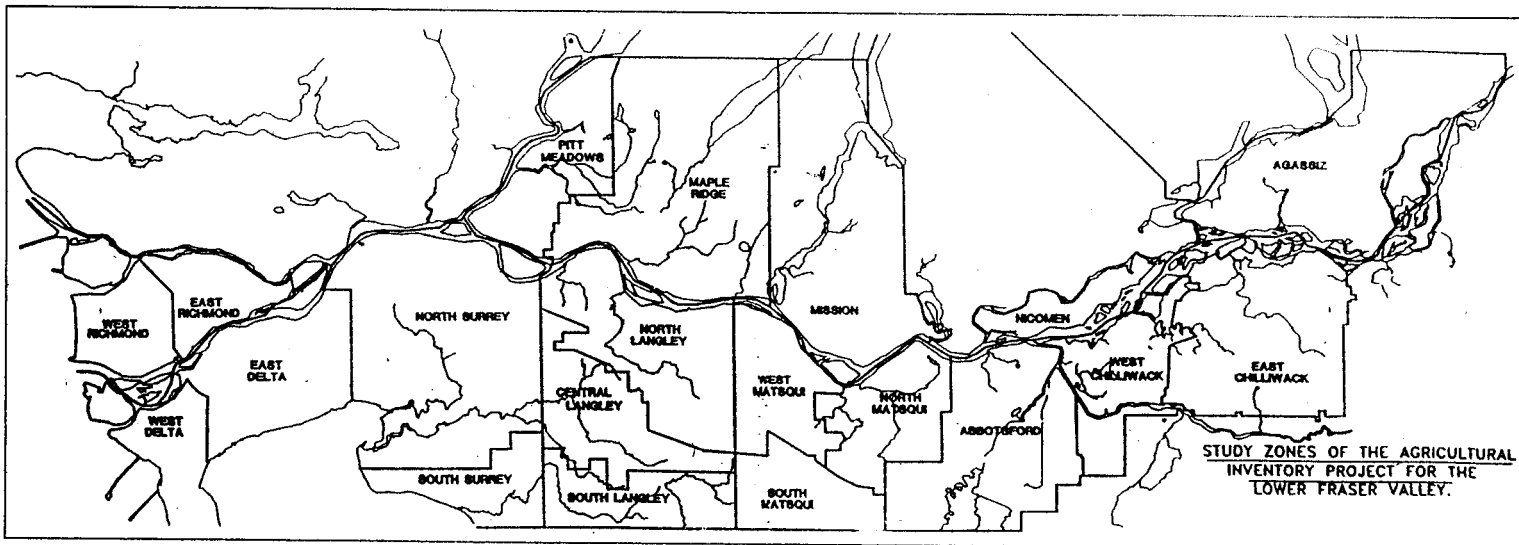


APPLICATION of INORGANIC FERTILIZERS in the LOWER FRASER VALLEY

DATA SUMMARY REPORT



Component Project
of
Management of Livestock and Poultry Manures in the Lower Fraser Valley

REPORT 2

DOE FRAP 1995 - 31



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DU FRASER



Ministry of Environment,
Lands and Parks



Ministry of Agriculture,
Fisheries and Food

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in the
LOWER FRASER VALLEY**

DATA SUMMARY REPORT

Prepared for

**BC Ministry of
Environment, Lands and Parks**

**Environment Canada
Fraser River Action Plan**

**BC Ministry of
Agriculture, Fisheries and Food**

**Fisheries and Oceans
Fraser River Action Plan**

December 1995

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Disclaimer

This report contains the results of a project conducted under contract. The ideas and opinions expressed herein do not necessarily state or reflect those of the participating parties.

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1.0 INTRODUCTION

The objective of this project was to estimate of the use of inorganic fertilizers within different geographic zones of the Lower Fraser Valley. Figure 1 shows the boundaries of the twenty Agricultural Waste Management Zones (AWMZs) which were considered in this study.

This study addressed only the major plant nutrients; nitrogen (N), phosphorus (P) and potassium (K).

1991 Census of Agriculture information on land areas to which manure and fertilizers were applied, total expenditures on fertilizer and lime, and area farmed by crop was tabulated and summarized for each of the AWMZs.

Data on retail fertilizer sales within Southern BC (which excludes the Peace River area) was obtained from the Western Canada Fertilizer Association and summarized.

Estimates of the average N, P and K application for a variety of crops was solicited from a number of knowledgeable people within the agricultural industry and a concensus N, P and K application by crop was developed.

The concensus N, P and K application was applied to the area of each crop to generate an estimate of the total mass of inorganic fertilizer which was applied in each AWMZ. An estimate of 1991 unit costs for the major nutrients were then used to estimate the total expenditures on N, P and K in each AWMZ.

The total expenditure on fertilizer and lime as reported in the 1991 Census of Agriculture was discounted to reflect expenditures on nutrients other than nitrogen, phosphorus and potassium, expenditures on lime and expendiures on delivery and application. This provided a second estimate of the expenditures on N,P and K within the Fraser Valley.

These two estimates of expenditures on N,P and K were then compared.

2.0 CENSUS OF AGRICULTURE DATA

Selected data from the 1991 Census of Agriculture was obtained from Statistics Canada. The data was subdivided geographically into twenty AWMZs within the Lower Fraser Valley and further subdivided by three farm categories.

The approximate boundaries of the AWMZs are shown on Figure 1.

Within each AWMZ data were first divided into large and small farm categories; large farms being those with annual gross farm receipts of \$40,000 or greater and small farms being those with annual gross farm receipts of less than \$40,000.

The data for large farms were further divided into livestock and non-livestock categories. Livestock farms were defined as large farms which met one of the following conditions:

* total hens and chickens	150	or more
* turkeys	150	or more
* other poultry	150	or more
* total cattle and calves	6	or more
* total sheep and lambs	10	or more
* total pigs	10	or more
* total horses and ponies	6	or more
* total goats	10	or more
* total rabbits	20	or more
* total mink	20	or more

The Census of Agriculture data which is pertinent to this study is presented in Appendix A. Table A-1 summarizes data on areas to which fertilizer and manure were applied, total farm expenditures and expenditures on fertilizer and lime. Table A-2 summarizes farmed area by crop. Data is presented for each of the twenty AWMZs as well as totals for all Zones.

3.0 INDUSTRY DATA

The Western Canada Fertilizer Association provided information from their retail sales surveys for the fertilizer years 1983 to 1993 inclusive (a fertilizer year ends June 30).

The reported retail sales, in tonnes, are presented in Table B-1 of Appendix B.

Reported sales are for all of British Columbia except the Peace River area and include all sales, sales for both agricultural and non-agricultural use.

4.0 ESTIMATED FERTILIZER APPLICATION BY CROP

Estimates of the annual application of inorganic fertilizer, by crop, were obtained from government personnel and fertilizer industry representatives familiar with crop production and fertilization within the Fraser Valley. The list of contacts is presented in Table C-1 (Appendix C).

Table C-2 summarizes the estimated fertilizer application rates, by crop, which were provided, as well as the "concensus" rates which, with the exception of vegetables, were used in subsequent calculations in this study.

In the case of vegetables, the concensus application rates were prorated by the area of production of each vegetable within the four Regional Districts of the Fraser Valley. Table C-3 presents the areas of vegetable production and the resultant estimates of fertilizer application for each of the four regional districts.

The unit fertilizer application rates, by crop and by zone, which were used to generate fertilizer usage within each AWMZ are presented in Table C-4

5.0 ESTIMATED FERTILIZER APPLICATION BY ZONE

The unit fertilizer application rates of Table C-4 were applied to the cropped areas of Table A-2 to generate estimates of the total mass of fertilizer applications within each zone and by each crop. This information appears in Table D-1 of Appendix D.

Estimated 1991 unit fertilizer costs, derived from information obtained from industry representatives and summarized in Table D-2, were then applied to the estimated amounts of Table D-1 to provide one estimate of the value of applied fertilizer within each AWMZ. The resultant estimate of fertilizer (N, P and K) expenditures appears in Table D-4.

A second estimate of the value of applied fertilizer for each zone was made using the value of "fertilizers and lime" as reported in the 1991 Census of Agriculture less an allowance to reflect the value of nutrients other than nitrogen, phosphorus and potassium, the value of lime and the costs of delivery and application.

Table D-3 summarizes the estimates of the proportion of total fertilizer and lime expenditures which would be for nitrogen, phosphorus and potassium.

The results of this second estimate of the value of fertilizer applications and a comparison with the first estimate are contained in Table D-4. The comparison is presented as a ratio of the two expenditure estimates; estimate based on unit application rates : estimate based on reported expenditures.

6.0 SUMMARY

The two estimates of expenditures for the entire Lower Fraser Valley are quite close, with a ratio of 0.97 for all farms and a ratio of 0.94 for large farms. However there is considerable variation in the ratios when between Agricultural Waste Management Zones (AWMZs) and categories. This wide variation indicates that the estimated inorganic fertilizer applications as presented in Appendix D should only be used as very rough approximations only.

An effort was made to correlate the fertilizer expenditure ratios with other livestock and cropping characteristics (for example the ratio of livestock mass to cropped area vs. the estimated expenditure ratio) with no success.

The consensus estimates of fertilizer application rates by crop, as presented in Table 1, will be used in subsequent nutrient modelling.

FIGURE 1 AGRICULTURAL WASTE MANAGEMENT ZONES

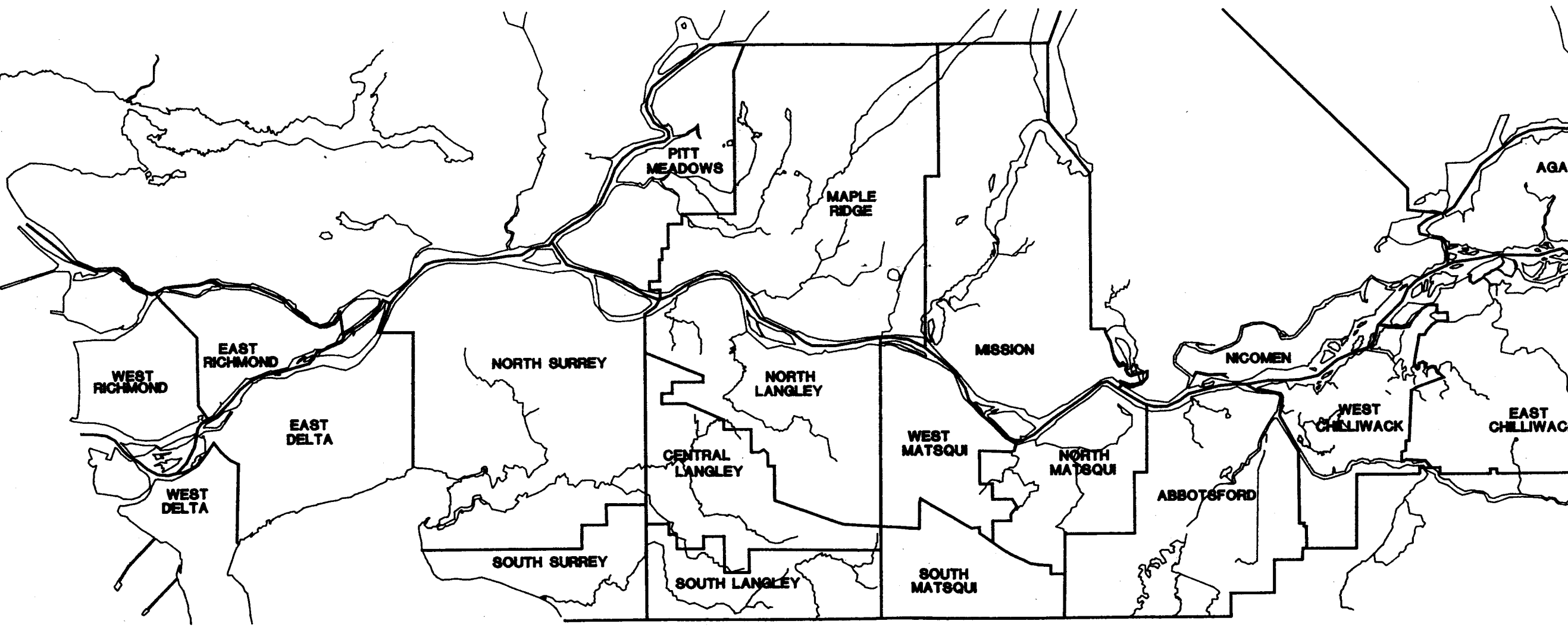


Table 1

ESTIMATED 1991 INORGANIC FERTILIZER APPLICATION RATES

Crop	inorganic fertilizer applications (kg/ha/yr)			inorganic fertilizer applications (kg/ha/yr)			
	N	P2O5	K2O	N	P	K	
Grass Hay	240	55	70	240	24	58	
Improved Pasture	120	28	35	120	12	29	
Unimproved Pasture	0	0	0	0	0	0	
Silage corn	140	95	105	140	42	87	
Grain	180	80	115	180	35	95	
Vegetables							
	potatoes	90	195	195	90	85	162
	peas	20	85	100	20	37	83
	corn	130	110	110	130	48	91
	beans	45	90	90	45	39	75
	cole crops	200	110	115	200	48	95
	other	100	150	170	100	66	141
Berries							
	raspberries	75	95	125	75	42	104
	strawberries	75	105	120	75	46	100
	blueberries	70	125	95	70	55	79
	other	15	20	15	15	9	12
Other field crops	132	102	111	132	45	92	
Tree Fruits	75	95	125	75	42	104	
Nursery Crops	60	50	30	60	22	25	
Sod	70	70	80	70	31	66	
Summerfallow	0	0	0	0	0	0	
Catch crops	0	0	0	0	0	0	

APPENDIX A

CENSUS OF AGRICULTURE DATA

Table A-1 Fertilizer Applications and Expenditures

Table A-2 Land Use and Cropping

Table A-1

FERTILIZER APPLICATIONS AND EXPENDITURES (1991 Census of Agriculture)

ZONE	Farm Category	Manure - hectares		Fertilizers (ha)	Fertilizers (ha) / Cropped + Imp Past. (ha)		Total crop expenses - amount (\$)	Fertilizer and Lime - amount (\$)		Agricultural chemicals - amount (\$)	Fertilizer & lime (\$) / Cropped (ha)		Agric. chemicals (\$) / Cropped (ha)	Fertilizer & lime (\$) / Total crop exp. (\$)		Agric. chemicals (\$) / Total crop exp. (\$)
		Manure (ha) / Cropped + Imp Pasture (ha)	Manure (ha) / Cropped (ha)		Fertilizers (ha) / Cropped (ha)	Fertilizers (ha) / Cropped (ha)		Fertilizer and Lime - amount (\$)	Fertilizer & lime (\$) / Cropped (ha)		Fertilizer & lime (\$) / Total crop exp. (\$)					
South Langley	total	1009	0.47	0.78	547	0.25	0.42	1361235	433624	237220	335	183	0.32	0.17		
	small	441	0.36	0.66	212	0.17	0.32	124250	55979	15401	84	23	0.45	0.12		
	large	568	0.60	0.91	335	0.36	0.54	1236985	377645	221819	603	354	0.31	0.18		
	non-livestock	66	0.56	0.56	108	0.92	0.92	1142762	328849	208084	2811	1778	0.29	0.18		
	livestock	502	0.61	0.98	228	0.28	0.45	94223	48796	13735	96	27	0.52	0.15		
North Langley	total	1849	0.56	0.84	2000	0.60	0.91	3672759	2001326	591437	907	268	0.54	0.16		
	small	617	0.45	0.89	562	0.41	0.81	198253	108839	17545	156	25	0.55	0.09		
	large	1232	0.63	0.82	1439	0.74	0.95	3474506	1892487	573892	1254	380	0.54	0.17		
	non-livestock	160	0.30	0.34	469	0.88	0.99	3115359	1716478	535458	3637	1134	0.55	0.17		
	livestock	1072	0.76	1.03	970	0.68	0.94	359147	176009	38434	170	37	0.49	0.11		
Central Langley	total	1311	0.56	0.84	964	0.41	0.62	1509237	602681	252961	385	162	0.40	0.17		
	small	489	0.43	0.82	277	0.25	0.46	108773	58806	15402	99	26	0.54	0.14		
	large	822	0.68	0.85	687	0.57	0.71	1400464	543875	237559	562	246	0.39	0.17		
	non-livestock	22	0.09	0.09	159	0.64	0.66	699883	227724	137654	945	571	0.33	0.20		
	livestock	799	0.84	1.10	528	0.55	0.73	700581	316151	99905	435	138	0.45	0.14		
LANGLEY	total	4169	0.53	0.82	3511	0.45	0.69	6543231	3037631	1081618	600	214	0.46	0.17		
	small	1547	0.42	0.79	1050	0.28	0.54	431276	223624	48348	114	25	0.52	0.11		
	large	2622	0.64	0.85	2461	0.60	0.79	6111955	2814007	1033270	907	333	0.46	0.17		
	non-livestock	249	0.28	0.30	736	0.82	0.89	4958004	2273051	881196	2742	1063	0.46	0.18		
	livestock	2373	0.74	1.04	1726	0.54	0.76	1153951	540956	152074	238	67	0.47	0.13		
East Richmond	total	350	0.22	0.25	1133	0.72	0.81	2445677	1037742	602870	745	433	0.42	0.25		
	small	23	0.16	0.21	89	0.63	0.81	95385	53534	20983	487	191	0.56	0.22		
	large	327	0.23	0.25	1043	0.73	0.81	2350292	984208	581887	767	453	0.42	0.25		
	non-livestock	X			781	0.89	0.93	2159493	877043	529253	1043	629	0.41	0.25		
	livestock	X			262	0.48	0.59	190799	107165	52634	242	119	0.56	0.28		
West Richmond	total	145	0.14	0.15	849	0.80	0.88	1095566	580295	137346	603	143	0.53	0.13		
	small	27	0.07	0.07	313	0.77	0.81	98121	73577	13456	190	35	0.75	0.14		
	large	118	0.18	0.21	536	0.83	0.93	997445	506718	123890	883	216	0.51	0.12		
	non-livestock	X			421	0.96	0.96	912964	470506	91527	1069	208	0.52	0.10		
	livestock	X			115	0.55	0.86	84481	36212	32363	270	242	0.43	0.38		
RICHMOND	total	495	0.19	0.21	1981	0.75	0.84	3541243	1618037	740216	687	314	0.46	0.21		
	small	50	0.09	0.10	402	0.73	0.81	193506	127111	34439	256	69	0.66	0.18		
	large	445	0.21	0.24	1579	0.76	0.85	3347737	1490926	705777	802	380	0.45	0.21		
	non-livestock	38	0.03	0.03	1202	0.91	0.94	3072457	1347549	620780	1052	485	0.44	0.20		
	livestock	407	0.53	0.71	377	0.49	0.65	275280	143377	84997	248	147	0.52	0.31		

Table A-1

FERTILIZER APPLICATIONS AND EXPENDITURES (1991 Census of Agriculture)

ZONE	Farm Category	Manure - hectares		Fertilizers (ha)	Fertilizers (ha) / Cropped + Imp Past. (ha)	Fertilizers (ha) / Cropped (ha)	Total crop expenses - amount (\$)	Fertilizer and Lime - amount (\$)	Agricultural chemicals - amount (\$)	Fertilizer & lime (\$) / Cropped (ha)	Agric. chemicals (\$) / Cropped (ha)	Fertilizer & lime (\$) / Total crop exp. (\$)	Agric. chemicals (\$) / Total crop exp. (\$)	
		Manure (ha) / Cropped + Imp Pasture (ha)	Manure (ha) / Cropped (ha)											
East Delta	total	1108	0.31	0.34	2745	0.78	0.83	1679265	926838	328132	282	100	0.55	0.20
	small	68	0.28	0.35	158	0.65	0.80	55485	31115	10027	158	51	0.56	0.18
	large	1040	0.32	0.34	2587	0.79	0.84	1623780	895723	318105	289	103	0.55	0.20
	non-livestock	X			1342	0.89	0.90	1155636	593403	244854	396	164	0.51	0.21
	livestock	X			1245	0.70	0.78	468144	302320	73251	189	46	0.65	0.16
West Delta	total	416	0.15	0.16	2422	0.87	0.92	2061278	986051	473973	373	179	0.48	0.23
	small	125	0.45	0.61	166	0.59	0.81	69934	37472	10851	183	53	0.54	0.16
	large	291	0.12	0.12	2256	0.90	0.92	1991344	948579	463122	389	190	0.48	0.23
	non-livestock	X			1248	0.96	0.97	1228057	505990	320613	392	248	0.41	0.26
	livestock	X			1008	0.82	0.88	763287	442589	142509	386	124	0.58	0.19
DELTA	total	1524	0.24	0.26	5167	0.82	0.87	3740543	1912889	802105	322	135	0.51	0.21
	small	193	0.37	0.48	324	0.62	0.81	125419	68587	20878	171	52	0.55	0.17
	large	1331	0.23	0.24	4843	0.83	0.88	3615124	1844302	781227	333	141	0.51	0.22
	non-livestock	176	0.06	0.06	2590	0.92	0.93	2383693	1099393	565467	394	203	0.46	0.24
	livestock	1155	0.39	0.42	2253	0.75	0.82	1231431	744909	215760	271	79	0.60	0.18
South Surrey	total	453	0.55	0.81	270	0.33	0.48	1003303	374924	235726	670	421	0.37	0.23
	small	193	0.60	1.07	77	0.24	0.43	29831	16990	1246	94	7	0.57	0.04
	large	260	0.52	0.69	193	0.39	0.51	973472	357934	234480	944	619	0.37	0.24
	non-livestock	14	0.26	0.26	32	0.60	0.60	930504	326219	X	6155		0.35	
	livestock	246	0.55	0.75	161	0.36	0.49	42968	31715	X	97		0.74	
North Surrey	total	2514	0.49	0.58	2962	0.58	0.68	5738118	2702330	1046612	621	240	0.47	0.18
	small	424	0.33	0.51	311	0.24	0.38	331997	116069	57025	140	69	0.35	0.17
	large	2090	0.54	0.59	2651	0.69	0.75	5406121	2586261	989587	734	281	0.48	0.18
	non-livestock	490	0.37	0.38	1181	0.88	0.91	4348408	2036164	X	1565		0.47	
	livestock	1599	0.64	0.72	1469	0.59	0.66	1057713	550097	X	247		0.52	
SURREY	total	2967	0.50	0.60	3232	0.54	0.66	6741421	3077254	1282338	626	261	0.46	0.19
	small	617	0.38	0.61	388	0.24	0.38	361828	133059	58271	132	58	0.37	0.16
	large	2350	0.54	0.60	2843	0.65	0.73	6379593	2944195	1224067	755	314	0.46	0.19
	non-livestock	505	0.36	0.37	1213	0.87	0.90	5278912	2362383	1011126	1745	747	0.45	0.19
	livestock	1845	0.62	0.72	1630	0.55	0.64	1100681	581812	212941	228	84	0.53	0.19

Table A-1

FERTILIZER APPLICATIONS AND EXPENDITURES (1991 Census of Agriculture)

ZONE	Farm Category	Manure - hectares		Fertilizers (ha)	Fertilizers (ha) / Cropped + Imp Past. (ha)	Fertilizers (ha) / Cropped (ha)	Total crop expenses - amount (\$)	Fertilizer and Lime - amount (\$)	Agricultural chemicals - amount (\$)	Fertilizer & lime (\$) / Cropped (ha)	Agric. chemicals (\$) / Cropped (ha)	Fertilizer & lime (\$) / Total crop exp. (\$)	Agric. chemicals (\$) / Total crop exp. (\$)	
		Manure (ha) / Cropped + Imp Pasture (ha)	Manure (ha) / Cropped (ha)											
South Matsqui	total	1522	0.58	0.67	1639	0.63	0.73	2241582	947228	586264	419	260	0.42	0.26
	small	419	0.62	0.79	367	0.55	0.69	323427	144490	72054	273	136	0.45	0.22
	large	1104	0.57	0.64	1273	0.66	0.74	1918155	802738	514210	464	297	0.42	0.27
	non-livestock	552	0.41	0.41	1013	0.75	0.76	1744425	729200	449435	548	338	0.42	0.26
	livestock	551	0.93	1.38	260	0.44	0.65	173730	73538	64775	184	162	0.42	0.37
West Matsqui	total	1664	0.64	0.89	923	0.36	0.49	1297323	587087	196696	313	105	0.45	0.15
	small	686	0.57	0.94	268	0.22	0.37	149895	67614	21562	92	29	0.45	0.14
	large	978	0.71	0.85	656	0.48	0.57	1147428	519473	175134	453	153	0.45	0.15
	non-livestock	77	0.22	0.23	158	0.46	0.47	929345	388168	138012	1162	413	0.42	0.15
	livestock	901	0.87	1.11	498	0.48	0.61	218083	131305	37122	162	46	0.60	0.17
North Matsqui	total	2862	0.74	0.82	2923	0.76	0.84	2229405	968956	336668	277	96	0.43	0.15
	small	312	0.46	0.54	241	0.35	0.42	318255	64263	55264	111	95	0.20	0.17
	large	2550	0.80	0.87	2682	0.84	0.92	1911150	904693	281404	310	96	0.47	0.15
	non-livestock	114	0.24	0.24	389	0.83	0.83	1158080	383602	211621	814	449	0.33	0.18
	livestock	2436	0.90	1.00	2293	0.85	0.94	753070	521091	69783	213	29	0.69	0.09
MATSQUI	total	6049	0.67	0.79	5486	0.61	0.72	5768310	2503271	1119628	328	147	0.43	0.19
	small	1417	0.55	0.77	875	0.34	0.48	791577	276367	148880	150	81	0.35	0.19
	large	4632	0.71	0.80	4610	0.71	0.80	4976733	2226904	970748	384	168	0.45	0.20
	non-livestock	744	0.34	0.35	1560	0.72	0.73	3831850	1500970	799068	703	374	0.39	0.21
	livestock	3888	0.90	1.06	3051	0.70	0.83	1144883	725934	171680	198	47	0.63	0.15
West Chilliwack	total	1802	0.62	0.71	2218	0.77	0.87	1363838	688480	292746	270	115	0.50	0.21
	small	215	0.41	0.60	237	0.45	0.66	118873	56795	20026	159	56	0.48	0.17
	large	1587	0.67	0.72	1981	0.84	0.90	1244965	631685	272720	288	124	0.51	0.22
	non-livestock	209	0.28	0.28	666	0.89	0.89	674215	285220	190441	383	256	0.42	0.28
	livestock	1378	0.85	0.95	1315	0.81	0.91	570750	346465	82279	240	57	0.61	0.14
East Chilliwack	total	5012	0.76	0.92	5283	0.80	0.97	2762911	1410486	442189	260	81	0.51	0.16
	small	710	0.58	0.84	580	0.48	0.69	177178	81713	23628	97	28	0.46	0.13
	large	4302	0.80	0.94	4703	0.87	1.02	2585733	1328773	418561	289	91	0.51	0.16
	non-livestock	191	0.62	0.62	277	0.90	0.90	1029916	390811	223822	1265	724	0.38	0.22
	livestock	4111	0.81	0.96	4426	0.87	1.03	1555817	937962	194739	219	45	0.60	0.13
CHILLIWACK	total	6815	0.72	0.85	7501	0.79	0.94	4126749	2098966	734935	263	92	0.51	0.18
	small	925	0.53	0.77	817	0.47	0.68	296051	138508	43654	115	36	0.47	0.15
	large	5889	0.76	0.87	6684	0.86	0.99	3830698	1960458	691281	289	102	0.51	0.18
	non-livestock	400	0.38	0.38	943	0.89	0.89	1704131	676031	414263	641	393	0.40	0.24
	livestock	5489	0.82	0.96	5741	0.86	1.00	2126567	1284427	277018	224	48	0.60	0.13

Table A-1

FERTILIZER APPLICATIONS AND EXPENDITURES (1991 Census of Agriculture)

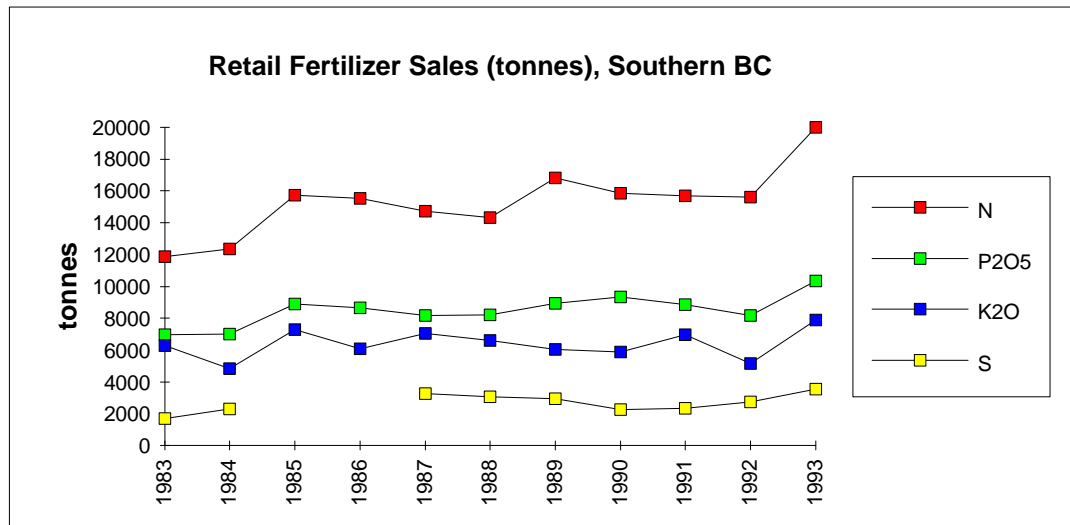
ZONE	Farm Category	Manure - hectares		Fertilizers (ha)		Fertilizers (ha) / Cropped + Imp Past. (ha)		Fertilizers (ha) / Cropped (ha)		Agricultural chemicals - amount (\$)		Fertilizer & lime (\$) / Total crop exp. (\$)		
		Manure (ha) / Cropped + Imp Pasture (ha)	Manure (ha) / Cropped (ha)	Fertilizers (ha)	Fertilizers (ha) / Cropped + Imp Past. (ha)	Fertilizers (ha) / Cropped (ha)	Total crop expenses - amount (\$)	Fertilizer and Lime - amount (\$)	Fertilizer & lime (\$) / Cropped (ha)	Agric. chemicals (\$) / Cropped (ha)	Fertilizer & lime (\$) / Total crop exp. (\$)	Agric. chemicals (\$) / Total crop exp. (\$)		
AGASSIZ	total	1718	0.65	0.79	2059	0.78	0.95	766836	581071	77957	268	36	0.76	0.10
	small	90	0.26	0.35	138	0.40	0.53	37974	26354	3991	101	15	0.69	0.11
	large	1628	0.71	0.85	1921	0.84	1.00	728862	554717	73966	290	39	0.76	0.10
	non-livestock													
	livestock	1628	0.71	0.85	1921	0.84	1.00	X	554717	73966	290	39		
ABBOTSFORD	total	4681	0.68	0.73	5491	0.80	0.86	2917975	1698707	468076	265	73	0.58	0.16
	small	284	0.59	0.77	257	0.53	0.69	130315	65453	24966	176	67	0.50	0.19
	large	4397	0.69	0.73	5235	0.82	0.87	2787660	1633254	443110	271	73	0.59	0.16
	non-livestock	248	0.16	0.16	1368	0.86	0.86	1305453	680905	222075	429	140	0.52	0.17
	livestock	4148	0.86	0.93	3867	0.80	0.87	1482207	952349	221035	214	50	0.64	0.15
MISSION	total	420	0.58	1.03	372	0.52	0.92	202499	89878	27700	221	68	0.44	0.14
	small	101	0.35	1.35	42	0.14	0.56	29784	7931	6283	106	84	0.27	0.21
	large	319	0.75	0.96	330	0.77	1.00	172715	81947	21417	248	65	0.47	0.12
	non-livestock	X			53	0.64	0.65	103938	25827	18042	319	223	0.25	0.17
	livestock	X			277	0.81	1.11	68777	56120	3375	224	14	0.82	0.05
MAPLE RIDGE	total	472	0.50	0.71	466	0.50	0.70	927442	376550	193816	570	293	0.41	0.21
	small	191	0.52	0.97	139	0.38	0.71	59727	37634	7338	191	37	0.63	0.12
	large	280	0.49	0.60	327	0.57	0.70	867715	338916	186478	730	402	0.39	0.21
	non-livestock	X			73	0.39	0.44	752149	279808	182804	1686	1101	0.37	0.24
	livestock	X			254	0.66	0.85	115566	59108	3674	198	12	0.51	0.03
PITT MEADOWS	total	1214	0.40	0.45	1934	0.64	0.72	2124986	1110087	377509	411	140	0.52	0.18
	small	200	0.31	0.40	301	0.47	0.60	191205	70818	35205	141	70	0.37	0.18
	large	1015	0.42	0.46	1633	0.68	0.74	1933781	1039269	342304	473	156	0.54	0.18
	non-livestock	55	0.08	0.08	408	0.56	0.57	1503075	709530	323106	995	453	0.47	0.21
	livestock	960	0.57	0.65	1226	0.73	0.83	430706	329739	19198	222	13	0.77	0.04
NICOMEN	total	2818	0.76	1.02	2766	0.74	1.00	669351	498353	55377	180	20	0.74	0.08
	small	308	0.39	0.72	320	0.41	0.75	71760	47852	2903	112	7	0.67	0.04
	large	2510	0.85	1.07	2446	0.83	1.04	597591	450501	52474	192	22	0.75	0.09
	non-livestock	X			22	1.00	1.00	35055	19386	11235	881	511	0.55	0.32
	livestock	X			2424	0.83	1.04	562536	431115	41239	185	18	0.77	0.07
FRASER VALLEY	total	33342	0.56	0.68	39966	0.67	0.82	38070586	18602694	6961275	380	142	0.49	0.18
	small	5923	0.43	0.68	5053	0.37	0.58	2720422	1223298	435156	140	50	0.45	0.16
	large	27418	0.60	0.68	34912	0.77	0.87	35350164	17379396	6526119	432	162	0.49	0.18
	non-livestock				10168	0.83	0.85		10974833		914			
	livestock				24747	0.74	0.88		6404563		227			

Table B-1

ANNUAL INORGANIC FERTILIZER SALES (tonnes)

Southern BC (excludes Peace River area)
 from WCFA Retail Fertilizer Sales Surveys
 include both agricultural and non-agricultural sales

	tonnes / year										
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
N	11852	12361	15734	15520	14707	14315	16816	15841	15670	15611	19996
P2O5	6982	7020	8879	8648	8187	8217	8942	9347	8840	8161	10347
K2O	6268	4824	7277	6097	7024	6604	6044	5881	6969	5168	7894
S	1692	2296			3278	3080	2964	2276	2322	2741	3528



APPENDIX C

ESTIMATED FERTILIZER APPLICATION BY CROP

Table C-1	List of Contacts
Table C-2	Estimated of Fertilizer Application Rates by Crop
Table C-3	Estimated Fertilizer Application Rates for Vegetables
Table C-4	Estimated Fertilizer Application Rates by Crop and AWMZ



LIST OF CONTACTS

Don Bates. Field Crop Specialist. BC Ministry of Agriculture, Fisheries and Food. Abbotsford, B.C.

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Brian Johnston. Systems and Customer Service Manager. Coast Agri. Abbotsford, B.C.

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Don McLean. Executive Secretary. Western Canada Fertilizer Association. Surrey, B.C.

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Wayne Odermatt. Regional Fresh Vegetable Specialist. BC Ministry of Agriculture, Fisheries and Food. Cloverdale, B.C.

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Rick Van Kleeck. Waste Management Engineer. Resource Management Branch. BC Ministry of Agriculture, Fisheries and Food. Abbotsford, B.C.

Table C-2

ESTIMATED FERTILIZER APPLICATION RATES BY CROP

Lower Fraser Valley

Crop	Estimated 1991 Inorganic Fertilizer Application Rates (kg/ha; N/P2O5/K2O)						Concensus
							Rate
improved pasture	305-86-371						120-28-35
grains & oilseeds	180-82-114						180-80-115
silage corn	146-56-175	140-100-123	157-?-?		139-91-87	140-90-95	
	175-67-209						
	204-78-244						
alfalfa							240-55-70
grass	305-86-371	240-62-95	238-65-78		239-31-38	240-55-70	
potatoes		81-222-222	112-168-168	60-?-?	84-196-196	90-195-195	
other field crops							132-102-111
tree fruits							75-95-125
strawberries		78-112-140	78-84-112		67-112-112	75-105-120	
raspberries	55-70-90	78-95-134	76-78-90		78-133-157	75-95-125	
blueberries		73-131-94	37-78-90		84-160-106	70-125-95	
other berries							12-16-12
vegetables	112-112-112						see below
	90-269-269						
nursery products							60-50-30
sod							70-70-80
		62-62-67					
green peas		22-90-112	12-56-84		22-101-101	20-85-100	
corn		123-90-112	140-134-123	130-?-?	134-101-101	130-110-110	
green beans		45-78-84		40-?-?	45-101-101	45-90-90	
broccoli		228-125-125	210-84-123	185-?-?	190-101-101	205-105-115	
cauliflower		228-125-125	168-84-123	185-?-?	190-101-101	195-105-115	
lettuce		118-179-179	101-73-112	90-?-?	106-196-196	105-185-185	
cabbage		228-125-125		120-?-?	157-101-101	112-196-196	
carrots		34-179-179	73-73-112	125-?-?	73-196-196	75-150-150	
squash				110-?-?	134-101-101	135-100-100	
sprouts		228-125-125		120-?-?	157-101-101	170-115-115	
dry onions		95-179-179		70-?-?	126-196-196	100-185-185	
cucumber				70-?-?	134-101-101	135-100-100	
celery					112-196-196	115-185-185	
green onions		95-179-179			126-196-196	100-185-185	

Table C-3

ESTIMATED FERTILIZER APPLICATION RATES FOR VEGETABLES

Vegetable Production by Regional District
1991 Census of Agriculture

	Total	GVRD	Central Fraser Valley	Fraser Cheam	Dewdney Alouette
green peas	1732	1048	458	198	28
corn	1377	660	265	348	104
green beans	770	493	46	228	3
broccoli	530	12	518		
cauliflower	338	104	234		
lettuce	324	297	13	8	6
cabbage	221	216	5		
carrots	180	152	18	7	3
squash	165	130	24	3	8
sprouts	135		135		
dry onions	108	103	5		
cucumber	101	77	22		2
celery	71	71			
green onions	49	46	2		1
other	730	311	206	180	33
TOTAL	6831	3720	1951	972	188

Average Vegetable Fertilizer Application Rates

	GVRD	Central Fraser Valley	Fraser Cheam	Dewdney Alouette
N	80	132	77	107
P2O5	114	102	99	109
K2O	119	111	103	112

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	N improved pasture			N grain and oilseed			N silage corn			N alfalfa			N grass			N potatoes			N other field crops			N tree fruits		
		P improved pasture	K improved pasture		P grain and oilseed	K grain and oilseed		P silage corn	K silage corn		P alfalfa	K alfalfa		P grass	K grass		P potatoes	K potatoes		P other field crops	K other field crops		P tree fruits	K tree fruits	
South Langley	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14	17		80	115		90	95		28	35		28	35		195	195		114	119		95	125	
	large	28	35		80	115		90	95		55	70		55	70		195	195		114	119		95	125	
North Langley	non-livestock																								
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	80	114	119	75	95	125
Central Langley	small	14	17		80	115		90	95		28	35		28	35		195	195		114	119		95	125	
	large	28	35		80	115		90	95		55	70		55	70		195	195		114	119		95	125	
	non-livestock																								
LANGLEY	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	80	114	119	75	95	125
	small	14	17		80	115		90	95		28	35		28	35		195	195		114	119		95	125	
East Richmond	large	28	35		80	115		90	95		55	70		55	70		195	195		114	119		95	125	
	non-livestock																								
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
West Richmond	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	80	114	119	75	95	125
	small	14	17		80	115		90	95		28	35		28	35		195	195		114	119		95	125	
	large	28	35		80	115		90	95		55	70		55	70		195	195		114	119		95	125	
RICHMOND	non-livestock																								
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	80	114	119	75	95	125

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	N improved pasture			N grain and oilseed			N silage corn			N alfalfa			N grass			N potatoes			N other field crops			N tree fruits		
		P improved pasture	K improved pasture		P grain and oilseed	K grain and oilseed		P silage corn	K silage corn		P alfalfa	K alfalfa		P grass	K grass		P potatoes	K potatoes		P other field crops	K other field crops		P tree fruits	K tree fruits	
East Delta	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		
West Delta	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		
DELTA	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		
South Surrey	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		
North Surrey	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		
SURREY	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	80	114	119	75	95	125
	small	14			80			90			28			28			195			114			95		
	large	28			80			90			55			55			195			114			95		
	non-livestock livestock	35			115			95			70			70			195			119			125		

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	N improved pasture			N grain and oilseed			N silage corn			N alfalfa			N grass			N potatoes			N other field crops			N tree fruits		
		P improved pasture	K improved pasture		P grain and oilseed	K grain and oilseed		P silage corn	K silage corn		P alfalfa	K alfalfa		P grass	K grass		P potatoes	K potatoes		P other field crops	K other field crops		P tree fruits	K tree fruits	
South Matsqui	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	small	14			80			90			28			28			195			102			95		
	large	28			80			90			55			55			195			102			95		
West Matsqui	non-livestock	17			115			95			35			35			195			111			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	132	102	111	75	95	125
North Matsqui	non-livestock	17			115			95			35			35			195			111			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	132	102	111	75	95	125
MATSQUI	non-livestock	17			115			95			35			35			195			111			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	132	102	111	75	95	125
West Chilliwack	non-livestock	17			115			95			35			35			195			103			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	77	99	103	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	77	99	103	75	95	125
East Chilliwack	non-livestock	17			115			95			35			35			195			103			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	77	99	103	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	77	99	103	75	95	125
CHILLIWACK	non-livestock	17			115			95			35			35			195			103			125		
	livestock	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	77	99	103	75	95	125
	total	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	77	99	103	75	95	125

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	N strawberries			P strawberries			K strawberries			N raspberries			P raspberries			K raspberries			N blueberries			P blueberries			K blueberries			N other berries & grapes			P other berries & grapes			K other berries & grapes			N vegetables			P vegetables			K vegetables			N nursery products			P nursery products			K nursery products			N sod			P sod			K sod		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K															
South Matsqui	total	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	small	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	large	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
West Matsqui	non-livestock	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	livestock	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	total	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
North Matsqui	small	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	large	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	non-livestock	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
MATSQUI	livestock	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	total	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
	small	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80																																										
West Chilliwack	large	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	non-livestock	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	livestock	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
East Chilliwack	total	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	small	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	large	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
CHILLIWACK	non-livestock	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	livestock	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										
	total	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80																																										

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	Improved pasture			N grain and oilseed			N silage corn			N alfalfa			N grass			N potatoes			N other field crops			N tree fruits		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K
AGASSIZ	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	77	99	103	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	77	99	103	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	77	99	103	75	95	125
ABBOTSFORD	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	132	102	111	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	132	102	111	75	95	125
MISSION	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	107	109	112	75	95	125
MAPLE RIDGE	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	107	109	112	75	95	125
PITT MEADOW:	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	107	109	112	75	95	125
NICOMEN	total	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	small	60	14	17	180	80	115	140	90	95	120	28	35	120	28	35	90	195	195	107	109	112	75	95	125
	large	120	28	35	180	80	115	140	90	95	240	55	70	240	55	70	90	195	195	107	109	112	75	95	125

Table C-4

ESTIMATED FERTILIZER APPLICATION RATES (kg/ha)

P is expressed as P2O5 and K as K2O

ZONE	Farm Category	N strawberries			P raspberries			K blueberries			N other berries & grapes			P other berries & grapes			K other berries & grapes			N sod			P sod			K sod		
		N strawberries	P strawberries	K strawberries	N raspberries	P raspberries	K raspberries	N blueberries	P blueberries	K blueberries	N other berries & grapes	P other berries & grapes	K other berries & grapes	N vegetables	P vegetables	K vegetables	N nursery products	P nursery products	K nursery products	N sod	P sod	K sod	N sod	P sod	K sod	N sod	P sod	K sod
AGASSIZ	total	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	77	99	103	60	50	30	70	70	80	70	70	80	70	70	80
ABBOTSFORD	total	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	132	102	111	60	50	30	70	70	80	70	70	80	70	70	80
MISSION	total	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
MAPLE RIDGE	total	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
PITT MEADOW:	total	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
NICOMEN	total	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	small	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80
	large	75	105	120	75	95	125	70	125	95	15	20	15	107	109	112	60	50	30	70	70	80	70	70	80	70	70	80

APPENDIX D

ESTIMATED TOTAL FERTILIZER APPLICATION RATES

Table D-1	Total Estimated Fertilizer Application by Crop and AWMZ
Table D-2	Estimated Unit Fertilizer Costs
Table D-3	Components of Total Fertilizer and Lime Expenditures
Table D-4	Estimated Value of Fertilizer Applications

Table D-1

TOTAL ESTIMATED FERTILIZER APPLICATION BY CROP AND AWMZ (tonnes)

ZONE	Farm Category	N improved pasture			P improved pasture			K improved pasture			N grain and oilseed			P grain and oilseed			K grain and oilseed			N silage corn			P silage corn			K silage corn			N alfalfa			P alfalfa			K alfalfa			N grass			P grass			K grass			N potatoes			P potatoes			K potatoes			N other field crops			P other field crops			K other field crops			N tree fruits			P tree fruits			K tree fruits		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K																					
South Langley	total	0	0	0	2	1	1	9	5	6	12	3	4	25	6	7	0	1	1	1	1	1	1	2	2																																																
	small	0	0	0	2	1	1	3	2	2	12	3	4	0	0	0	0	0	0	1	1	1	1	1	2																																																
	large non-livestock	0	0	0	0	0	0	5	4	4	0	0	0	25	6	7	0	0	0	0	0	0	0	0	1																																																
North Langley	total	0	0	0	10	5	7	19	12	13	14	3	4	202	46	59	2	4	4	1	1	1	1	2	2																																																
	small	0	0	0	2	1	1	0	0	0	1	0	0	45	11	13	0	0	0	0	0	0	1	1	2																																																
	large non-livestock	0	0	0	8	4	5	19	12	13	13	3	4	156	36	46	2	4	4	1	1	1	0	0	1																																																
Central Langley	total	0	0	0	10	4	6	12	8	8	3	1	1	94	22	27	4	9	9	0	0	0	2	2	3																																																
	small	0	0	0	4	2	3	1	0	0	2	0	1	13	3	4	0	1	1	0	0	0	1	2	2																																																
	large non-livestock	0	0	0	6	2	4	12	7	8	1	0	0	81	18	24	4	8	8	0	0	0	0	0	0																																																
LANGLEY	total	0	0	0	22	10	14	40	26	27	30	7	9	321	74	94	6	13	13	1	2	2	4	5	7																																																
	small	0	0	0	8	4	5	4	3	3	15	4	5	59	14	17	1	1	1	1	1	1	4	5	6																																																
	large non-livestock	0	0	0	14	6	9	36	23	24	14	3	4	262	60	76	5	12	12	1	1	1	1	1	1																																																
East Richmond	total	0	0	0	8	4	5	0	0	0	0	0	0	5	1	1	6	14	14	0	1	1	0	0	0																																																
	small	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0																																																
	large non-livestock	0	0	0	8	4	5	0	0	0	0	0	0	4	1	1	6	13	13	0	1	1	0	0	0																																																
West Richmond	total	0	0	0	12	6	8	0	0	0	0	0	0	16	4	5	12	25	25	0	0	0	0	0	0																																																
	small	0	0	0	7	3	4	0	0	0	0	0	0	16	4	5	0	0	0	1	1	1	0	0	0																																																
	large non-livestock	0	0	0	5	2	3	0	0	0	0	0	0	0	0	0	12	25	25	0	-1	-1	0	0	0																																																
RICHMOND	total	0	0	0	21	9	13	1	1	1	0	0	0	21	5	6	18	39	39	1	1	1	0	1	1																																																
	small	0	0	0	7	3	4	0	0	0	0	0	0	17	4	5	0	0	0	1	1	1	0	0	0																																																
	large non-livestock	0	0	0	14	6	9	1	1	1	0	0	0	4	1	1	18	39	39	0	0	0	0	0	0																																																

Table D-1

TOTAL ESTIMATED FERTILIZER APPLICATION BY CROP AND AWMZ (tonnes)

ZONE	Farm Category	strawberries			raspberries			blueberries			other berries & grapes			vegetables			nursery products			sod		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K
South Langley	total	2	3	3	5	7	9	1	1	1	1	1	1	1	2	2	4	3	2	0	0	0
	small	0	0	0	1	1	2	0	1	1	0	0	0	0	1	1	2	1	1	0	0	0
	large non-livestock livestock	2	3	3	4	5	7	0	1	0	1	1	1	1	1	2	2	2	1	0	0	0
North Langley	total	5	7	8	10	12	16	3	6	5	2	2	2	7	9	10	7	6	4	7	7	8
	small	1	1	1	1	1	2	2	4	3	0	0	0	3	4	4	3	2	1	0	0	0
	large non-livestock livestock	4	6	7	9	11	15	1	2	2	2	2	2	4	5	5	4	4	2	7	7	8
Central Langley	total	1	1	1	2	3	4	1	2	2	0	1	0	8	11	11	5	4	2	2	2	3
	small	0	1	1	1	1	1	1	2	2	0	0	0	1	2	2	2	2	1	0	0	0
	large non-livestock livestock	0	0	0	2	2	3	0	0	0	0	0	0	6	9	10	3	2	1	2	2	2
LANGLEY	total	7	10	12	17	22	29	6	10	8	3	4	3	16	22	23	16	13	8	9	9	11
	small	1	1	2	3	3	5	4	7	5	0	0	0	5	7	7	7	5	3	0	0	0
	large non-livestock livestock	6	9	10	15	19	24	2	3	2	3	4	3	11	16	16	9	8	5	9	9	10
East Richmond	total	5	7	8	1	1	1	10	17	13	8	10	8	11	16	17	4	4	2	2	2	2
	small	0	0	0	0	0	0	3	6	5	0	0	0	1	2	2	0	0	0	0	0	0
	large non-livestock livestock	5	7	8	1	1	1	6	11	9	8	10	8	10	14	15	4	4	2	2	2	2
West Richmond	total	2	3	3	1	1	1	15	27	21	2	2	2	11	16	16	0	0	0	0	0	1
	small	1	1	1	1	1	1	5	10	7	0	0	0	2	4	4	0	0	0	0	0	1
	large non-livestock livestock	1	2	2	0	0	0	10	17	13	2	2	2	9	12	13	0	0	0	0	0	0
RICHMOND	total	7	10	11	1	2	2	25	45	34	9	13	9	22	32	33	5	4	2	2	2	3
	small	1	1	1	1	1	1	9	16	12	0	0	0	4	6	6	0	0	0	0	0	1
	large non-livestock livestock	7	9	11	1	1	1	16	29	22	9	12	9	18	26	27	5	4	2	2	2	2

Table D-1

TOTAL ESTIMATED FERTILIZER APPLICATION BY CROP AND AWMZ (tonnes)

ZONE	Farm Category	N improved pasture			P improved pasture			K improved pasture			N grain and oilseed			P grain and oilseed			K grain and oilseed			N silage corn			P silage corn			K silage corn			N alfalfa			P alfalfa			K alfalfa			N grass			P grass			K grass			N potatoes			P potatoes			K potatoes			N other field crops			P other field crops			K other field crops			N tree fruits			P tree fruits			K tree fruits		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K															
South Matsqui	total	0	0	0	0	0	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0															
	small	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																		
	large non-livestock	0	0	0	0	0	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0																		
West Matsqui	total	0	0	0	8	4	5	19	12	13	15	3	4	11	3	3	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1															
	small	0	0	0	4	2	2	0	0	0	3	1	1	3	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	1	1	1	1	1	1															
	large non-livestock	0	0	0	5	2	3	19	12	13	12	3	4	8	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
North Matsqui	total	0	0	0	22	10	14	77	50	52	4	1	1	339	78	99	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0																		
	small	0	0	0	0	0	0	2	1	1	1	0	0	3	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1															
	large non-livestock	0	0	0	22	10	14	76	49	51	3	1	1	337	77	98	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0															
MATSQUI	total	0	0	0	30	14	19	99	64	67	19	4	6	350	80	102	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3																		
	small	0	0	0	4	2	2	2	1	1	4	1	1	6	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2																		
	large non-livestock	0	0	0	27	12	17	97	63	66	15	3	4	345	79	101	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																		
West Chilliwack	total	0	0	0	6	3	4	69	44	47	4	1	1	169	39	49	1	3	3	26	33	34	26	33	34	26	33	34	26	33	34	26	33	34	26	33	34	26	33	34	4	6	7	4	6	7	4	6	7	4	6	7	4	6	7																		
	small	0	0	0	1	0	0	4	2	2	0	0	0	12	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	6	4	5	6	4	5	6	4	5	6																					
	large non-livestock	0	0	0	5	2	3	65	42	44	4	1	1	157	36	46	1	3	3	26	33	34	26	33	34	26	33	34	26	33	34	26	33	34	26	33	34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																		
East Chilliwack	total	13	3	4	68	30	43	187	120	127	21	5	6	541	124	158	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	9	11	14	9	11	14	9	11	14	9	11	14																								
	small	0	0	0	20	9	13	5	3	3	7	2	2	21	5	6	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	6	4	5	6	4	5	6	4	5	6																											
	large non-livestock	13	3	4	48	21	31	182	117	124	14	3	4	520	119	152	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	5	6	8	5	6	8	5	6	8	5	6	8																											
CHILLIWACK	total	13	3	4	74	33	47	256	165	174	25	6	7	710	163	207	2	5	5	27	35	36	27	35	36	27	35	36	27	35	36	27	35	36	13	17	22	13	17	22	13	17	22	13	17	22																											
	small	0	0	0	21	9	13	9	6	6	7	2	2	33	8	10	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	8	10	13	8	10	13	8	10	13	8	10	13																														
	large non-livestock	13	3	4	53	24	34	248	159	168	18	4	5	677	155	198	2	5	5	26	34	35	26	34	35	26	34	35	26	34	35	5	7	9	5	7	9	5	7	9	5	7	9																														

Table D-1

TOTAL ESTIMATED FERTILIZER APPLICATION BY CROP AND AWMZ (tonnes)

ZONE	Farm Category	strawberries			raspberries			blueberries			other berries & grapes			vegetables			nursery products			sod		
		N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K	N	P	K
South Matsqui	total	12	17	20	103	130	171	7	12	9	0	1	0	27	21	22	3	2	1	0	0	0
	small	0	1	1	25	31	41	2	3	2	0	0	0	2	1	1	1	1	0	0	0	0
	large non-livestock	12	17	19	78	98	130	5	8	6	0	0	0	25	19	21	2	2	1	0	0	0
West Matsqui	total	5	6	7	4	5	7	4	7	5	0	0	0	21	16	17	15	13	8	0	0	0
	small	1	1	1	2	2	3	2	3	2	0	0	0	2	2	2	6	5	3	0	0	0
	large non-livestock	4	5	6	2	3	4	2	4	3	0	0	0	19	14	16	9	8	5	0	0	0
North Matsqui	total	0	0	0	9	11	15	22	40	30	1	1	1	34	26	29	2	2	1	0	0	0
	small	0	0	0	3	3	4	6	11	8	0	0	0	6	5	5	1	1	0	0	0	0
	large non-livestock	0	0	0	6	8	11	16	29	22	1	1	1	28	22	23	1	1	1	0	0	0
MATSQUI	total	17	24	27	115	146	192	33	58	44	1	2	1	81	63	68	20	17	10	0	0	0
	small	1	2	2	29	37	48	9	17	13	0	0	0	10	7	8	8	6	4	0	0	0
	large non-livestock	16	22	25	87	110	144	23	42	32	1	1	1	72	55	60	13	11	6	0	0	0
West Chilliwack	total	4	6	6	4	5	7	1	1	1	0	0	0	28	36	38	2	2	1	0	0	0
	small	0	0	0	1	1	1	0	0	0	0	0	0	2	2	3	1	1	1	0	0	0
	large non-livestock	4	5	6	4	5	6	1	1	1	0	0	0	26	34	35	1	1	0	0	0	0
East Chilliwack	total	1	1	1	4	5	6	1	2	1	0	0	0	38	49	51	16	14	8	0	0	0
	small	0	0	0	2	3	4	0	1	1	0	0	0	2	3	3	3	3	2	0	0	0
	large non-livestock	0	1	1	2	2	3	0	1	1	0	0	0	36	46	48	13	11	6	0	0	0
CHILLIWACK	total	5	6	7	8	10	13	2	3	2	0	0	0	67	86	89	18	15	9	0	0	0
	small	0	0	0	3	4	5	1	1	1	0	0	0	4	6	6	5	4	2	0	0	0
	large non-livestock	4	6	7	5	7	9	1	2	1	0	0	0	62	80	83	14	11	7	0	0	0

Table D-2

ESTIMATED UNIT FERTILIZER COSTS (1991)

component	\$/kg
N	1.01
P2O5	0.80
K2O	0.68

Table D-3

**COMPONENTS OF TOTAL
FERTILIZER AND LIME EXPENDITURES**

component	percentage
N, P2O5, K2O	60
other nutrients	15
lime	15
delivery and application	10
	100

