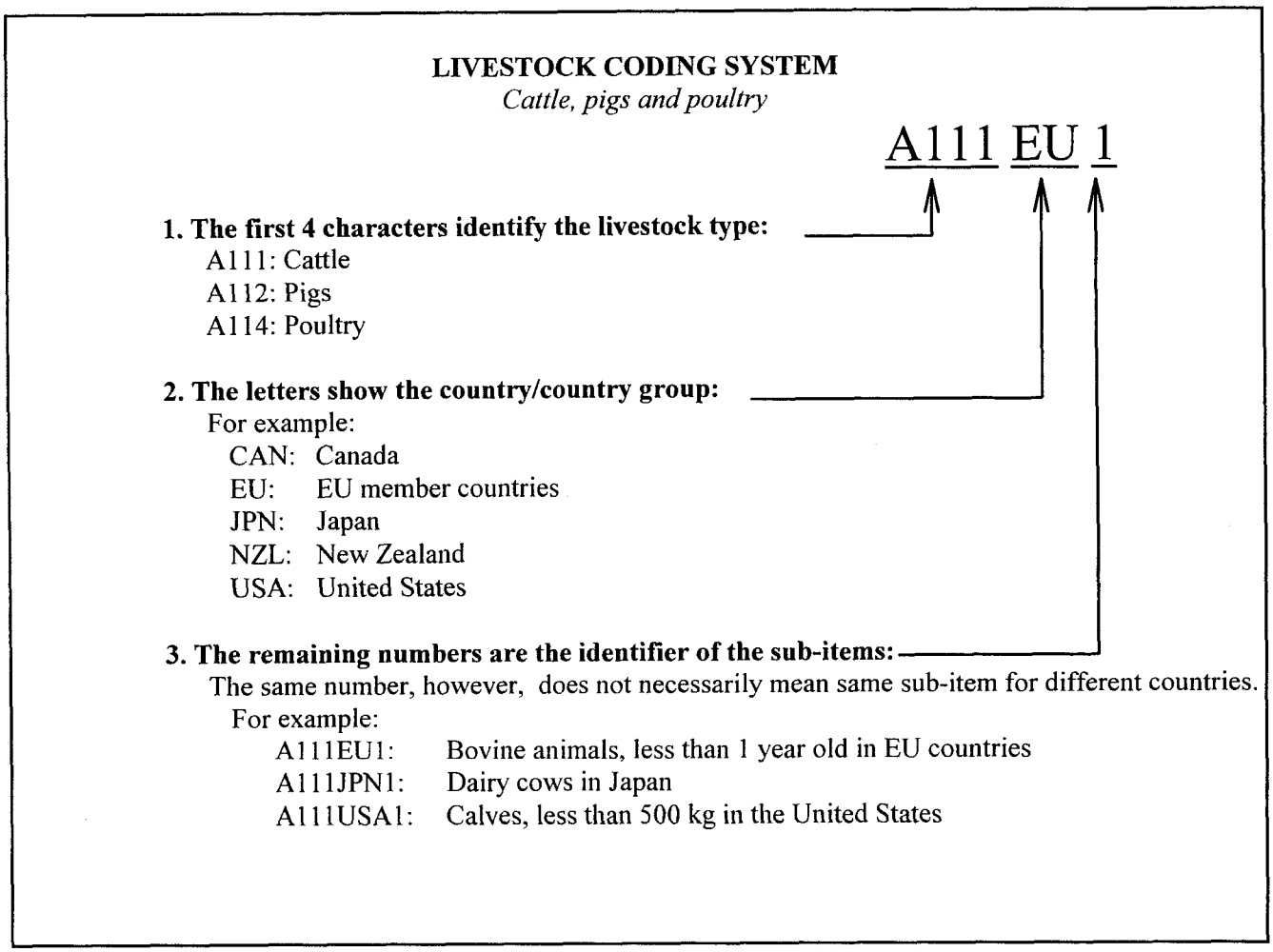
12. So as to classify data in the nutrient balance tables and facilitate the identification of specific data, the OECD Secretariat has organised the data according to a series of coding conventions. This is explained in Figure 3 using the example of fertilisers.

Figure 3 OECD Coding Conventions



13. Since disaggregation of livestock statistics varies significantly among countries, a different coding system is employed from that used for other items. Figure 4 provides a brief overview of the coding system used for livestock, which is applied to cattle, pigs and poultry at this stage, but could be extended to other livestock categories, sheep for example, if necessary.

Figure 4 OECD Livestock Coding Conventions



3.4 Extending the coverage of categories and sub-items in the data sheets

14. While the coverage of basic data in the nutrient balances outlined here cover the major categories and sub-items to complete the calculations, the coding system allows additional categories and/or sub-items to be included to reflect both varying national situations and changes over time, as necessary.

15. Where the level of disaggregation shown in the data sheets is insufficient to reflect the availability of basic data and coefficients for a country, additional items can be added to the data sheets. For example, some countries may have available data series that provides further disaggregation of "Other Livestock" (e.g. to include not only horses and donkeys but also rabbits, deer, etc.), and in this case the new items can be added to the data sheets after "Donkeys" (e.g. A1193 Rabbits).

16. Where disaggregated data is provided, especially for crops and livestock, this should be accompanied, if possible, by the respective coefficients necessary to convert these sub-items into nutrient content and composition.

4. VERIFYING AND COMPLETING THE DATA SHEETS

4.1 General comments

17. In verifying and completing the data sheets the following should be noted:

- The classification system of crops and livestock draws on national sources, EUROSTAT for European Union member countries, and FAO.

- Countries should provide explanatory notes where relevant data coverage includes other uses than "primary agriculture", e.g. fertiliser consumption data, in addition to primary agriculture use, may include use on golf courses, private gardens, public parks, forestry, etc.

- Countries should attempt to correct data series where the annual coverage of basic data may differ significantly, e.g. crop year, livestock year, calendar year for fertiliser data, etc.

- Countries are requested to verify data presented in tables and provide additions and/or notify the Secretariat of any errors.

- Where possible countries are encouraged to provide disaggregated data, especially for crop and livestock series, to facilitate a more accurate estimate of the nutrient balance (e.g. piglets, sows), plus the relevant sub-total (e.g. total pigs). However, where disaggregated data does not exist, then if possible aggregated data should be provided (e.g. total pig numbers), together with the corresponding coefficients to convert these data into nutrient composition and quantities.

- The basic data are automatically rounded to the closest integer in the electronic data sheets, but the precise values are maintained in the database. In these cases, data less than 0.5 are expressed as 0. Blank entries indicate data are not available.

- Countries use different classification systems to record the numbers of live animals, especially for cattle, pigs and poultry, as noted in section 3.3 and figure 4 above. Irrespective of the classification system used by a country, the important aspect of the data coverage here is to include all live animals at a sufficient level of disaggregation to provide the basic data needed in the calculation of livestock manure production. In this respect, disaggregation of livestock statistics should follow as closely as possible to the coverage of nutrient coefficients to convert livestock numbers into estimates of manure nutrient production and composition.

- Where new data are included, please indicate the source and any supporting code.

- Please indicate if the unit used for new data entries differs from those used in the data sheets.

4.2 Basic data

4.2.1 Fertilisers: inorganic and organic products

18. **Table 1.1** covers data on apparent inorganic fertiliser consumption and on other organic fertilisers applied to agricultural land, excluding livestock manure which is treated separately.

F111: Consumption of Nitrogenous fertilisers, expressed in nitrogen (N) content.

F112: Consumption of Phosphate fertilisers, expressed in P_2O_5 content.

F113: Consumption of Potash fertilisers, expressed in K_2O content.

F121: Use of treated public sewage sludge

F122: Use of urban compost from public garbage collection

F123: Use of industrial waste, such as products from the food processing industry

F129: Other organic products used as fertilisers.

4.2.2 Livestock numbers

19. **Table 1.2** covers the total livestock inventory of live animals required in the calculation of the nutrient content of livestock manure production.

20. It is important to note that the number of live animals in table 1.2 include those recorded for a given census day in the year, and do not include, the total number of animals slaughtered over a given year. The total number of livestock slaughtered over a year are reflected in the coefficients used to convert livestock numbers into manure nutrient quantity and composition, described under section 4.3 below.

4.2.3 Livestock Manure Withdrawals from Agriculture, Manure Stocks and Imports

21. **Table 1.3** covers data on livestock manure use withdrawn and not used on agricultural land (including manure exports); added to or withdrawn from stocks from one year to the next but intended for use on agricultural land; and manure imported into a country for use on agricultural land. This information provides the basis for calculating the "net" input of livestock manure on agricultural land over a given year as follows (characters in brackets are the OECD identifier codes, see also Section 4.5 below and table 4.1.1):

Net Input of Manure: = Livestock manure production (M11) – Manure withdrawals (M21, including manure exports M214) + Change in manure stocks (M22 = M222 – M221) + Manure imports (M23)

M21: Amount of manure withdrawn from agriculture and not applied to agricultural land. The evaporation of ammonia and mineralisation of nitrogen after manure is applied to the soil is regarded as a part of nutrient losses.

M211: Destruction of manure and evaporation of ammonia which occurs from stored manure and livestock housing. The quantity of ammonia evaporation from stored manure and livestock housing is not included in the OECD soil surface nutrient balance calculation, and is an issue requiring further research.

M212: Non-agricultural use of manure, such as for private gardens.

M213: Manure processed as industrial waste in a processing plant and not used on agricultural land.

M214: Manure and other organic fertilisers exported from a country.

M219: Other manure withdrawals.

M22: Change in annual manure stocks, obtained by deducting the beginning stocks (M221) from the ending stocks (M222).

M23 Manure and other organic fertilisers imported.

4.2.4 Harvested crops and forage production

22. **Table 1.4** covers data on harvested crop production from arable field crops (e.g. cereals); permanent crops (e.g. fruit trees), and forage production, including both harvested fodder crops (e.g. fodder beets); and pasture production from temporary grassland and permanent pasture. The definitions and categories of crops and forage used here follows closely that used by FAO.

C21: **Harvested Crops**, regardless of their final destination, including for human consumption, livestock feed, industrial use and seeds.

C211: **Cereals**, covering wheat, rice and coarse grains.

C212: **Oil crops**, covering both annually sown oil crops (e.g. soybeans, rapeseed) and perennial oil crops (e.g. olives). This category also covers oilcrops, such as soybeans, used for purposes other than the production of vegetable oil, such as for animal feed and processed foods.

C213: **Dried pulses and beans**, in dry weight, including beans, broad beans, peas, chickpeas and lentils but excluding soybeans included in C212.

C214: **Root crops**, covering mainly crops used for food and industrial use (e.g. potatoes), but excluding root crops grown principally for feed, such as fodder beets included in C221.

C215: **Fruit crops**, covering both annually sown fruit crops (e.g. strawberries) and fruit tree crops (e.g. apples, peaches). It is emphasised that while many countries have disaggregated fruit production data this should only be included here where coefficients exists to convert the particular fruit into its nutrient content and composition (see nutrient coefficients table 2.4, item C215). However, preference should be given to providing data and nutrient coefficients for sub-groups of fruits (e.g. citrus fruit) rather than individual fruit crops (e.g. grapefruit), to ease the burden of data collection and processing.

C216: **Vegetable crops**, covering leaf (e.g. cabbage, lettuce), vine (e.g. tomatoes, melons) and root vegetables (e.g. carrots, beets). It is emphasised that while many countries have disaggregated

vegetable production data this should only be included here where coefficients exist to convert the particular vegetable into its nutrient content and composition (see nutrient coefficients table 2.4, item C216). However, preference should be given to providing data and nutrient coefficients for sub-groups of vegetables (e.g. leaf vegetables) rather than individual vegetable crops (e.g. cabbages) to ease the burden of data collection and processing.

C217: **Industrial crops**, covering sugar crops (C2171), fibre crops(C2172) and other industrial crops (C2179), for example, tobacco, hops, etc.

C218: **Ornamental crops**, covering crops such as flowers.

C219: **Other harvested crops**, covering any other harvested crop not covered under the sub-categories C211 to C218.

C22: **Forage**, covering annually harvested fodder crops and pasture used as livestock feed.

C221: **Harvested fodder crops**, covering fodder root crops (C2211), green fodder (C2212) and other harvested fodder crops (C2219).

C222: **Pasture**, covering the quantity of vegetation utilised by livestock from both temporary and permanent pasture.

23. The calculation of the soil surface nutrient balance should include the "actual" utilisation or consumption of vegetation from pasture land (C2222), but exclude that vegetation not utilised by livestock and remaining on pasture land. Very few countries regularly collect data related to pasture consumption by livestock, although statistics are more commonly available on pasture area (C222A) and for some countries pasture production (C2221), which includes both pasture vegetation consumed by livestock and that remaining in the field. For those countries with only data on pasture area, calculation of pasture production can be made from an assumed pasture yield figure (C222Y1/Y2).

24. For most countries it will be necessary to make assumptions regarding the "potential" quantity of pasture vegetation consumed by livestock, for example, calculated from the number of grazing livestock and average vegetation consumption levels per animal. The methodology and assumptions made to estimate pasture consumption should be described (C2222). Please note that the total pasture figure (C222) should include pasture consumption (C2222) and not pasture production (C2221).

C23 **Crop residues** (removed from the field), covering crop heads, leaves and stems (C231), straw, mainly cereal straw (C232); and other crop residues (C239).

25. The inclusion of crop residues in the soil surface nutrient balance still requires further research. In particular, examination is required of the extent to which some crop residues may already be covered under crop production data (C21), and also with respect to the use of nutrient conversion coefficients, for example, coefficients should cover the nutrient content not only in harvested cereal grains but also the cereal straw removed from the field.

4.2.5 Quantities of Seeds and Planting materials

26. **Table 1.5** covers the quantities of seeds and other planting materials, used in agriculture. This table includes data on the major categories of seeds and planting materials covering cereals

(C111), oil crops (C112) , and root crops (C113). Where data and corresponding coefficients are available for other crop categories, these should be included under other crops (C119).

4.2.6 Area of legume crops

27. **Tables 1.6** covers the planted area of legume crops which contribute to biological nitrogen fixation, mainly pulses (C121), soybeans (C122), clover (C123), alfalfa (C124) and other legume crops (C129). These data are only applicable to the calculation of the soil surface nitrogen balance. It should be noted that it is the planted area of legumes which is important, not the harvested area, since biological nitrogen fixation occurs regardless of whether the crop is harvested or not. For example, leguminous crops are often not harvested but ploughed into the field to provide soil nitrogen.

4.2.7 Total and agricultural land use area

28. **Table 1.7** covers the total area of a country (L1), which includes the area of inland waters (e.g. rivers, lakes and inland seas); the total land area (L11), which includes the total and agricultural land area (L111); forest land (L112); and other land (L119), which covers, for example, urban, mountain and tundra areas, etc. Other land use categories (L2), includes the sub-category irrigated agricultural area (L21), which covers a part of the agricultural land area under sub-item L111.

29. **Agricultural land area** (L111) is sub-divided into arable and permanent crop land (L1111) and permanent pasture (L1112), which corresponds to the data on permanent pasture area shown in Table 1.4, sub-item C222A2 (see also Section 4.2.4 paragraph 24 above).

30. Data on agricultural land area are required in the nutrient balance calculation to estimate the:

- biological nitrogen fixation by free living micro-organisms in the soil of the total agricultural land area (see tables 2.6 and 3.1.6);
- atmospheric deposition of nutrients on the total agricultural land area (see tables 2.7 and 3.1.7);
- nutrients supplied from irrigation water (at present this is not included in the balance calculation, and requires further research);
- nutrient balance (in quantity terms of respective nutrients) per total area of agricultural land.

4.3 Nutrient Coefficients

4.3.1 General comments

31. Coefficients to convert basic data to nutrient content and composition vary over time and among countries. As the availability of national nutrient conversion coefficients are in general limited, the Secretariat has provisionally used the following approach to obtain a consistent set of nitrogen coefficients:

- it is assumed that nitrogen coefficients are assumed unchanged over the period 1985 to 1995, in the absence of time series data;

- national coefficients have been used, where available, as shown in the summary of the national coefficients across countries given in tables 1 to 7 at the end of these explanatory notes;

- coefficients for a "comparable" country and/or those reported by Belgium, in the document: Bomans, E. et al (1996) ***Development of an Indicator for Agricultural Nutrient Balances for the OECD***, Soil Service of Belgium, Ministry of the Flemish Community, Leuven-Heverlee, Belgium, have been used in the absence of national coefficients.

32. For each set of national data sheets the source of the nitrogen coefficients used in tables 2.1 to 2.7 are indicated under the column *"Source"* together with the applicable country to that source under the next column *"Code used by source"*. The sources include:

- National Research Institutes, such as the coefficients used in the balances for Canada and Japan;

- EUROSTAT, referring to national coefficients provided to EUROSTAT in response to their 1996 questionnaire to European Union member countries;

- OECD, referring to the use of Belgian coefficients drawn from the OECD document cited above (see paragraph 32);

- SCHLEEF, referring to coefficients drawn from a study of selected European Union member countries: Schleef, K.H. and Kleinhanb, W (1994), *Mineral Balances in Agriculture in the EU,* Institute of Farm Economics, Federal Agricultural Research Centre, Braunschweig, Germany.

33. To improve the current coverage of nutrient coefficients and their consistency between countries the intention is to where possible provide:

- nutrient coefficients from national sources;

- annual series of nutrient coefficients;

- definitions of the derivation of coefficients, which is particularly important in improving the consistency of coefficients across countries. For example, in the coefficient tables 1 to 7 attached to these explanatory notes, it is notable that for certain countries and crop/livestock sub-categories coefficients differ markedly, such as for dairy cows (see table 2 code M111EU4) and maize (see table 4 code C21132);

- nutrient coefficients for phosphate and potassium, so that soil surface balances for these nutrients can be calculated.

4.3.2 Fertilisers

34. **Table 2.1** provides the nutrient composition coefficients to convert quantities of inorganic and organic fertilisers. It is assumed that nitrogenous inorganic fertiliser (F111) has a fixed nitrogen conversion coefficient of 1000 kg/t. Coefficients are required for inorganic phosphate (F112) and potassium (F113) fertilisers, as well as nutrient coefficients to convert organic fertilisers (F12).

4.3.2 Livestock Manure

35. **Table 2.2** provides the coefficients to convert numbers of livestock into annual manure production and nutrient composition, however, the following should be noted in developing this data set:

- where countries have one set of coefficients to calculate the quantity of manure produced per animal or livestock unit, and another set of coefficients to calculate the nutrient content of manure, then these should preferably be combined to provide a single coefficient, as shown in table 2.2, or the two sets of coefficients should be provided;

- the set of nutrient manure conversion coefficients should correspond as closely as possible to the level of disaggregation provided in the basic data for livestock numbers (see Table 1.2);

- the coefficients should take into account the slaughtering of animals over a given year, as already discussed above in Section 4.2, paragraph 21;

4.3.3 Manure withdrawals, stocks and imports

36. **Table 2.3** provides nutrient composition coefficients for manure withdrawals (including manure exports), change in stocks and imports. At present the Secretariat has no coefficients for the various sub-items included in this category.

4.3.4 Harvested crops and forage

37. **Table 2.4** provides the nutrient composition coefficients to convert the production of harvested crops and forage into quantities of nutrients harvested and/or removed from the field, however, the following should be noted in developing this data set:

- the set of crop and forage nutrient conversion coefficients should correspond as closely as possible to the level of disaggregation provided in the basic data for crops and forage (see Table 1.4);

- crop nutrient coefficients should cover the nutrients not only in the main crop product, for example grain, but also the crop by-products, for example cereal straw, where these are removed from the field. However, the coefficients should exclude crop residues, such as roots and leaves left on or ploughed into the soil;

- where coefficients are not available for certain crops it may be possible to provisionally use nutrient coefficients that are available for similar crops, such as applying the coefficient for barley to oats;

- in providing nutrient coefficients for pasture, attention needs to be given to the utilisation of pasture (i.e. consumption by livestock) rather than forage production as noted above in section 4.2.4, paragraphs 24 and 25.

4.3.5 Seeds and planting materials

38. **Table 2.5** provides coefficients to convert the quantities of seeds and planting materials into their nutrient composition. Coefficients in this group are not the same as those for crops given in Table 2.4, since the crop nutrient coefficients in Table 2.4 include crop by-products.

4.3.6 Biological nitrogen fixation

39. **Table 2.6** provides coefficients to calculate the biological nitrogen fixation from the planted area of leguminous crops and biological nitrogen fixation by soil micro-organisms on all agricultural land.

4.3.7 Atmospheric deposition

40. **Table 2.7** provides the coefficients to calculate atmospheric deposition of nutrients on all agricultural land.

4.4 Nutrient Content

41. **Tables 3.1.1 to 3.1.7** provide the total nitrogen content of the inputs and outputs in the soil surface balance in terms of tonnes on nitrogen. The nitrogen content data in these tables are derived from the *multiplication of the basic data* provided in tables 1.1 to 1.7 *by the nitrogen coefficients* given in tables 2.1 to 2.7. Where countries are able to provide phosphate and potassium nutrient coefficients, the Secretariat would request that the respective nutrient content tables, in terms of tonnes of phosphorus (P) and potash (K) respectively, are completed and included with the tables in this Part (tables 3.2.1. etc., for phosphorus and 3.3.1 etc., for potash respectively).

4.5 Nutrient Balance

42. **Table 4.1.1** summarises the calculation of the nitrogen soil surface balance, as follows:

NITROGEN INPUT (tonnes of nitrogen)	=	Fertilisers (F1) + Net Input of Manure (M11 – M21 + M22 + M23) + Other Nitrogen Inputs (D1 + B1 + C11)
NITROGEN OUTPUT (tonnes of nitrogen)	=	Total Harvested Crops (C21) + Total Forage (C22)
NITROGEN BALANCE (tonnes of nitrogen)	=	Nitrogen Outputs – Nitrogen Inputs
NITROGEN BALANCE PER HECTARE OF AGRICULTURAL LAND (kg per hectare)	=	Nitrogen Balance (tonnes of nitrogen) divided by the Total Area of Agricultural Land (hectares)

43. **Table 4.1.2** expresses the major nitrogen input and output components as respective percentages of total nitrogen inputs and outputs. This table allows a quick comparison of the relative importance of the respective nitrogen input and output components, and also helps as a check to identify potentially incorrect estimates in the balance calculation. For example, if over the past 10 years the share of cattle in total nitrogen inputs was estimated at about 50%, but the estimate for 1990 was found to be 20%, then this is likely to signify that some error in the basic data, coefficient and/or calculations may have occurred.

44. The balances for phosphorus and potash should follow the same structure as provided for the nitrogen balance in tables 4.1.1 and 4.1.2 (tables 4.2.1 for phosphorous and 4.3.1 for potash).

5. AREAS OF FUTURE WORK

45. The Secretariat welcomes any country comments on the areas of possible future work on nutrient balances outlined here, in particular covering any suggestions related to the:

- table format, conventions and harmonisation of terminology, for example the coverage of pasture, that have been used in the explanatory notes and data sheets here;
- refinements to the methodology for calculating a national soil surface nutrient balance outlined in these notes;
- possible calculation by countries of sub-national nutrient soil surface balances, so as to improve the expression of the spatial variation in national average nutrient balance calculations;
- feasibility of calculating national farm gate nutrient balance calculations.

10 UNTERLAGEN DER OECD: TABELLENBLÄTTER

COUNTRY: AUSTRIA

Table 1.1 FERTILISERS : INORGANIC AND ORGANIC PRODUCTS (Apparent Agricultural Consumption excluding livestock manure)

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
F11	**Total Inorganic Fertilisers**	**sub-total**		**256**	**214**	**226**	**219**	**210**	**209**	**204**	**189**	**185**	**181**	**181**
F111	Nitrogenous Fertilisers	OECD Compendium		165	138	146	141	136	135	132	124	124	122	122
F112	Phosphate Fertilisers	OECD Compendium		91	76	80	78	74	74	72	65	61	59	59
F113	Potassium Fertilisers													
F12	**Total Organic Products**													
F121	Sewage Sludge													
F122	Urban Compost													
F123	Industrial Waste Products													
F129	Other Products													

COUNTRY: AUSTRIA

Table 1.2 LIVESTOCK (Number of Live Animals) — 1 000 Head

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
A111EU	**Total Cattle**	**EUROSTAT**	**pc 000**									**2.334**	**2.329**	**2.323**
A111EU1	Bovine Animals <1 year	sub-total												
A111EU11	Calves for Slaughter	EUROSTAT	pc1100									71	84	64
A111EU12	Other Calves	EUROSTAT	pc1200									635	623	626
A111EU121	Male	EUROSTAT	pc1210									322	314	307
A111EU122	Female	EUROSTAT	pc1220									313	309	320
A111EU2	Bovine Animals 1-2 yrs	sub-total												
A111EU21	Male Cattle 1-2 yrs	EUROSTAT	pc2100							265	245	278	272	263
A111EU22	Female Cattle 1-2 yrs	EUROSTAT	pc2200									295	301	300
A111EU3	Bovine > 2 years	sub-total												
A111EU31	Male Cattle >2yr	EUROSTAT	pc3100							37	34	28	24	25
A111EU32	Heifers	EUROSTAT	pc3210									130	125	128
A111EU321	Breeding Heifers													
A111EU322	Heifers for Slaughter													
A111EU4	Dairy Cows	EUROSTAT	pc3221							876	842	828	810	705
A111EU9	Other Cows	EUROSTAT	pc3222							57	60	69	90	210
A112EU	**Total Pigs**	**EUROSTAT**	**pp 0000**									**3.820**	**3.729**	**3.703**
A112EU1	Piglets													
A112EU11	Pigs <20kg (Live Weight)													
A112EU12	Pigs 20 -50 kgs													
A112EU2	Fattening Pigs >50kgs	EUROSTAT	pp3000									1.355	1.323	1.308
A112EU3	Breeding Pigs >50 Kgs													
A112EU31	Boars													
A112EU32	Sows	EUROSTAT	pp4200								360	381	381	388
A112EU9	Other Pigs	EUROSTAT	pp1000 + pp2000 + pp4100								1.163	2.084	2.025	2.008
A113	**Total Sheep and Goats**	**sub-total**								**367**	**351**	**381**	**392**	**415**
A1131	Sheep and Lambs	sub-total								326	312	334	342	363
A11311	Sheep	EUROSTAT	ps0000							326	312	334	342	363
A11312	Lambs													
A1132	Goats	EUROSTAT	pg0000							**41**	**39**	**47**	**50**	**53**
A114EU	**Total Poultry**													
A114EU1	Broilers	EUROSTAT FSS												

COUNTRY: AUSTRIA

Table 1.2 LIVESTOCK (Number of Live Animals) — **1 000 Head**

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
A114EU2	Layers	EUROSTAT FSS												
A114EU3	Other Chickens													
A114EU9	Other Poultry	EUROSTAT FSS												
A114EU91	Ducks													
A114EU92	Turkeys													
A114EU99	Others													
A119	**Total Other Livestock**													
A1191	Horses													
A1192	Donkeys													
A1199	Others													

COUNTRY: AUSTRIA

Table 1.3 LIVESTOCK MANURE WITHDRAWALS FROM AGRICULTURE, MANURE STOCKS AND IMPORTS

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M21	**Total Manure Withdrawals**	**sub-total**		**0**	**0**	**0**	**0**	**0**	**4**	**10**				
M211	Destruction and Evaporation of Manure													
M212	Non-Agricultural use													
M213	Processed as industrial waste													
M214	Exported Organic Fertilisers	FAO		0	0	0	0	0	4	10				
M219	Other Withdrawals													
M22	**Change in Manure Stocks**													
M221	Beginning Stocks													
M222	Ending Stocks													
M23	**Imported Organic Fertilisers**	**FAO**		**6**	**6**	**6**	**3**	**3**	**3**	**3**				

COUNTRY: AUSTRIA

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C2	**Total Harvested Crops and Forage**													
C21	**Total Harvested Crops**													
C211	**Total Cereals**	**sub-total**		**3.248**	**3.032**	**2.864**	**3.066**	**2.913**	**3.141**	**2.998**	**4.283**	**4.154**	**4.397**	**4.323**
C2111	Wheat	EUROSTAT	c1100								1.360	1.048	1.301	1.302
C21111	Common Wheat													
C211111	Spring Wheat													
C211112	Winter Wheat													
C21112	Durum Wheat													
C21119	Other Wheat													
C2112	Rice													
C2113	Coarse Grains	sub-total		3.248	3.032	2.864	3.066	2.913	3.141	2.998	2.923	3.107	3.096	3.022
C21131	Barley	EUROSTAT	c1160	1.521	1.292	1.179	1.366	1.422	1.521	1.427	1.342	1.100	1.184	1.065
C21132	Maize	EUROSTAT	c1200	1.727	1.740	1.685	1.700	1.491	1.620	1.571	1.118	1.524	1.421	1.024
C21133	Millet	EUROSTAT	c1219											457
C21134	Oats	EUROSTAT	c1180								185	191	172	162
C21135	Rye	EUROSTAT	c1140								278	292	319	314
C21136	Sorghum													
C21139	Other Coarse Grains													
C2119	Other Cereals													
C21191	Triticale													
C21199	Others													
C212	**Total Oil Crops**	**sub-total**							**18**	**37**	**225**	**257**	**322**	**299**
C2121	Soybeans	EUROSTAT	c1470						18	37	92	125	105	31
C2122	Groundnuts													
C2123	Sunflowerseed													
C2124	Rapeseed	EUROSTAT	c1420								132	131	217	268
C2125	Cottonseed													
C2126	Olives													
C2129	Other Oil Crops													
C213	**Total Dried Pulses and Beans**													
C214	**Total Root Crops**	**sub-total**		**1.042**	**982**	**879**	**1.001**	**845**	**794**	**790**	**738**	**886**	**594**	**724**
C2141	Potatoes	EUROSTAT	c1360	1.042	982	879	1.001	845	794	790	738	886	594	724

COUNTRY: AUSTRIA

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C2142	Sweet Potatoes													
C2149	Other Root Crops													
C215	**Total Fruit**	**sub-total**						**649**	**562**	**487**	**484**	**631**	**553**	**657**
C2151	Citrus Fruit													
C2159	Other Fruit	EUROSTAT	c2009					649	562	487	484	631	553	657
C216	**Total Vegetables**	**EUROSTAT**	**c1600**						**297**	**304**	**243**	**252**	**280**	**395**
C217	**Total Industrial Crops**	**sub-total**		**2.407**	**1.571**	**2.128**	**1.934**	**2.641**	**2.494**	**2.522**	**2.605**	**2.994**	**2.561**	**2.886**
C2171	Sugar Crops	sub-total		2.407	1.571	2.128	1.934	2.641	2.494	2.522	2.605	2.994	2.561	2.886
C21711	Sugar Beet	EUROSTAT	c1370	2.407	1.571	2.128	1.934	2.641	2.494	2.522	2.605	2.994	2.561	2.886
C21712	Sugar Cane													
C2172	Fibre Crops													
C21721	Flax Straw													
C21722	Hemp Straw													
C21729	Other Fibre Crops													
C2179	Other Industrial Crops	sub-total												1
C21791	Tobacco	EUROSTAT	c1550											0
C21792	Chicory													
C21793	Hop	EUROSTAT	c1560											0
C21799	Others													
C218	**Total Ornamental Crops**													
C219	**Total Other Harvested Crops**													
C22	**Total Forage**													
C221	**Total Harvested Fodder Crops**	**sub-total**		**20.466**	**19.392**	**18.789**	**18.078**	**17.877**	**16.815**	**16.778**	**16.049**	**16.745**	**16.678**	**16.505**
C2211	Fodder Root Crops	sub-total												
C22111	Fodder Beets													
C22112	Other Fodder Roots													
C2212	Green Fodder	sub-total		20.466	19.392	18.789	18.078	17.877	16.815	16.778	16.049	16.745	16.678	16.505
C22121	Clover	EUROSTAT	c2671	6.822	6.464	6.263	6.263	6.263	6.263	6.263	6.263	6.263	6.263	6.263
C22122	Alfalfa	EUROSTAT	c2672	6.822	6.464	6.263	6.263	6.263	6.263	6.263	6.263	6.263	6.263	6.263
C22123	Silage Maize	EUROSTAT	c2625	6.822	6.464	6.263	5.552	5.351	4.289	4.252	3.523	4.219	4.152	3.979

COUNTRY: AUSTRIA

Table 1.4 HARVESTED CROPS AND FORAGE PRODUCTION

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C22129	Other Green Fodder													
C2219	Other Harvested Fodder Crops													
C222	**Total Pasture**	**sub-total**												**274**
C2221	Total Pasture Production	**sub-total**												274
C22211	Temporary Pasture Production	EUROSTAT	c2680											274
C22212	Permanent Pasture Production													
C222A	Total Pasture Area (1 000 hectare)													
C222A1	Temporary Pasture (Area 1 000 hectare)													
C222A2	Permanent Pasture (Area 1 000 hectare)	EUROSTAT	10002	1.986	1.986	1.970	1.970	1.970	1.993	1.993	1.993	1.981	1.981	1.951
C222Y1	Temporary Yield (tonnes / hectare)													
C222Y2	Permanent Yield (tonnes / hectare)													
C2222	Total Pasture Consumption													
C22221	Temporary Pasture Consumption													
C22222	Permanent Pasture Consumption													
C23	**Total Crop Residues (removed from the field)**													
C231	Head Leaves and Stems													
C232	Straws													
C239	Other Crop Residues													

COUNTRY: AUSTRIA

Table 1.5 QUANTITIES OF SEEDS AND PLANTING MATERIALS

1 000 Tonnes

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C11	**Total Seeds and Planting Materials**													
C111	**Total Cereals**	**EUROSTAT**	**b1100**										**123**	**123**
C1111	Wheat	EUROSTAT	b1110										44	44
C1112	Rice													
C1113	Coarse Grains	sub-total											68	68
C11131	Barley	EUROSTAT	b1122										46	46
C11132	Maize	EUROSTAT	b1124										9	9
C11133	Millet													
C11134	Oats													
C11135	Rye	EUROSTAT	b1121										13	13
C11136	Sorghum													
C1119	Other Cereals	dofference											11	11
C112	**Total Oil Crops**													
C1121	Soybeans													
C1122	Groundnuts													
C1123	Sunflowerseed													
C1124	Rapeseed													
C1125	Cottonseed													
C1129	Other Oil Crops													
C113	**Total Root Crops**	**sub-total**											**68**	**68**
C1131	Potatoes	EUROSTAT	b1410										68	68
C1132	Sweet Potatoes													
C1139	Other Root Crops													
C119	**Total Other Crops**													

COUNTRY: AUSTRIA

Table 1.6 AREA OF LEGUME CROPS

000 Hectares

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C12	**Total Area of Legume Crops**													
C121	Pulses	EUROSTAT	c1300								58	55	49	26
C122	Soybeans	EUROSTAT	c1470						9	15	53	54	47	14
C123	Clover													
C124	Alfalfa													
C129	Other Legume Crops													

COUNTRY: AUSTRIA

Table 1.7 TOTAL AND AGRICULTURAL LAND USE AREA

1 000 Hectares

OECD Code	Description	Source	Code Used by Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
L1	**TOTAL AREA**													
L11	**Total Land Area**													
L111	Agricultural Land													
L1111	Arable and Permanent Crop Land													
L11111	Arable Land	EUROSTAT	10001	1.430	1.418	1.420	1.440	1.441	1.406	1.426	1.417	1.401	1.402	1.403
L11112	Permanent Crops	EUROSTAT	10003	95	92	92	92	92	99	99	91	97	97	76
L1112	Permanent Pasture	EUROSTAT	10002	1.986	1.986	1.970	1.970	1.970	1.993	1.993	1.993	1.981	1.981	1.951
L112	Forest													
L119	Other Land													
L2	**OTHER LAND USE CATEGORIES**													
L21	Irrigated Agricultural Area	FAO		4	4	4	4	4	4	4	4	4	4	4

COUNTRY: AUSTRIA

Table 2.1 FERTILISER NUTRIENT CONVERSION COEFFICIENTS

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
F11	**Total Inorganic Fertilisers**					
F111	Nitrogenous Fertilisers			1000	--	--
F112	Phosphate Fertilisers			--		--
F113	Potassium Fertilisers			--	--	
F12	**Total Organic Products**					
F121	Sewage Sludge					
F122	Urban Compost					
F123	Industrial Waste Products					
F124	Imported Organic Fertilisers					
F129	Other Products					
Notes:						
-- : Not applicable						

COUNTRY: AUSTRIA

Table 2.2	COEFFICIENTS TO CONVERT LIVESTOCK NUMBERS INTO MANURE NUTRIENT QUANTITY AND COMPOSITION					Kilograms / Head/ Year
OECD Code	Description	Source	Code Used by Source	N	P	K
M111EU	**Total Cattle**					
M111EU1	Bovine Animals <1 year					
M111EU11	Calves for Slaughter	EUROSTAT	Germany	33,00		
M111EU12	Other Calves					
M111EU121	Male	EUROSTAT	Germany	33,00		
M111EU122	Female	EUROSTAT	Germany	30,00		
M111EU2	Bovine Animals 1-2 yrs					
M111EU21	Male Cattle 1-2 yrs	EUROSTAT	Germany	45,00		
M111EU22	Female Cattle 1-2 yrs	EUROSTAT	Germany	50,00		
M111EU3	Bovine > 2 years					
M111EU31	Male Cattle >2yr	EUROSTAT	Germany	50,00		
M111EU32	Heifers	EUROSTAT	Germany	50,00		
M111EU321	Breeding Heifers					
M111EU322	Heifers for Slaughter					
M111EU4	Dairy Cows	EUROSTAT	Germany	94,50		
M111EU9	Other Cows	EUROSTAT	Germany	70,00		
M112EU	**Total Pigs**					
M112EU1	Piglets					
M112EU11	Pigs <20kg (Live Weight)					
M112EU12	Pigs 20 -50 kgs					
M112EU2	Fattening Pigs >50kgs	EUROSTAT	Germany	12,80		
M112EU3	Breeding Pigs >50 Kgs					
M112EU31	Boars					
M112EU32	Sows	EUROSTAT	Germany	33,00		
M112EU9	Other Pigs	EUROSTAT	Germany	12,80		
M113	**Total Sheep and goats**					
M1131	Sheep and Lambs					
M11311	Sheep	EUROSTAT	Germany	13,00		
M11312	Lambs					
M1132	Goats	EUROSTAT	Germany	13,00		
M114EU	**Total Poultry**					
M114EU1	Broilers	EUROSTAT	Germany	0,27		
M114EU2	Layers	EUROSTAT	Germany	0,86		

COUNTRY: AUSTRIA

Table 2.2	COEFFICIENTS TO CONVERT LIVESTOCK NUMBERS INTO MANURE NUTRIENT QUANTITY AND COMPOSITION					Kilograms / Head/ Year
OECD Code	**Description**	**Source**	**Code Used by Source**	**N**	**P**	**K**
M114EU3	Other Chicken					
M114EU9	Other Poultry	EUROSTAT	Germany	1,52		
M114EU91	Ducks					
M114EU92	Turkeys					
M114EU99	Others					
M119	**Total Other Livestock**					
M1191	Horses	OECD	Belgium	87,15		
M1192	Donkeys					
M1199	Others					

COUNTRY: AUSTRIA

Table 2.3 COEFFICIENTS TO CONVERT LIVESTOCK MANURE WITHDRAWN FROM AGRICULTURE, MANURE STOCKS AND IMPORTS INTO NUTRIENT QUANTITY AND COMPOSITION

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
M21	**Total Manure Withdrawals**					
M211	Destruction and Evaporation of Manure					
M212	Non-agricultural use					
M213	Processed as industrial waste					
M214	Exported Organic Fertilisers					
M219	Other Withdrawals					
M22	**Change in Manure Stocks**					
M221	Beginning Stocks					
M222	Ending Stocks					
M23	**Imported Organic Fertilisers**					

COUNTRY: AUSTRIA

Table 2.4 COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
C2	**Total Harvested Crops and Forage**					
C21	**Total Harvested Crops**					
C211	**Total Cereals**					
C2111	Wheat	EUROSTAT	Germany	22,00		
C21111	Common Wheat	EUROSTAT	Germany	22,00		
C211111	Spring Wheat					
C211112	Winter Wheat					
C21112	Durum Wheat	EUROSTAT	Germany	26,00		
C21119	Other Wheat					
C2112	Rice					
C2113	Coarse Grains					
C21131	Barley	EUROSTAT	Germany	21,00		
C21132	Maize	EUROSTAT	Germany	29,00		
C21133	Millet	EUROSTAT	Germany	19,00		
C21134	Oats	EUROSTAT	Germany	20,00		
C21135	Rye	EUROSTAT	Germany	20,00		
C21136	Sorghum					
C21139	Other Coarse Grains					
C2119	Other Cereals					
C21191	Triticale					
C21199	Others	EUROSTAT	Germany	20,00		
C212	**Total Oil Crops**					
C2121	Soybeans					
C2122	Groundnuts					
C2123	Sunflowerseed	EUROSTAT	Germany	55,00		
C2124	Rapeseed	EUROSTAT	Germany	44,00		
C2125	Cottonseed	EUROSTAT	Germany	5,00		
C2126	Olives					
C2129	Other Oil Crops					
C213	**Total Dried Pulses and Beans**	**OECD**	**Belgium**	**33,00**		
C214	**Total Root Crops**					

COUNTRY: AUSTRIA

Table 2.4 COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
C2141	Potatoes	EUROSTAT	Germany	3,50		
C2142	Sweet Potatoes					
C2149	Other Root Crops					
C215	**Total Fruit**					
C2151	Citrus Fruit	OECD	Belgium	0,70		
C2159	Other Fruit	OECD	Belgium	0,70		
C216	**Total Vegetables**	**OECD**	**Belgium**	**3,00**		
C217	**Total Industrial Crops**					
C2171	Sugar Crops					
C21711	Sugar Beet	EUROSTAT	Germany	4,60		
C21712	Sugar Cane					
C2172	Fibre Crops					
C21721	Flax Straw	OECD	Belgium	5,00		
C21722	Hemp Straw					
C21729	Other Fibre Crops					
C2179	Other Industrial Crops					
C21791	Tobacco					
C21792	Chicory	OECD	Belgium	2,20		
C21793	Hop	OECD	Belgium	32,00		
C21794	Tea					
C21799	Others					
C218	**Total Ornamental Crops**					
C219	**Total Other Harvested Crops**					
C22	**Total Forage**					
C221	**Total Harvested Fodder Crops**					
C2211	Fodder Root Crops					
C22111	Fodder Beets	EUROSTAT	Germany	1,90		
C22112	Other Fodder Roots	EUROSTAT	Germany	1,60		
C2212	Green Fodder					
C22121	Clover	EUROSTAT	Germany	17,00		

COUNTRY: AUSTRIA

Table 2.4 COEFFICIENTS TO CONVERT CROP AND FORAGE PRODUCTION INTO NUTRIENT UPTAKE AND COMPOSITION

Kilograms / Tonne

OECD Code	Description	Source	Code Used by Source	N	P	K
C22122	Alfalfa	EUROSTAT	Germany	5,80		
C22123	Silage Maize	EUROSTAT	Germany	3,00		
C22129	Other Green Fodder	EUROSTAT	Germany	3,00		
C2219	Other Harvested Fodder Crops					
C222	**Total Pasture**					
C2221	Total Pasture Production					
C22211	Temporary Grassland Production	OECD	Belgium	32,00		
C22212	Permanent Grassland Production	OECD	Belgium	32,00		
C2222	Total Pasture Consumption					
C22221	Temporary Grassland Consumption					
C22222	Permanent Grassland Consumption					
C23	**Total Crop Residues (removed from the field)**					
C231	**Head Leaves and Stems**					
C232	**Straws**					
C239	**Other Crop Residues**					

COUNTRY: AUSTRIA

Table 2.5 COEFFICIENTS TO CONVERT QUANTITIES OF SEEDS AND PLANTING MATERIALS INTO NUTRIENT UPTAKE AND COMPOSITION						Kilograms / Tonne
OECD Code	**Description**	**Source**	**Code Used by Source**	**N**	**P**	**K**
C11	**Total Seeds and Planting Materials**					
C111	**Total Cereals**					
C1111	Wheat	OECD	Belgium	18,00		
C1112	Rice	OECD	Belgium	18,00		
C1113	Coarse Grains					
C11131	Barley	OECD	Belgium	18,00		
C11132	Maize	OECD	Belgium	13,90		
C11133	Millet					
C11134	Oats					
C11135	Rye	OECD	Belgium	18,00		
C11136	Sorghum					
C1119	Other Cereals					
C112	**Total Oil Crops**					
C1121	Soybeans					
C1122	Groundnuts					
C1123	Sunflowerseed					
C1124	Rapeseed	OECD	Belgium	18,00		
C1125	Cottonseed					
C1129	Other Oil Crops					
C113	**Total Root Crops**					
C1131	Potatoes	OECD	Belgium	3,20		
C1132	Sweet Potatoes					
C1139	Other Root Crops					
C119	**Total Other Crops**					

COUNTRY: AUSTRIA

Table 2.6	COEFFICIENTS TO CALCULATE BIOLOGICAL NITROGEN			Kilograms / Hectare
OECD Code	Description	Source	Code Used by Source	N
B1	**Biological Nitrogen Fixation**			
B11	**Leguminous Crops**			
B111	Pulses	OECD	Belgium	125,00
B112	Soybeans			
B113	Clover	OECD	Belgium	125,00
B114	Alfalfa	OECD	Belgium	250,00
B119	Other Legume Crops			
B12	**Free Living Organisms**			
B121	Arable Land	OECD	Belgium	4,00
B122	Permanent Crops	OECD	Belgium	4,00
B123	Permanent pasture	OECD	Belgium	4,00

COUNTRY: AUSTRIA

Table 2.7 COEFFICIENTS TO CALCULATE ATMOSPHERIC DEPOSITION OF NUTRIENT QUANTITY AND COMPOSITION ON AGRICULTURAL					Kilograms / Hectare		
OECD	**Description**		**Source**	**Code Used by Source**	**N**	**P**	**K**
D1	**Agricultural Land**						
D11	Arable and Permanent Crop Land						
D111		Arable Land	OECD	Belgium	33,10		
D112		Permanent Crops	OECD	Belgium	33,10		
D12	Permanent Pasture		OECD	Belgium	33,10		

COUNTRY: AUSTRIA

Table 3.1.1 FERTILISERS : NITROGEN CONTENT OF INORGANIC AND ORGANIC PRODUCTS (excluding livestock manure)

Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
F1	**Total Fertilisers**											
F11	**Total Inorganic Fertilisers**											
F111	Nitrogenous Fertilisers	165.070	137.770	146.320	140.880	135.590	135.000	132.000	124.000	124.000	122.000	122.000
F112	Phosphate Fertilisers											
F113	Potassium Fertilisers											
F12	**Total Organic Products**											
F121	Sewage Sludge											
F122	Urban Compost											
F123	Industrial Waste Products											
F124	Imported Organic Fertilisers											
F124	Other Products											

COUNTRY: AUSTRIA

Table 3.1.2 NITROGEN CONTENT OF LIVESTOCK MANURE PRODUCTION — Tonnes

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M11	**Livestock Manure Production**											
M111EU	**Total Cattle**							**100.547**	**96.523**	**140.595**	**139.989**	**137.697**
M111EU1	Bovine Animals <1 year									22.359	22.404	21.836
M111EU11	Calves for Slaughter									2.343	2.772	2.128
M111EU12	Other Calves									20.016	19.632	19.708
M111EU121	Male									10.626	10.362	10.122
M111EU122	Female									9.390	9.270	9.586
M111EU2	Bovine Animals 1-2 yrs							11.925	11.030	27.260	27.290	26.844
M111EU21	Male Cattle 1-2 yrs							11.925	11.030	12.510	12.240	11.836
M111EU22	Female Cattle 1-2 yrs									14.750	15.050	15.008
M111EU3	Bovine > 2 years							1.850	1.724	7.900	7.450	7.690
M111EU31	Male Cattle >2yr							1.850	1.724	1.400	1.200	1.270
M111EU32	Heifers									6.500	6.250	6.420
M111EU321	Breeding Heifers											
M111EU322	Heifers for Slaughter											
M111EU4	Dairy Cows							82.782	79.569	78.246	76.545	66.615
M111EU9	Other Cows							3.990	4.200	4.830	6.300	14.713
M112EU	**Total Pigs**								**26.774**	**56.592**	**55.427**	**55.236**
M112EU1	Piglets											
M112EU11	Pigs <20kg (Live Weight)											
M112EU12	Pigs 20 -50 kgs											
M112EU2	Fattening Pigs >50kgs									17.344	16.934	16.739
M112EU3	Breeding Pigs >50 Kgs								11.885	12.573	12.573	12.800
M112EU31	Boars											
M112EU32	Sows								11.885	12.573	12.573	12.800
M112EU9	Other Pigs								14.889	26.675	25.920	25.697
M113	**Total Sheep and Goats**							**4.771**	**4.563**	**4.953**	**5.096**	**5.399**
M1131	Sheep and Lambs							4.238	4.056	4.342	4.446	4.716
M11311	Sheep							4.238	4.056	4.342	4.446	4.716
M11312	Lambs											
M1132	Goats							533	507	611	650	683
M114EU	**Total Poultry**											

COUNTRY: AUSTRIA

Table 3.1.2 NITROGEN CONTENT OF LIVESTOCK MANURE PRODUCTION **Tonnes**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
M114EU1	Broilers											
M114EU2	Layers											
M114EU3	Other Chickens											
M114EU9	Other Poultry											
M114EU91	Ducks											
M114EU92	Turkeys											
M114EU99	Others											
M119	**Total Other Livestock**											
M1191	Horses											
M1192	Donkeys											
M1199	Others											

COUNTRY: AUSTRIA

Table 3.1.3 NITROGEN CONTENT OF LIVESTOCK MANURE WITHDRAWN FROM AGRICULTURE, MANURE STOCKS AND IMPORTS												Tonnes
OECD Code	**Description**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
M21	**Total Manure Withdrawals**											
M211	Destruction and Evaporation of Manure											
M212	Non Agricultural use											
M213	Processed as industrial waste											
M214	Exported Organic Fertilisers											
M219	Other Withdrawal											
M22	**Change in Manure Stocks**											
M221	Beginning Stocks											
M222	Ending Stocks											
M23	**Imported Organic Fertilisers**											

COUNTRY: AUSTRIA

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE — **Tonnes**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C2	**Total Harvested Crops and Forage**											
C21	**Total Harvested Crops**											
C211	**Total Cereals**	**82.024**	**77.592**	**73.624**	**77.986**	**73.101**	**78.928**	**75.536**	**99.787**	**100.003**	**104.512**	**98.888**
C2111	Wheat								29.918	23.049	28.632	28.635
C21111	Common Wheat											
C211111	Spring Wheat											
C211112	Winter Wheat											
C21112	Durum Wheat											
C21119	Other Wheat											
C2112	Rice											
C2113	Coarse Grains	82.024	77.592	73.624	77.986	73.101	78.928	75.536	69.870	76.954	75.880	70.252
C21131	Barley	31.941	27.132	24.759	28.686	29.862	31.941	29.967	28.185	23.093	24.871	22.369
C21132	Maize	50.083	50.460	48.865	49.300	43.239	46.987	45.569	32.427	44.210	41.199	29.690
C21133	Millet											8.685
C21134	Oats								3.701	3.818	3.434	3.232
C21135	Rye								5.557	5.833	6.376	6.276
C21136	Sorghum											
C21139	Other Coarse Grains											
C2119	Other Cereals											
C21191	Triticale											
C21199	Others											
C212	**Total Oil Crops**								**5.823**	**5.782**	**9.551**	**11.774**
C2121	Soybeans											
C2122	Groundnuts											
C2123	Sunflowerseed											
C2124	Rapeseed								5.823	5.782	9.551	11.774
C2125	Cottonseed											
C2126	Olives											
C2129	Other Oil Crops											
C213	**Total Dried Pulses and Beans**											
C214	**Total Root Crops**	**3.647**	**3.437**	**3.077**	**3.504**	**2.958**	**2.777**	**2.765**	**2.584**	**3.100**	**2.078**	**2.535**
C2141	Potatoes	3.647	3.437	3.077	3.504	2.958	2.777	2.765	2.584	3.100	2.078	2.535

COUNTRY: AUSTRIA

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE												Tonnes
OECD Code	**Description**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
C2142	Sweet Potatoes											
C2149	Other Root Crops											
C215	**Total Fruit**					**455**	**393**	**341**	**339**	**441**	**387**	**460**
C2151	Citrus Fruit											
C2159	Other Fruit					455	393	341	339	441	387	460
C216	**Total Vegetables**						**892**	**912**	**728**	**755**	**841**	**1.185**
C217	**Total Industrial Crops**	**11.072**	**7.227**	**9.789**	**8.896**	**12.149**	**11.474**	**11.599**	**11.985**	**13.772**	**11.779**	**13.284**
C2171	Sugar Crops	11.072	7.227	9.789	8.896	12.149	11.474	11.599	11.985	13.772	11.779	13.275
C21711	Sugar Beet	11.072	7.227	9.789	8.896	12.149	11.474	11.599	11.985	13.772	11.779	13.275
C21712	Sugar Cane											
C2172	Fibre Crops											
C21721	Flax Straw											
C21722	Hemp Straw											
C21729	Other Fibre Crops											
C2179	Other Industrial Crops											10
C21791	Tobacco											
C21799	Others											
C218	**Total Ornamental Crops**											
C219	**Total Other Harvested Crops**											
C22	**Total Forage**											
C221	**Total Harvested Fodder Crops**	**176.008**	**166.771**	**161.585**	**159.452**	**158.849**	**155.664**	**155.552**	**153.367**	**155.455**	**155.251**	**154.732**
C2211	Fodder Root Crops											
C22111	Fodder Beets											
C22112	Other Fodder Roots											
C2212	Green Fodder	176.008	166.771	161.585	159.452	158.849	155.664	155.552	153.367	155.455	155.251	154.732
C22121	Clover	115.974	109.888	106.471	106.471	106.471	106.471	106.471	106.471	106.471	106.471	106.471
C22122	Alfalfa	39.568	37.491	36.325	36.325	36.325	36.325	36.325	36.325	36.325	36.325	36.325
C22123	Silage Maize	20.466	19.392	18.789	16.656	16.053	12.868	12.756	10.570	12.658	12.455	11.936
C22129	Other Green Fodder											
C2219	Other Harvested Fodder Crops											

COUNTRY: AUSTRIA

Table 3.1.4 NITROGEN UPTAKE BY CROPS AND FORAGE												Tonnes
OECD Code	**Description**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
C222	**Total Pasture**											**8.778**
C2221	Total Pasture Production											
C22211	Temporary Grassland Production											8.778
C22212	Permanent Grassland Production											
C2222	Total Pasture Consumption											
C22221	Temporary Grassland Consumption											
C22222	Permanent Grassland Consumption											
C23	**Total Crop Residues (removed from the field**											
C231	**Head Leaves and Stems**											
C232	**Straws**											
C239	**Other Crop Residues**											

COUNTRY: AUSTRIA

Table 3.1.5 NITROGEN CONTENT OF SEEDS AND PLANTING MATERIALS												Tonnes
OECD Code	**Description**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
C11	**Total Seeds and Planting Materials**										**2.197**	**2.197**
C111	**Total Cereals**										**1.979**	**1.979**
C1111	Wheat										792	792
C1112	Rice											
C1113	Coarse Grains										1.187	1.187
C11131	Barley										828	828
C11132	Maize										125	125
C11133	Millet											
C11134	Oats											
C11135	Rye										234	234
C11136	Sorghum											
C1119	Other Cereals											
C112	**Total Oil Crops**											
C1121	Soybeans											
C1122	Groundnuts											
C1123	Sunflowerseed											
C1124	Rapeseed											
C1125	Cottonseed											
C1129	Other Oil Crops											
C113	**Total Root Crops**										**218**	**218**
C1131	Potatoes										218	218
C1132	Sweet Potatoes											
C1139	Other Root Crops											
C119	**Total Other Crops**											

COUNTRY: AUSTRIA

Table 3.1.6 NITROGEN INPUT FROM BIOLOGICAL NITROGEN FIXATION **Tonnes**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
B1	**BIOLOGICAL NITROGEN FIXATI**	**14.044**	**13.984**	**13.928**	**14.008**	**14.012**	**13.992**	**14.072**	**21.219**	**20.750**	**20.034**	**17.021**
B11	**Total Area Legume Crops**								**7.215**	**6.834**	**6.115**	**3.303**
B111	Pulses								7.215	6.834	6.115	3.303
B112	Soybeans											
B113	Clover											
B114	Alfalfa											
B119	Other Legume Crops											
B12	**Free Living Organisms**	**14.044**	**13.984**	**13.928**	**14.008**	**14.012**	**13.992**	**14.072**	**14.004**	**13.916**	**13.919**	**13.718**
B121	Arable Land	5.720	5.672	5.680	5.760	5.764	5.624	5.704	5.668	5.604	5.607	5.610
B122	Permanent Crops	380	368	368	368	368	396	396	364	388	388	303
B123	Permanent pasture	7.944	7.944	7.880	7.880	7.880	7.972	7.972	7.972	7.924	7.924	7.805

COUNTRY: AUSTRIA

Table 3.1.7 NITROGEN ATMOSPHERIC DEPOSITION ON AGRICULTURAL LAND												Tonnes
OECD Code	**Description**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
D1	**Total Atmospheric Deposition on Agricultural Land**	**116.214**	**115.718**	**115.254**	**115.916**	**115.949**	**115.784**	**116.446**	**115.883**	**115.155**	**115.178**	**113.520**
D11	Arable and Permanent Crop Land	50.478	49.981	50.047	50.709	50.742	49.816	50.478	49.915	49.584	49.607	48.932
D111	Arable Land	47.333	46.936	47.002	47.664	47.697	46.539	47.201	46.903	46.373	46.396	46.425
D112	Permanent Crops	3.145	3.045	3.045	3.045	3.045	3.277	3.277	3.012	3.211	3.211	2.507
D12	Permanent Pasture	65.737	65.737	65.207	65.207	65.207	65.968	65.968	65.968	65.571	65.571	64.589

COUNTRY: AUSTRIA

Table 4.1.1 NITROGEN BALANCE [1] [2] — **Tonnes of Nitrogen**

OECD Code	Description	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	NITROGEN INPUTS											
F1	Fertilisers											
F11	Inorganic Fertilisers	165.070	137.770	146.320	140.880	135.590	135.000	132.000	124.000	124.000	122.000	122.000
F12	Organic Products											
	Net Input of Manure (M11-M21+M22+M23)											
M11	Livestock Manure Production							105.318	127.860	202.140	200.512	198.332
M111	Cattle							100.547	96.523	140.595	139.989	137.697
M112	Pigs								26.774	56.592	55.427	55.236
M113	Sheep and Goats							4.771	4.563	4.953	5.096	5.399
M114	Poultry											
M115	Other Livestock											
M21	Withdrawals											
M22	Change in Manure Stocks											
M23	Manure Imports											
	Other Nitrogen Inputs	130.258	129.702	129.182	129.924	129.961	129.776	130.518	137.102	135.905	137.408	132.738
D1	Atmospheric Deposition	116.214	115.718	115.254	115.916	115.949	115.784	116.446	115.883	115.155	115.178	113.520
B1	Biological Nitrogen Fixation	14.044	13.984	13.928	14.008	14.012	13.992	14.072	21.219	20.750	20.034	17.021
C11	Seeds and Planting Material										2.197	2.197
	NITROGEN OUTPUTS									**279.308**	**284.398**	
C21	Total Harvested Crops	96.743	88.256	86.489	90.386	88.662	94.465	91.154	121.247	123.853	129.147	128.126
C211	Cereals	82.024	77.592	73.624	77.986	73.101	78.928	75.536	99.787	100.003	104.512	98.888
C212	Oilcrops								5.823	5.782	9.551	11.774
C213	Pulses and Beans											
C217	Industrial Crops	11.072	7.227	9.789	8.896	12.149	11.474	11.599	11.985	13.772	11.779	13.284
	Other Crops [3]	3.647	3.437	3.077	3.504	3.412	4.063	4.018	3.651	4.297	3.305	4.180
C22	Total Forage	176.008	166.771	161.585	159.452	158.849	155.664	155.552	153.367	155.455	155.251	154.732
C221	Harvested Fodder Crops	176.008	166.771	161.585	159.452	158.849	155.664	155.552	153.367	155.455	155.251	154.732
C222	Pasture											8.778
	BALANCE (Inputs minus Outputs)										**-284.398**	
	Nitrogen Balance in Kilograms per Hectare of Total Agricultural Land (4)											

Notes:

1. Sub-totals may not add to totals due to rounding errors.
2. Balances for 1985-95 are not calculated due to significant lock of data
3. C214+C215+C216+C218+C219
4. Balance per hectare calculated from unrounded data and using total agricultural land category L111 shown in Table 1.7.