Table 1.1 Summary of project funding/in-kind agencies, programs, program objectives and program reports/agency roles.

Agency	Program	Program Objectives[1]	Report and/or Agency Roles
1. Canadian International Development Agency (CIDA)	Viet Nam Short-term Retraining Fund (VSTRF).	1. Improve Vietnamese dioxin field sampling and analysis laboratories capabilities.	Development of Impact Mitigation Strategies Related to the Use of Agent Orange Herbicide in the Aluoi Valley, Viet Nam
2. Revenue Canada	Scientific Research and Experimental Development expenditure (SRED) program.	1. Assist Canadian companies to develop new technology through R&D.	SRED program R&D project reports.
3. Hatfield Consultants Ltd. (HCL)	1. Staff training programs. 2. Significant in-kind contribution of personnel time and logistics costs.	1. Contribution to the dioxin contamination study. 2. Assisting staff in gaining Indochina working experience. 3. Assisting staff in learning new environment assessment technology (i.e., CORONA, RADARSAT).	HCL staff authored this study report and the reports listed above.
4. 10-80 Committee (Viet Nam)	1. Staff training program 2. Significant in-kind contribution of personnel time and logistics support.	1. Contribution to the dioxin contamination study. 2. Assisting staff in learning new environmental assessment technology.	10-80 Committee staff reviewed and contributed to this study report.
5. Thua Thien Hue Province Dept. of Health	1. Staff training program. 2. Significant in-kind contribution of personnel time and logistics support.	1. Contribution to the dioxin contamination study. 2. Assisting staff in learning new health assessment technology.	Dept. of Health staff reviewed and contributed to this study report.
6. National Research Council (NRC)	Technical Inflow Program.	1. Access to new technology. 2. Assistance for staff training in new technology.	Progress reports to NRC.

[1] In addition to utilizing program data to assess environmental impacts of herbicide spraying in Aluoi Valley.

Table 2.1 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in soil, fishpond sediment and animal tissues (pg/g [ppt], dry weight [soils]; pg/g [ppt], wet weight [biological tissues]), central Viet Nam, January 1996 (Hatfield Consultants Ltd. and 10-80 Committee 1998).

Sample Location and Type	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
A Ngo, Aluoi Valley (Exposed)															
Bomb crater soil (0-10 cm depth)	VN9605	**1.1**	2.0	0.5	3.9	26	830	ND	0.8	0.1	0.5	0.5	1.0	**2.3**	**47.8%**
Bomb crater soil (10-30 cm depth)	VN9613	**0.9**	1.2	ND	3.0	27	950	ND	0.5	0.1	0.2	0.5	0.9	**2.1**	**42.9%**
Fish pond sediment	VN9619	**5.3**	7.7	6.3	9.7	35	880	0.2	0.8	ND	0.3	ND	ND	**6.8**	**77.9%**
Carp liver	VN9618	**1.0**	1.5	0.4	ND	ND	1.0	0.4	2.6	1.3	ND	ND	ND	**1.2**	**83.3%**
Manioc root	VN9603	**ND**	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	**0.2**	**0.0%**
Hong Thuong, Aluoi Valley (Exposed)															
Carp liver	VN9620	**1.6**	1.6	ND	ND	ND	1.6	0.7	1.1	0.90	ND	ND	ND	**1.9**	**84.2%**
Manioc root	VN9606	**ND**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.2**	**0.0%**
Hong Ha, Aluoi Valley (Exposed)															
Farmer's field soil (10-30 cm)	VN9615	**1.7**	1.9	ND	2.9	2.7	48	0.2	0.5	0.3	ND	ND	ND	**2.1**	**81.0%**
Fish pond sediment	VN9635	**0.3**	0.3	ND	0.3	1.1	18	ND	ND	ND	ND	0.1	ND	**0.4**	**75.0%**
Carp liver	VN9623	**0.3**	0.6	ND	1.6	3.9	4.0	0.3	1.1	1.6	1.1	0.6	ND	**0.5**	**60.0%**
Hong Van, Aluoi Valley (Exposed)															
Farmer's field soil (10-30 cm)	VN9643	**0.7**	6.9	3.0	16	42	1700	ND	0.4	ND	ND	ND	ND	**2.9**	**24.1%**
Son Thuy, Aluoi Valley (Exposed)															
Pig liver	VN9629	**ND**	ND	ND	0.4	17	300	ND	ND	0.6	3.4	7.2	2.7	**1.3**	**0.0%**
Xa Nham, Aluoi Valley (Exposed)															
Farmer's field soil (10-30 cm)	VN9631	**4.3**	6.5	3.9	6.6	9.9	230	ND	ND	ND	ND	ND	ND	**5.0**	**86.0%**
Carp fat	VN9640	**0.7**	2.3	ND	ND	ND	5.1	1.2	9.2	1.7	ND	ND	ND	**1.5**	**46.7%**
A So, Aluoi Valley (Exposed)															
Former airbase soil (0-10 cm)	VN9642	**110**	120	7.8	13	47	460	3.6	11	8.8	8.4	28	36	**112.6**	**97.7%**
Former airbase soil (10-30 cm)	VN9622	**32**	34	0.2	7.8	23	430	1.1	2.7	2.9	3.7	6.7	7.5	**33.3**	**96.1%**
Fish pond sediment	VN9602	**6.9**	9.5	3.1	9.1	19	460	0.6	1.7	1.4	0.5	0.8	1.2	**7.8**	**88.5%**
A Sap River sediment	VN9650	**0.8**	0.8	ND	0.5	3.6	69	ND	0.40	ND	ND	ND	ND	**1.2**	**66.7%**
Carp fat	VN9646	**51**	59	2.4	ND	ND	ND	6.6	25	12	ND	ND	ND	**53.7**	**95.0%**
Carp liver	VN9614	**2.4**	3.0	0.4	ND	ND	ND	0.4	1.3	0.4	ND	ND	ND	**2.6**	**92.3%**
Duck liver	VN9608	**1.4**	1.4	ND	ND	ND	ND	0.2	0.2	ND	ND	ND	ND	**1.6**	**87.5%**
Dong Ha, Quang Tri province (Exposed)															
Former airbase soil (0-10 cm)	VN9645	**ND**	0.2	ND	9.2	58	290	0.4	1.1	3.5	11	23	26	**1.6**	**0.0%**
Former airbase soil (10-30 cm)	VN9630	**ND**	ND	ND	3.6	13	62	ND	ND	ND	1.3	2.1	3.9	**0.6**	**0.0%**
Chi Khe, Nhge An province (Reference)															
Farmer's field soil (0-10 cm)	VN9636	**ND**	0.2	ND	1.8	1.3	13	0.2	1.1	0.1	0.8	ND	ND	**0.4**	**0.0%**
Farmer's field soil (10-30 cm)	VN9624	**ND**	ND	ND	2.0	1.4	16	ND	0.8	ND	0.6	ND	ND	**0.6**	**0.0%**
Con Cuong, Nhge An province (Reference)															
Carp liver	VN9621	**ND**	0.1	ND	ND	ND	ND	0.2	0.4	0.3	ND	ND	ND	**0.2**	**0.0%**
Duck liver	VN9644	**ND**	ND	ND	ND	ND	ND	0.2	0.4	ND	ND	ND	ND	**0.2**	**0.0%**
Pig liver	VN9641	**ND**	ND	ND	ND	1.2	4.1	ND	ND	ND	ND	ND	ND	**0.2**	**0.0%**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.
NDR = Peak detected but did not meet quantification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.2 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in soil, fishpond sediment, animal tissues and whole human blood, (pg/g [ppt], dry weight [soils], pg/g [ppt], wet weight [biological tissues]), central and southern Viet Nam, November 1997 (Hatfield Consultants Ltd. and 10-80 Committee 1998).

Sample Location and Type	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
A So, Aluoi Valley, central Viet Nam (Exposed)															
Soil (0 to 10 cm depth)															
Former airbase	97VN051	**897.85**	897.85	7.76	24.35	68.44	563.84	10.46	30.30	23.59	8.19	19.83	16.50	**901.22**	**99.6%**
Former airstrip	97VN057	**88.32**	88.32	7.40	19.83	65.82	697.05	3.08	11.27	6.94	8.94	22.37	30.31	**92.21**	**95.8%**
Manioc field	97VN001	**6.61**	8.26	1.56	8.49	10.92	142.29	0.64	3.17	0.87	0.55	0.92	1.61	**7.01**	**94.3%**
Ploughed field	97VN013	**4.20**	6.49	2.93	10.49	10.88	136.34	0.24	1.66	0.78	ND	0.78	1.95	**4.53**	**92.7%**
Fish pond sediment															
Fish pond #3	97VN009	**8.5**	11	3.3	5.8	9.4	220	0.5	2.2	1.1	0.2	ND	ND	**9.2**	**92.4%**
Fish pond #2	97VN007	**5.4**	7.1	4.5	9.3	7.9	170	0.3	1.5	0.9	0.2	ND	ND	**6.0**	**90.0%**
Fish pond #1	97VN005	**5.2**	9.9	13	10	5.3	64	0.3	2.3	1.1	0.3	ND	ND	**5.9**	**88.1%**
Fish pond #4	97VN011	**1.8**	3.3	2.5	1.5	1.4	23	0.1	0.6	0.4	ND	ND	ND	**2.0**	**90.0%**
Animal tissue															
Grass carp fat (pond#4)	97VN039	**34**	41	9.5	1.8	0.2	0.6	4.4	15	5.3	0.6	0.2	0.1	**35.4**	**96.0%**
Grass carp fat (pond#3)	97VN031	**21**	25	4.0	0.6	0.8	3.3	4.0	15	5.0	ND	0.5	ND	**22.4**	**93.8%**
Grass carp fat (pond#2)	97VN027	**16**	20	4.2	1.4	0.7	1.0	2.4	11	4.0	1.1	0.1	ND	**16.7**	**95.8%**
Grass carp fat (pond#1)	97VN019	**7.9**	10	2.3	1.5	1.6	2.9	2.3	13	3.4	0.5	0.4	NDR	**8.7**	**90.8%**
Duck fat	97VN045	**6.1**	7.0	3.4	0.8	ND	2.2	1.1	2.7	2.1	ND	ND	ND	**7.0**	**87.1%**
Human blood (lipid basis)															
Males, age >25	97VN047	**31**	31	ND	6.9	10	52	ND	ND	3.4	17	ND	NDR	**37.2**	**83.4%**
Females, age >25	97VN048	**11**	11	ND	ND	14	64	ND	ND	ND	ND	ND	NDR	**14.3**	**76.9%**
Males, age 12 to 25	97VN049	**21**	21	ND	ND	10	NDR	ND	ND	ND	14	24	76	**25.5**	**82.4%**
Females, age 12 to 25	97VN050	**12**	12	ND	ND	19	50	ND	ND	ND	ND	12	ND	**15.4**	**78.0%**
Rang Rang, Ma Da forest region, southern Viet Nam (Exposed)															
Soil (0 to 10 cm)															
North of Ma Da River	97VN077	**19.10**	24.88	8.94	26.37	7.54	26.86	2.48	8.98	5.42	1.13	1.44	1.40	**20.33**	**93.9%**
South of former airstrip	97VN075	**7.86**	10.13	1.41	7.22	6.62	16.58	1.03	4.02	1.54	0.51	ND	0.81	**8.44**	**93.1%**
At former airstrip	97VN079	**1.82**	2.46	3.76	7.60	9.58	24.91	0.59	1.15	0.71	ND	1.07	ND	**2.37**	**76.8%**
Sediment															
Fish pond near Ba Hao	97VN073	**7.80**	9.71	ND	ND	5.85	29.51	0.59	0.88	1.07	ND	1.32	1.41	**7.93**	**98.4%**
Ba Hao Reservoir	97VN089	**2.28**	3.34	ND	7.59	10.40	18.76	0.27	2.12	ND	ND	1.01	0.69	**2.64**	**86.4%**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.
NDR = Peak detected but did not meet quantification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.3 **Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in soil (0-10 cm depth) composite samples (pg/g [ppt], dry weight), Aluoi Valley, Viet Nam, March 1999.**

Site Location	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
A Dot Commune															
Site 1	99VN020	**1.0**	1.0	ND	1.5	11	540	0.3	1.7	ND	ND	0.5	0.7	**1.8**	**55.6%**
Site 1	99VN022	**0.8**	0.8	ND	1.1	8.8	430	0.2	1.7	0.3	ND	0.4	0.7	**1.4**	**57.1%**
Site 2	99VN023	**0.4**	0.6	ND	1.1	3.0	43	0.2	0.9	0.3	ND	0.4	0.4	**0.62**	**64.5%**
A So Special Forces Base															
North West	99VN001	**220**	220	8.7	17	32	330	3.7	11	9.3	7.7	11	11	**220**	**>99%**
North Centre	99VN003	**360**	370	13	16	16	310	11	25	37	3.9	4.2	4.6	**360**	**>99%**
North Centre (dup.)	99VN004	**260**	260	9.2	11	13	280	7.1	17	25	3.1	4.1	3.8	**260**	**>99%**
North East	99VN006	**260**	280	23	22	10	240	20	35	20	4.4	1.5	1.2	**260**	**>99%**
Centre West	99VN008	**24**	36	28	23	7.5	120	2.1	12	9.1	1.7	1.0	0.9	**26**	**92.3%**
Centre	99VN010	**25**	37	31	25	5.2	69	1.6	6.1	5.7	1.4	0.7	0.7	**27**	**92.6%**
Centre East	99VN012	**45**	54	21	21	7.5	130	2.7	11	9	2.3	0.9	0.9	**46**	**97.8%**
South West	99VN014	**15**	20	6.5	7.6	6.8	75	0.9	6	4.8	1.5	0.9	0.8	**16**	**93.8%**
South Centre	99VN016	**5.4**	7.6	3.6	4.4	5.1	77	0.4	2.3	1.6	0.6	0.5	0.6	**5.7**	**94.7%**
South East	99VN018	**4.2**	5.1	2.5	6	9.2	240	0.4	2.4	1.0	0.3	0.9	1.0	**4.9**	**85.7%**
Huong Lam Commune															
Site 1	99VN025	**0.4**	0.6	ND	0.9	3.2	68	ND	0.3	ND	ND	0.4	0.6	**0.6**	**66.7%**
Site 2	99VN027	**ND**	0.4	0.3	3.9	32	180	0.2	0.6	0.2	2.7	6.6	6.0	**0.6**	**-**
Huong Phong Commune															
Site 1	99VN029	**1.6**	2.3	0.3	1.9	7.0	270	0.2	1.3	0.5	0.5	0.8	0.8	**2.1**	**76.2%**
Site 2	99VN031	**6.7**	8.4	2.0	4.4	14	210	0.4	2.6	2.1	1.1	1.2	1.2	**7.3**	**91.8%**
Phu Vinh Commune															
Site 1	99VN035	**3.0**	3.7	0.7	2.4	11	540	0.3	1.1	0.6	0.8	0.6	1.2	**3.8**	**78.9%**
Site 2	99VN037	**3.1**	3.7	1.0	3.2	13	610	0.5	2.6	2.4	0.7	1.3	1.5	**4.1**	**75.6%**
Hong Thuong Commune															
Site 1	99VN039	**5.1**	6.8	1.5	6.1	30	2200	0.3	1.3	1.5	0.7	0.9	1.1	**7.7**	**66.2%**
Ta Bat Special Forces Base															
North West	99VN057	**11**	16	7.7	9.6	21	880	0.7	5.7	2.8	1.0	1.6	1.6	**13**	**84.6%**
North Centre	99VN055	**9.2**	12	2.5	8.0	28	820	0.6	3.2	2.8	3.5	4.9	3.8	**11**	**83.6%**
North East	99VN053	**9.4**	15	7.8	8.5	13	520	1.4	11	11	2.4	2.3	2.1	**11**	**85.5%**
Centre West	99VN059	**35**	40	7.0	8.9	18	800	1.0	5.3	2.5	1.0	1.2	1.3	**37**	**94.6%**
Centre	99VN061	**5.9**	10	6.7	8.0	10	400	0.8	6.5	6.8	0.7	0.9	1.0	**7.1**	**83.1%**
Centre East	99VN063	**4.3**	8.8	1.4	5.7	18	750	0.3	2.7	1.0	0.3	0.6	0.6	**5.5**	**78.2%**
South West	99VN069	**18**	27	5.2	12	19	520	0.4	4.5	2.1	3.0	4.5	3.2	**19**	**94.7%**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.

NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.3 Cont'd.

Site Location	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8-T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
South Centre	99VN065	**8.4**	16	5.4	10	16	1100	0.5	4.1	2.1	0.8	1.0	1.2	**10**	**84.0%**
South East	99VN067	**7.7**	12	3.1	10	17	530	0.6	4.4	2.8	1.0	1.4	1.5	**9.0**	**85.6%**
Bo Dot Market															
Site 1	99VN033	**4.6**	6.8	7.8	20	150	1100	3.2	16	15	26	34	19	**9.1**	**50.5%**
Son Thuy Commune															
Site 1	99VN041	**3.1**	4.3	5.7	29	230	1800	0.4	2.1	4.1	19	44	36	**7.6**	**40.8%**
Site 2	99VN043	**3.4**	6.6	4.5	9.2	30	1100	NDR	1	1.3	1.1	1.7	2.0	**5.1**	**66.7%**
Hong Quang Commune															
Site 1	99VN051	**7.9**	8.9	2	5.4	4.3	67	0.4	1.1	1.9	1.5	0.9	0.6	**8.3**	**95.2%**
Aluoi Commune															
Site 1	99VN073	**2.1**	3.1	1.9	8.5	4.1	28	0.2	1.3	0.7	0.4	0.4	0.5	**2.7**	**77.8%**
Aluoi Market															
Site 1	99VN071	**15**	21	9.5	11	19	770	0.8	7.9	4.0	0.8	0.4	0.6	**17**	**88.2%**
Aluoi Special Forces Base															
North West	99VN079	**11**	15	6.7	13	7.0	74	0.6	3	2.1	1.0	11.8	1.3	**12**	**91.7%**
North Centre	99VN077	**12**	15	4.9	11	6.1	76	0.6	2.1	1.5	0.9	1.8	1.7	**13**	**92.3%**
North East	99VN075	**5.0**	7.3	7.5	10	9.7	140	0.4	1.6	1.0	0.9	1.7	1.7	**5.7**	**87.7%**
Centre West	99VN083	**12**	15	3.9	9.5	8.0	340	0.5	2.2	1.1	0.6	0.7	0.7	**13**	**92.3%**
Centre	99VN081	**5.7**	6.9	1.7	5.7	6.7	210	0.5	1.7	0.9	0.8	1.0	0.6	**6.3**	**90.5%**
Centre East	99VN085	**19**	24	7.4	16	11	370	0.9	5.8	3.1	1.7	1.3	1.2	**20**	**95.0%**
South West	99VN091	**11**	16	13	11	6.6	260	0.5	2.7	1.6	0.6	0.4	0.6	**12**	**91.7%**
South Centre	99VN087	**19**	26	18	16	7.0	320	0.7	3.4	2.1	1.1	0.8	0.8	**20**	**95.0%**
South East	99VN089	**10**	14	8.8	11	7.3	250	0.6	3.6	2.4	1.0	0.9	0.7	**11**	**90.9%**
Hong Kim Commune															
Site 1	99VN049	**3.7**	4.7	0.8	3.6	3.7	74	0.2	0.9	0.3	ND	0.4	0.5	**4.1**	**90.2%**
Hong Van Commune															
Site 1	99VN045	**0.4**	0.8	1.0	5.0	6.3	130	0.1	0.5	ND	0.4	1.1	0.8	**1.1**	**36.4%**
Site 2	99VN047	**0.3**	1.0	ND	1.4	3.5	64	0.1	0.9	0.3	0.2	0.4	0.5	**0.6**	**50.0%**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.

NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.4 Particle size and total organic carbon (TOC) in soil (0-10 cm depth) composite samples, Aluoi Valley, Viet Nam, March 1999.

Site Location	Sample ID	Particle Size[1]				TOC (% carbon)
		% Gravel[2]	% Sand	% Silt	% Clay	
A Dot Commune						
Site 1	99VN020	6.08	26.95	48.13	24.92	2.05
Site 1	99VN022	7.24	26.60	48.28	25.13	1.92
Site 2	99VN023	4.61	29.06	48.21	22.73	1.31
A So Special Forces Base						
North West	99VN001	3.25	48.27	41.86	9.87	1.60
North Centre	99VN003	3.21	49.12	41.43	9.46	2.19
North Centre (dup.)	99VN004	3.74	49.34	40.87	9.79	1.55
North East	99VN006	1.20	35.66	54.70	9.63	1.49
Centre West	99VN008	0.25	43.43	44.76	11.81	1.58
Centre	99VN010	0.65	43.97	47.43	8.60	1.31
Centre East	99VN012	1.60	42.10	49.08	8.82	0.85
South West	99VN014	0.24	48.74	44.93	6.33	1.85
South Centre	99VN016	0.73	57.76	36.87	5.37	1.08
South East	99VN018	0.53	34.54	53.07	12.38	1.48
Huong Lam Commune						
Site 1	99VN025	0.12	40.72	48.91	10.37	0.81
Site 2	99VN027	4.79	39.48	43.29	17.24	1.31
Huong Phong Commune						
Site 1	99VN029	1.90	53.73	34.10	12.17	1.29
Site 2	99VN031	0.61	66.42	28.82	4.76	1.27
Phu Vinh Commune						
Site 1	99VN035	2.20	30.36	46.58	23.06	1.59
Site 2	99VN037	6.16	38.37	42.48	19.14	1.80
Hong Thuong Commune						
Site 1	99VN039	2.18	21.77	44.27	33.95	1.64
Ta Bat Special Forces Base						
North West	99VN057	3.67	40.52	37.51	21.97	1.62
North Centre	99VN055	7.78	23.13	45.62	31.25	1.35
North East	99VN053	4.16	34.86	41.56	23.58	2.01
Centre West	99VN059	13.89	29.34	35.70	34.96	2.18
Centre	99VN061	3.46	33.13	39.86	27.02	2.38
Centre East	99VN063	7.23	25.53	38.57	35.90	2.09
South West	99VN069	3.98	29.46	43.33	27.21	1.80
South Centre	99VN065	7.81	20.95	40.12	38.94	1.75
South East	99VN067	4.89	33.03	35.47	31.50	2.15
Bo Dot Market						
Site 1	99VN033	4.39	36.44	40.61	22.94	1.67
Son Thuy Commune						
Site 1	99VN041	2.60	34.65	42.67	22.68	1.67
Site 2	99VN043	1.01	31.83	41.63	26.54	2.92
Hong Quang Commune						
Site 1	99VN051	0.36	16.83	57.93	25.24	1.49
Aluoi Commune						
Site 1	99VN073	0.95	26.06	52.03	21.91	1.74
Aluoi Market						
Site 1	99VN071	1.76	33.83	46.82	19.35	1.96
Aluoi Special Forces Base						
North West	99VN079	1.76	40.23	43.10	16.67	1.78
North Centre	99VN077	5.59	51.57	32.70	15.73	1.89
North East	99VN075	5.20	52.45	30.34	17.21	1.18
Centre West	99VN083	3.18	35.85	45.43	18.72	1.54
Centre	99VN081	4.46	44.92	39.55	15.53	1.38
Centre East	99VN085	1.46	36.56	44.23	19.21	1.21
South West	99VN091	4.56	37.31	43.05	19.64	1.43
South Centre	99VN087	4.15	29.92	48.43	21.65	1.46
South East	99VN089	1.85	32.26	47.60	20.14	1.88
Hong Kim Commune						
Site 1	99VN049	3.28	42.39	40.36	17.25	1.89
Hong Van Commune						
Site 1	99VN045	2.77	65.78	24.23	9.99	1.28
Site 2	99VN047	1.19	29.23	54.02	16.75	2.42

[1]Gravel (>2.00 mm); sand (<2.00 mm and >0.053 mm); silt (<0.053 mm and >0.002 mm); clay (<0.002 mm).
[2]Percent gravel is based on the entire sample. Percent sand, silt and clay sum to 100%.

Table 2.5 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in vegetation and animal tissues (pg/g [ppt], dry weight [vegetation], pg/g [ppt], wet weight [animal tissues]), Aluoi Valley, Viet Nam, 1999.

Sample Location and Type	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
A So Commune															
Animal Tissue															
Grass carp fat (pond #4)	Comp of 99VN438 99VN447	**21**	25	4.9	0.8	1.6	6.3	3.4	11	0.6	ND	ND	ND	**22**	**97.2%**
Grass carp fat (pond #4)	99VN443	**20**	25	5.4	0.9	0.8	2.4	6.0	18	5.4	0.32	0.72	1.0	**22**	**91.3%**
Grass carp fat (pond #5)	99VN451	**14**	18	3.6	0.5	0.6	3.9	2.2	11	1.9	0.2	ND	ND	**14.6**	**95.9%**
Grass carp fat (pond #1)	99VN278	**8.2**	12	1.3	0.7	1.0	5.8	2.8	12	4.9	0.8	0.2	NDR	**8.9**	**92.1%**
Grass carp fat (pond #3)	Comp of 99VN307 99VN314	**3.3**	5.6	1.8	1.1	0.5	2.2	1.8	16	3.2	0.4	ND	ND	**4.2**	**79.5%**
Common carp fat (pond #1)	99VN284	**1.9**	1.9	ND	ND	0.7	3.3	0.4	0.6	ND	ND	ND	ND	**2.12**	**89.6%**
Grass carp liver (pond #1)	99VN276	**1.1**	1.5	0.2	ND	0.6	2.3	0.3	1.6	0.4	0.2	ND	0.1	**1.26**	**87.3%**
Grass carp muscle (pond #1)	99VN281	**0.4**	0.6	0.1	ND	0.3	1.9	0.1	0.3	ND	ND	ND	ND	**0.52**	**76.8%**
Duck fat	99VN329	**82**	94	21	11	5.5	24	11	35	26	5.3	1.1	0.9	**87**	**94.3%**
Duck fat	99VN325	**52**	55	13	0.75	ND	2.8	5.6	15	3.2	0.37	0.49	1.7	**56**	**92.9%**
Chicken egg	99VN434	**ND**	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	**0.35**	**-**
Vegetation															
Rice (Comp from three owners)	Comp of 99VN272 99VN274 99VN433	**ND**	ND	ND	ND	0.3	1.8	ND	ND	ND	ND	ND	ND	**0.15**	**-**
Huong Lam Commune															
Animal Tissue															
Grass carp fat (pond #3)	99VN223	**2.8**	8.2	0.8	0.4	1.2	3.9	2.3	17	31	0.9	ND	ND	**3.61**	**77.6%**
Grass carp fat (pond #1)	Comp of 99VN186 99VN199 99VN203	**0.5**	1.9	ND	ND	1.4	4.1	0.6	9.0	ND	ND	ND	ND	**0.81**	**61.5%**
Indian carp liver (pond #3)	Comp of 99VN245 99VN250 99VN254	**0.7**	0.7	ND	ND	ND	2.6	0.2	0.7	ND	0.6	0.3	ND	**0.89**	**78.7%**
Duck fat	99VN163	**5.3**	7.1	1.5	1.3	0.69	2.6	3.2	20	8.8	0.95	ND	NDR	**7.03**	**75.4%**
Duck fat	99VN169	**4.4**	5.9	2.2	2.7	1.6	2.6	1.9	14	4.8	0.7	0.2	0.13	**5.86**	**75.1%**
Cow fat (#91 Market)	99VN690	**0.1**	0.2	ND	0.3	0.3	1.1	ND	ND	0.1	0.3	ND	NDR	**0.3**	**33.3%**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.

NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.5 Cont'd.

Sample Location and Type	Sample ID	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ
		2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF		
Hong Thuong Commune															
Animal Tissue															
Grass carp fat (pond #3)	99VN151	**4.4**	8.4	0.4	2.1	2.5	6.7	3.4	19	6.9	1.3	ND	ND	**5.09**	**86.4%**
Grass carp fat (pond #2)	Comp of 99VN131 99VN135	**4.2**	8.5	ND	1.6	ND	NDR	2.4	12	ND	ND	ND	ND	**4.91**	**85.5%**
Common carp liver (pond #2)	99VN124	**2.8**	2.8	ND	ND	1.0	8.7	NDR	ND	ND	ND	ND	ND	**3.12**	**89.7%**
Son Thuy Commune															
Animal Tissue															
Pig fat (Bo Dot Market)	99VN482	**0.1**	0.1	ND	0.2	0.5	2.6	ND	ND	ND	0.8	0.6	NDR	**0.3**	**33.3%**
Xa Nham Commune (Pa Du Stream)															
Animal Tissue (wild fish)															
Common carp liver	99VN499	**0.7**	0.7	0.1	0.1	0.4	1.6	0.2	0.2	ND	0.1	ND	0.1	**0.8**	**87.5%**
Aluoi Commune															
Animal Tissue															
Pig fat (#91 Market)	99VN694	**NDR**	ND	ND	ND	3.1	9.8	ND	ND	ND	2.2	3.5	0.8	0.4	**-**
Other															
Cooking Oil (#91 Market)	Comp of 99VN494, 99VN495 and 99VN496	**ND**	ND	ND	1.0	5.2	19	ND	ND	ND	ND	1.3	2.0	**0.172**	**-**
Hong Van Commune															
Animal Tissue															
Grass carp fat (pond #4)	Comp of 99VN391 99VN395	**3.4**	6.3	0.5	0.5	1.2	4.0	1.0	4.6	1.2	ND	ND	0.2	**3.7**	**91.9%**
Grass carp fat (pond #3)	Comp of 99VN380 99VN386	**NDR**	2.0	ND	ND	1.7	NDR	NDR	6.5	ND	ND	ND	ND	**0.34**	**-**
Duck fat	99VN355	**1.1**	4.2	2.1	8.3	7.2	27	2.0	12	5.1	1.6	0.3	0.2	**2.7**	**40.7%**
Vegetation															
Rice	99VN332	**ND**	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	ND	**0.14**	**-**

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.
NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.6 Age of participants in whole human blood analyses for PCDDs/PCDFs, Aluoi Valley, Viet Nam, June 1999.

Commune	Males		Females	
	>25 yrs.	<25 yrs.	>25 yrs.	<25 yrs.
A So				
mean ± SD	**48** ± 16	**20** ± 3.1	**40** ± 13	**20** ± 2.7
range	25 - 79	16 - 24	25 - 68	15 - 24
n	48	30	44	41
Huong Lam				
mean ± SD	**32** ± 8.6	**21** ± 2.4	**30** ± 6.5	**22** ± 1.9
range	25 - 60	15 - 24	25 - 49	17 - 24
n	31	33	29	27
Hong Thuong				
mean ± SD	**48** ± 14	**20** ± 2.7	**40** ± 11	**22** ± 2.0
range	25 - 78	15 - 24	25 - 75	17 - 24
n	43	27	37	25
Hong Van				
mean ± SD	**50** ± 14	**21** ± 2.3	**42** ± 12	**20** ± 2.6
range	25 - 70	16 - 24	25 - 60	15 - 24
n	37	40	27	37

Table 2.7 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in whole human blood (pg/g [ppt], lipid basis) sampled in the Aluoi Valley, Viet Nam, 1999.

Commune and Donor Type	Sample ID	# in Comp.	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8-T4CDD of TEQ	P5CDD: TCDD Ratio
			2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8-T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF			
A So Commune																	
males >25	Comp. 4	48	**41**	41	ND	ND	ND	72	ND	ND	ND	29	ND	7.4	**45.9**	**89.3%**	-
males <25	Comp. 3	30	**31**	31	ND	ND	18	49	ND	ND	ND	25	ND	NDR	**35.0**	**88.6%**	-
females >25	Comp. 2	44	**16**	16	ND	ND	ND	42	ND	ND	ND	ND	13	ND	**18.3**	**87.4%**	-
females <25	Comp. 1	41	**14**	14	ND	2.1	28	86	ND	ND	5.0	16	23	7.5	**16.6**	**84.3%**	-
Huong Lam Commune																	
males >25	Comp. 12	31	**17**	17	ND	7.0	36	120	ND	ND	ND	55	65	6.5	**25.6**	**66.4%**	-
males <25	Comp. 11	33	**9.0**	9.0	3.9	13	21	74	ND	ND	5.5	36	47	6.5	**19.8**	**45.5%**	0.43
females >25	Comp. 10	29	**5.3**	5.3	2.9	25	49	130	ND	ND	24	89	130	NDR	**22.0**	**24.1%**	0.55
females <25	Comp. 9	27	**ND**	ND	ND	3.8	ND	110	ND	ND	ND	23	ND	ND	**10.0**	**-**	-
Hong Thuong Commune																	
males >25	Comp. 16	43	**21**	21	5.6	15	24	120	ND	ND	ND	49	53	3.7	**32.3**	**65.0%**	0.27
males <25	Comp. 15	27	**8.6**	8.6	ND	10	44	180	ND	ND	3.4	26	32	ND	**15.1**	**57.0%**	-
females >25	Comp. 14	37	**12**	12	4.0	14	29	170	ND	ND	5.2	50	77	NDR	**24.6**	**48.8%**	0.33
females <25	Comp. 13	25	**7.6**	7.6	ND	5.2	26.0	87	NDR	ND	ND	10	21	4.1	**11.5**	**66.1%**	-
Hong Van Commune																	
males >25	Comp. 8	37	**ND**	ND	ND	4.7	11	83	ND	ND	ND	16	25	2.6	**5.41**	**-**	-
males <25	Comp. 7	40	**NDR**	ND	1.6	ND	10	64	ND	ND	ND	20	32	NDR	**7.67**	**-**	-
females >25	Comp. 6	27	**ND**	ND	ND	ND	15	120	ND	ND	ND	10	23	ND	**5.95**	**-**	-
females <25	Comp. 5	37	**ND**	ND	ND	ND	ND	82	ND	ND	ND	7.7	ND	3.2	**3.53**	**-**	-

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.

NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.8 Overview of TCDD and 1,2,3,7,8-P5CDD (P5CDD) concentrations (pg/g [ppt], lipid basis) and Total TEQs determined in human blood during non-Viet Nam studies involving unexposed participants in industrialized countries (P5CDD:TCDD ratios included).

Location	TCDD (pg/g)	P5CDD (pg/g)	Total TEQ (pg/g)	% TCDD of Total TEQ	P5CDD: TCDD Ratio
Unexposed Participants:					
USA (residents) (n=16) (Median)[1]	1.8	5.6	19.4	9.3	3.11
Russia (Baikalsk) (n=8) (Pool)[2]	3.7	4.7	18.0	20.6	1.27
Russia (St. Petersburg) (n=60) (Pool)[2]	4.5	9.3	17.0	26.5	2.07
Germany (n=102) (Mean)[2]	3.6	13.8	42.0	8.6	3.83
USA (n=100) (Pool)[2]	5.2	21	41.0	12.7	4.04
Guam (n=10) (Mean)[2]	2.6	14.7	28.0	9.3	5.65
USA (Missouri) (n=6) (Pool)[3]	3.4	7.1	23.4	14.5	2.09
Spain (males, 18-29 yrs) (2 Pools; n=20&14) (Mean)[4]	1.5	3.2	10.0	15.0	2.13
Spain (males, 30-49 yrs) (2 Pools; n=16&22) (Mean)[4]	1.5	4.7	12.5	12.0	3.13
Spain (males, 50-69 yrs) (2 Pools; n=12&15) (Mean)[4]	1.9	5.8	15.0	12.7	3.05
Spain (females, 18-39 yrs) (2 Pools; n=26&21) (Mean)[4]	0.8	4.7	11.7	6.8	5.88
Spain (females, 40-69 yrs) (2 Pools; n=28&24) (Mean)[4]	2.3	6.1	17.6	13.1	2.65
Germany (adults) (n=15) (Mean)[5]	2.4	6.1	18.4	13.0	2.54
Germany (urban industrial) (n=45) (Pool)[5]	1.2	2.5	7.3	16.4	2.08
Germany (urban industrial) (n=79) (Pool)[5]	1.2	2.7	8.2	14.6	2.25
Germany (rural industrial) (n=39) (Pool)[5]	1.8	3.8	10.0	18.0	2.11
Germany (rural industrial) (n=44) (Pool)[5]	1.4	3.2	9.0	15.6	2.29
Germany (rural) (n=46) (Pool)[5]	1.5	3.1	9.3	16.1	2.07
Germany (rural) (n=33) (Pool)[5]	1.8	3.6	10.1	17.8	2.00
China (15-19 yrs) (n=50) (Pool)[6]	<1.2	1.6	4.8	-	-
China (>40 yrs) (n=50) (Pool)[6]	ND	3.1	5.7	-	-
Finland (control) (n=3) (Mean)[7]	0.9	5.1	19.1	4.7	5.67
Russia (control) (n=100) (Pool)[8]	12	9.5	22.3	53.8	0.79
Finland (control) (n=14) (Mean)[9]	4.1	17	49.0	8.4	4.15
Germany (vegetarians) (n=24) (Mean)[10]	3.39	14.1	32.6	10.4	4.16
Germany (non-vegetarians) (n=24) (Mean)[10]	3.58	15.5	34.32	10.4	4.33
Canada (reference) (n=10) (Mean)[11]	4	16.5	12.9	31.0	4.13
Canada (non-fish eaters, <38 yrs) (n=unspecified) (Pool)[12]	3	8.7	24.7	12.1	2.90
Canada (non-fish eaters, 38-50 yrs) (n=unspecified) (Pool)[12]	4.6	6.8	29.8	15.4	1.48
Canada (non-fish eaters, >50 yrs) (n=unspecified) (Pool)[12]	5.9	15.1	36.8	16.0	2.56
Canada (non-fish eaters, <38 yrs) (n=unspecified) (Pool)[12]	2.8	ND	34.0	8.2	-
Canada (non-fish eaters, 38-50 yrs) (n=unspecified) (Pool)[12]	3.6	11	29.1	12.4	3.06
Canada (non-fish eaters, >50 yrs) (n=unspecified) (Pool)[12]	ND	11	34.3	-	-

Table 2.8 cont'd.

Location	TCDD (pg/g)	P5CDD (pg/g)	Total TEQ (pg/g)	% TCDD of Total TEQ	P5CDD: TCDD Ratio
Unexposed Participants:					
Spain (adults) (n=11) (Mean)[13]	1.52	4.09	14.3	10.6	2.69
Germany (adults) (n=134) (Mean)[14]	2.9	6.3	19.1	15.2	2.17
Russia (general population) (n=68) (Pool)[15,16]	4.4	8.8	17.0	25.9	2.00
Germany (control) (n=85) (Mean)[17]	3.6	NR	42.0	8.6	-
USA (referent) (n=79) (Mean)[18]	7	12	34.3	20.4	1.71
Russia (general Ufa population) (n=100) (Pool)[16]	12	9.5	22.7	52.9	0.79

ND = Not Detected
NR = Not Reported

[1] Tepper *et al.* 1997.
[2] Schecter *et al.* 1992c.
[3] Schecter 1994b (Table 15).
[4] Gonzalez *et al.* 1998.
[5] Wuthe *et al.* 1996.
[6] Schecter 1994b (Table 9).
[7] Hesso *et al.* 1992.
[8] Schecter 1994b (Table 8).
[9] Rosenberg *et al.* 1995.
[10] Welge *et al.* 1993.
[11] Papke *et al.* 1990.
[12] Cole *et al.* 1997.
[13] Jiminez *et al.* 1996.
[14] Papke *et al.* 1996.
[15] Schecter *et al.* 1993b.
[16] Schecter *et al.* 1994b.
[17] Schecter 1992.
[18] Piacitelli *et al.* 1992.

Table 2.9 Overview of TCDD and 1,2,3,7,8-P5CDD (P5CDD) concentrations (pg/g [ppt], lipid basis) and Total TEQs determined in human blood during non-Viet Nam studies involving exposed participants (i.e., some form of exposure in industrialized countries) (P5CDD:TCDD ratios included).

Location (Exposed Participants)	TCDD (pg/g)	P5CDD (pg/g)	Total TEQ (pg/g)	% TCDD of Total TEQ	P5CDD: TCDD Ratio
TCDD value < 100 pg/g, lipid basis					
USA (pulp mill) (n=46) (Median)[1]	1.9	5.5	20.0	9.5	2.89
Canada (Quebec, sea-food based diet) (n=9-55) (Mean)[2]	8.4	16.2	39.6	21.2	1.93
Germany (TCP accident) (n=17) (Mean)[3]	53	23.9	92.6	57.2	0.45
Germany (metal plant) (n=32) (Mean)[3]	5.2	19.2	90.2	5.8	3.69
Germany (pyrolysis plant) (n=12) (Mean)[4]	4.4	12.5	27.0	16.3	2.84
Germany (incinerator plant) (n=19) (Mean)[5]	1.3	5.1	15.6	8.3	3.92
Germany (incinerator plant) (n=20) (Mean)[5]	1.4	5.5	18.4	7.6	3.93
China (Na-PCP sprayed areas, 15-19 yrs) (n=50) (Pool)[6]	2.2	5.3	9.0	24.4	2.41
China (Na-PCP sprayed areas, 40 yrs) (n=50) (Pool)[6]	4.6	9.5	16.5	27.9	2.07
Finland (lab personnel) (n=7) (Mean)[7]	2	5.5	23.0	8.7	2.75
Russia (chemical workers' children) (n=6) (Mean)[8]	49	23	69.7	70.3	0.47
Finland (pulp bleaching plant) (n=14) (Mean)[9]	5.7	24	61.0	9.3	4.21
Finland (paper mill) (n=20) (Mean)[9]	3.1	20	60.0	5.2	6.45
Germany (hospital fire) (n=53) (Mean)[10]	3.6	15.3	30.3	11.9	4.25
Germany (relay station fire) (n=25) (Mean)[10]	3	11.4	18.5	16.2	3.80
Germany (distillation plant fire) (n=7) (Mean)[10]	2.3	14	19.7	11.7	6.09
Canada (fish eaters, <38 yrs) (n=unspecified) (Pool)[11]	2.8	6.8	21.5	13.0	2.43
Canada (fish eaters, 38-50 yrs) (n=unspecified) (Pool)[11]	5.7	9.6	29.9	19.1	1.68
Canada (fish eaters, >50 yrs) (n=unspecified) (Pool)[11]	5.3	11.8	33.5	15.8	2.23
Canada (fish eaters, <38 yrs) (n=unspecified) (Pool)[11]	5.4	ND	32.4	16.7	-
Canada (fish eaters, 38-50 yrs) (n=unspecified) (Pool)[11]	7.4	17	40.1	18.5	2.30
Canada (fish eaters, >50 yrs) (n=unspecified) (Pool)[11]	4.8	15.4	41.2	11.7	3.21
USA & Europe (chemists) (n=3) (Mean)[12]	8.5	NR	18.7	45.5	-
USA (pulp plant) (n=2) (Mean)[13]	8.6	15.1	31.7	27.1	1.76
USA (PCB exposure) (n=2) (Mean)[13]	13	23.2	60.0	21.7	1.78
Russia (office workers in agrochemical plant) (n=2) (Mean)[14]	23.5	17	40.9	57.5	0.72
TCDD value > 100 pg/g, lipid basis					
Germany (TCP production) (n=12) (Mean)[3]	331.8	10.7	356.4	93.1	0.03
Germany (factory [2,4,5-T] workers) (n=85) (Mean)[3]	125.6	56.3	249.5	50.3	0.45
Russia (chemical [2,4,5-T] workers) (n=4) (Mean)[8]	168.0	28.0	190.9	88.0	0.17
Russia (factory [2,4,5-T] workers, males) (n=3) (Mean)[15]	163.0	29.0	191.2	85.3	0.18
Russia (factory [2,4,5-T] workers, females) (n=3) (Mean)[15]	202.0	64.0	258.6	78.1	0.32
Russia (factory [2,4,5-T / 2,4-D] workers) (n=10) (Mean)[14]	118.0	27.0	142.0	83.1	0.23

ND = Not Detected
NR = Not Reported

[1] Tepper *et al.* 1997.
[2] Ayotte *et al.* 1997.
[3] Papke *et al.* 1992.
[4] Wuthe *et al.* 1992.
[5] Demi *et al.* 1996.
[6] Schecter 1994b (Table 9).
[7] Hesso *et al.* 1992.
[8] Schecter 1994b (Table 8).
[9] Rosenberg *et al.* 1995.
[10] Papke *et al.* 1990.
[11] Cole *et al.* 1997.
[12] Schecter 1992.
[13] Schecter *et al.* 1993a.
[14] Schecter *et al.* 1994b.
[15] Schecter *et al.* 1993b.

Table 2.10 **Summary of information regarding lactating primaparous females (first child, single births) and one multiparous female (10 children; data in italics) who participated in breast milk PCDD/PCDF analyses, Aluoi Valley, Viet Nam, June 1999; analyses were performed on individual milk samples.**

Commune	Patient ID Number	Milk Sample Number	Age	Number of Children	Age of Children	Duration of Breastfeeding	Total Sample Volume (ml)
A So	H261	99VN649	23	1	5 mo	5 mo	30
A So	H182	99VN629	22	1	1 y	1 y	40
A So	H258	99VN648	20	1	1 mo	1 mo	30
A So	H353	99VN655	18	1	1 y	1 y	15
A So	***H179***	***99VN628***	***50***	***10***	***range 2-20 y***	***2 years each***	***35***
Huong Lam	H107	99VN603	28	1	3 mo	3 mo	35
Huong Lam	H096	99VN609	23	1	7 mo	7 mo	40
Huong Lam	H097	99VN608	21	1	20 days	20 days	60
Huong Lam	H112	99VN625	19	1	8 mo	8 mo	30
Hong Thuong	H611	99VN592	22	1	1 y	1 y	30
Hong Thuong	H588	99VN586	21	1	6 mo	6 mo	30
Hong Thuong	H623	99VN594	19	1	2 mo	2 mo	40
Hong Thuong	H576	99VN579	17	1	5 mo	5 mo	40
Hong Van	H458	99VN667	23	1	2 mo	2 mo	40
Hong Van	H457	99VN666	20	1	5 mo	5 mo	40
Hong Van	H480	99VN678	20	1	1 mo	1 mo	40
Hong Van	H502	99VN686	19	1	1 mo	1 mo	50

Table 2.11 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in human breast milk (pg/g [ppt], lipid basis) from primaparous females (first child, single births), Aluoi Valley, Viet Nam, 1999.

Sample Location	Sample ID	Donor Age (yrs)	% Lipid	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ	P5CDD :TCDD Ratio
				2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF			
A So Commune	99VN629	22	5.6	**5.5**	5.5	ND	1.3	0.2	1.8	ND	NDR	0.7	1.1	2.3	NDR	**6.15**	**89.4%**	-
	99VN648	20	4.5	**19.0**	19.0	3.1	ND	ND	4.7	ND	ND	1.9	3.0	ND	ND	**21.9**	**86.8%**	0.16
	99VN655	18	4.0	**18**	18	1.5	1.8	ND	15	ND	NDR	ND	ND	5.2	NDR	**18.7**	**96.3%**	0.08
	99VN649	23	3.3	**16**	16	1.8	3.0	0.6	7.9	ND	ND	ND	11	5.0	NDR	**18.8**	**85.1%**	0.11
Huong Lam Commune	99VN609	23	1.3	**12**	12	ND	ND	1.8	16	ND	ND	3.1	6.9	5.5	NDR	**14.6**	**82.2%**	-
	99VN625	19	3.7	**8.3**	8.3	ND	ND	8.9	51	NDR	ND	1.9	5.4	3.8	NDR	**10.2**	**81.4%**	-
	99VN603	28	3.6	**2.9**	2.9	2.7	7.7	9.2	15	1.1	1.1	8.3	23	17	4.9	**10.6**	**27.4%**	0.93
	99VN608	21	1.7	**5.8**	5.8	1.5	5.8	4.5	13	ND	NDR	3.2	6.3	6.0	ND	**9.33**	**62.2%**	0.26
Hong Thuong Commune	99VN579	17	1.6	**11**	11	2.5	7.8	11	31	1.1	1.5	5.3	25	12	2.7	**17.2**	**64.0%**	0.23
	99VN586	21	1.4	**8.7**	8.7	ND	8.7	9.5	32	1.0	1.0	4.6	10	6.4	4.8	**12.6**	**69.0%**	-
	99VN592	22	2.7	**7.7**	7.7	1.6	5.4	3.5	18	0.6	0.6	0.6	5.7	3.7	NDR	**9.73**	**79.1%**	0.21
	99VN594	19	2.1	**11**	11	2.7	7.8	7.2	30	0.6	0.6	6.1	23	13	NDR	**18.5**	**59.5%**	0.25
Hong Van Commune	99VN666	20	2.7	**3.3**	3.3	ND	1.8	3.0	13	ND	NDR	1.8	4.8	2.4	NDR	**5.07**	**65.1%**	-
	99VN667	23	2.1	**2.2**	2.2	1.2	3.0	0.5	12	ND	ND	ND	4.7	3.4	NDR	**3.85**	**57.1%**	0.55
	99VN678	20	3.2	**5.0**	5.0	4.1	14	14	43	ND	NDR	4.6	25	12	ND	**13.2**	**37.9%**	0.82
	99VN686	19	1.8	**1.4**	1.4	1.2	2.0	1.9	9.4	ND	NDR	ND	4.4	ND	NDR	**2.99**	**46.8%**	0.86

Table 2.12 Concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) in human breast milk (pg/g [ppt], lipid basis) from a multiparous (10 children) female, Aluoi Valley, Viet Nam, 1999.

Sample Location	Sample ID	Donor Age (yrs)	% Lipid	PCDD Concentration (pg/g)						PCDF Concentration (pg/g)						Total TEQ (pg/g)	% 2,3,7,8 - T4CDD of TEQ	P5CDD :TCDD Ratio
				2,3,7,8 - T4CDD	Total T4CDD	Total P5CDD	Total H6CDD	Total H7CDD	Total O8CDD	2,3,7,8- T4CDF	Total T4CDF	Total P5CDF	Total H6CDF	Total H7CDF	Total O8CDF			
A So Commune	99VN628	50	3.2	**32**	32	1.7	1.2	1.8	6.2	0.5	0.5	1.1	3.0	1.6	NDR	**34.1**	**93.8%**	0.05

ND = Not detected; for 'Total TEQ' calculations, if ND, ½ detection level was used.
NDR = Peak detected but did not meet qualification criteria; for 'Total TEQ' calculations, NDR was treated as ND.

Table 2.13 Polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) congener profiles determined in human breast milk samples (pg/g [ppt], lipid basis) during other investigations (including calculated P5CDD:TCDD ratios).

Location	Dioxin/Furan Congener (pg/g, lipid basis)										
	TCDD	P5CDD	H6CDD	H7CDD	O8CDD	T4CDF	P5CDF	H6CDF	H7CDF	O8CDF	P5CDD: TCDD Ratio
Non-Viet Nam Studies:											
Germany (n=526) (Mean)[1]	3.2	10.1	50.6	41.2	207.9	1.7	27.2	17.7	5.5	1.4	3.16
China (Na-PCP Exposed) (n=50) (Pool)[2]	1.4	3.4	14.1	7.1	103	0.5	1.1	2.3	0.6	0.4	2.43
China (General Population) (n=50) (Pool)[2]	0.6	0.7	2.9	3.3	26.8	2	2.0	2.1	0.8	0.3	1.17
Murmansk (n=8) (Pool)[3]	5.0	4.7	10.5	6.4	50	1.8	13.2	8.5	4.5	1.4	0.94
Germany (n=112) (Mean)[4]	3.6	12	66	51	344	2.5	21	19	8.4	1.6	3.33
Germany (n=1)[5]	3.9	16.3	59	34.9	134	1.5	5.8	18.1	<.03	7.5	4.18
Germany (n=1)[6]	2.1	5.3	38.6	29.7	118	<0.7	18	8.6	3.8	<2.0	2.52
Kazakhstan (Rural) (n=8) (Mean)[7]	46.5	14.6	11.2	11.4	167	0	4.4	5.1	2.3	3.7	0.31
Los Angeles (n=21) (Pool)[8]	3.1	7.2	47	50	303	3.3	6.5	10	5.7	2.7	2.32
Binghamton, NY (n=22) (Pool)[8]	3.5	6.2	39	34	163	2.6	5.1	9.9	1.4	5.5	1.77
UK (Birmingham) (n=1) (Pool)[8]	6.5	14	77	76	303	1.4	26	20	9.5	6.8	2.15
Sweden (Sundsvall) (n=10) (Mean/Median)[8]	3.3	7.8	35	52	209	3.8	20	9.3	6.7	<2.5	2.36
Norway (Tromso) (n=11) (Mean/Median)[8]	2.9	4.7	24	36	154	4.2	14	7.0	6.2	<2.5	1.62
New Zealand (n=2) (Mean/Median)[8]	1.4	2.6	12	52	141	<1	2.0	<1	4.6	1	1.86
Netherlands (Rural) (n=1) (Mean/Median)[8]	5.2	18	96	112	627	3.1	25	16	16	0.8	3.46
Netherlands (Urban) (n=1) (Mean/Median)[8]	5.4	17	90	82	545	2.8	24	14	0	2.4	3.15
Japan (Fukuoka) (n=6) (Mean/Median)[8]	2.1	4.6	39	62	975	3.0	26	9.4	4.0	<2	2.19
Weiden (n=14) (Mean/Median)[8]	3.7	12	63	60	264	3.3	23	18	8.7	0.7	3.24
W. Berlin (n=40) (Pool)[8]	3.3	14	79	44	210	2.5	20	14	8.5	<3	4.24
Denmark (n=10) (Mean/Median)[8]	2.3	5.5	39	51	157	1.2	13	14	8.4	0	2.39
Canada (Quebec) (n=34) (Pool)[8]	2.8	8.1	53	73	152	4.0	8.8	9.0	6.2	<2	2.89
Belgium (Industrial) (n=1)[8]	10.2	10.7	42	52	283	6.2	35	29	7.3	0.3	1.05
Vienna (n=54) (Pool)[8]	2.9	4.4	18	47	159	4.4	17	10	6.5	18	1.52

Table 2.13 cont'd.

Location	Dioxin/Furan Congener (pg/g, lipid basis)										
	TCDD	P5CDD	H6CDD	H7CDD	O8CDD	T4CDF	P5CDF	H6CDF	H7CDF	O8CDF	P5CDD: TCDD Ratio
Canada (S. Quebec) (n=96) (Pool)[9]	2.3	4.8	41.0	40.5	131.7	6.1	5.2	6.6	4.5	1.1	2.09
Canada (Arctic) (n=40) (Pool)[9]	6.2	8.0	38.8	37.4	292.3	2.2	6.7	6.2	6.7	3.8	1.29
Germany (n=185) (Pool)[10]	3.0	9.3	46.1	46.0	185.0	2.0	24.7	16.7	5.5	9.9	3.10
United States (n=42) (Pool)[10]	3.3	6.7	41.7	42.0	233.0	2.9	7.8	10.9	4.3	4.1	2.03
Siberia (n=23) (Pool)[10]	2.7	3.3	8.4	8.1	50.2	2.9	11.5	11.8	1.5	1.2	1.22
Thailand (Bangkok) (n=10) (Pool)[10]	0.3	1.1	2.3	10.0	68.0	1.8	3.3	3.0	1.2	0.6	3.67
Cambodia (Phnom Penh) (n=8) (Pool)[10]	0.5	1.6	5.1	11.0	59.0	0.5	1.9	2.2	2.5	2.4	3.20
Spain (Tarragona) (n=15) (Pool)[11]	1.0	4.0	35.3	38.3	145.7	0.7	8.3	6.6	2.1	0.3	4.00
Lithuania (Anykshchiai) (n=10-12) (Pool)[12]	5.5	3.6	8.6	5.7	32.7	0.8	10.7	8.0	3.5	0.6	0.65
Viet Nam (Other Studies):											
Tan Than [*sic*] Village (n=2) (Pool)[13]	3.0	3.3	8.1	37	452	1.3	2.7	5.3	12	115	1.10
South (n=11) (Pool)[8]	12	14	41	50	143	8.0	18	41	38	0	1.17
Ho Chi Minh City (n=7) (Pool)[13]	4.5	6.1	14	40	520	3.1	5.5	9.0	9.1	220	1.36
Ha Noi (n=30) (Pool)[10]	2.1	2.9	8.8	11.5	78.3	2	7.1	8.7	3.4	2.1	1.38
Da Nang (n=11) (Pool)[10]	5.6	15	38.1	55	292	2.2	21.1	53	40	7.4	2.68
Dong Nai (n=11) (Pool)[10]	10	7.2	16.1	28	119	1.6	14.0	32.1	6.2	0.9	0.72
Ho Chi Minh City (n=38) (Pool)[14]	7.1	6.0	22.1	36.0	231.0	2.8	9.5	11.2	8.0	2.6	0.85
Song Be Province (n=12) (Pool)[14]	17.0	8.2	30.6	36.0	185.0	2.0	10.7	22.8	10.0	1.8	0.48
Tan Uyen District (n=2) (Pool)[14]	2.9	4.9	25.5	64.0	210.0	2.3	22.7	68.6	93.0	1.0	1.69
Tan Uyen District (n=2) (Pool)[14]	5.2	1.5	8.8	31.0	120.0	1.0	2.8	5.5	8.0	1.0	0.29
Tan Uyen District (n=2) (Pool)[14]	11.0	5.4	18.0	31.0	99.0	0.5	6.1	5.7	1.0	1.0	0.49

[1] Furst *et al.* 1994.
[2] Schecter *et al.* 1994a.
[3] Polder *et al.* 1998.
[4] Beck *et al.* 1994.
[5] Korner *et al.* 1993.
[6] Jodicke *et al.* 1992.
[7] Hooper *et al.* 1998.
[8] Jensen and Slorach 1991.
[9] Dewailly *et al.* 1992; Dewailly *et al.* 1991.
[10] Schecter *et al.* 1991b; Schecter 1994b.
[11] Schuhmacher *et al.* 1999.
[12] Becher 1995.
[13] Schecter *et al.* 1989b.
[14] Schecter *et al.* 1989c.

Table 2.14 Concentrations of TCDD in human breast milk (pg/g [ppt], lipid basis) and average daily intake (pg/kg body weight/day) of contaminants by infants from primaparous females (first child, single births), Aluoi Valley, Viet Nam, 1999.

Sample Location	Sample ID	Donor Age (yrs)	% Lipid	TCDD (pg/g)	Total TEQ (pg/g)	%TCDD of Total TEQ	Intake[1] (actual % lipid used in determination)		Intake[1] (3.5% lipid used in determination)[2]	
							TCDD	Total TEQ	TCDD	Total TEQ
A So Commune	99VN629	22	5.6	5.5	6.15	89.4%	43.1	48.2	27.0	30.1
	99VN648	20	4.5	19.0	21.9	86.8%	119.7	138.0	93.1	107.3
	99VN655	18	4.0	18	18.7	96.3%	100.8	104.7	88.2	91.6
	99VN649	23	3.3	16	18.8	85.1%	73.9	86.9	78.4	92.1
mean (n=4)		***20.8***	***4.4***	***14.6***	***16.4***	***89.4%***	***84.4***	***94.5***	***71.7***	***80.3***
± standard deviation		***2.2***	***1.0***	***6.2***	***7.0***	***4.9%***	***33.3***	***37.4***	***30.4***	***34.2***
Huong Lam Commune	99VN609	23	1.3	12	14.6	82.2%	21.8	26.6	58.8	71.5
	99VN625	19	3.7	8.3	10.2	81.4%	43.0	52.8	40.7	50.0
	99VN603	28	3.6	2.9	10.6	27.4%	14.6	53.4	14.2	51.9
	99VN608	21	1.7	5.8	9.33	62.2%	13.8	22.2	28.4	45.7
mean (n=4)		***22.8***	***2.6***	***7.3***	***11.2***	***63.3%***	***23.3***	***38.8***	***35.5***	***54.8***
± standard deviation		***3.9***	***1.3***	***3.9***	***2.3***	***25.7%***	***13.6***	***16.7***	***18.9***	***11.4***
Hong Thuong Commune	99VN579	17	1.6	11	17.2	64.0%	24.6	38.5	53.9	84.3
	99VN586	21	1.4	8.7	12.6	69.0%	17.1	24.7	42.6	61.7
	99VN592	22	2.7	7.7	9.73	79.1%	29.1	36.8	37.7	47.7
	99VN594	19	2.1	11	18.5	59.5%	32.3	54.4	53.9	90.7
mean (n=4)		***19.8***	***2.0***	***9.6***	***14.5***	***67.9%***	***25.8***	***38.6***	***47.0***	***71.1***
± standard deviation		***2.2***	***0.6***	***1.7***	***4.1***	***8.5%***	***6.6***	***12.2***	***8.2***	***20.0***
Hong Van Commune	99VN666	20	2.7	3.3	5.07	65.1%	12.5	19.2	16.2	24.8
	99VN667	23	2.1	2.2	3.85	57.1%	6.5	11.3	10.8	18.9
	99VN678	20	3.2	5.0	13.2	37.9%	22.4	59.1	24.5	64.7
	99VN686	19	1.8	1.4	3.0	46.8%	3.5	7.6	6.9	14.7
mean (n=4)		***20.5***	***2.5***	***3.0***	***6.3***	***51.7%***	***11.2***	***24.3***	***14.6***	***30.8***
± standard deviation		***1.7***	***0.6***	***1.6***	***4.7***	***11.9%***	***8.3***	***23.7***	***7.6***	***23.0***
overall mean (n=16)		***20.9***	***2.8***	***8.6***	***12.1***	***68.1%***	***36.2***	***49.0***	***42.2***	***59.2***
± standard deviation		***2.6***	***1.2***	***5.5***	***5.9***	***19.4%***	***33.8***	***35.3***	***27.1***	***28.7***

[1] Average daily intake via human milk based on a 5 kg infant consuming 700 ml of milk per day (WHO/EURO 1989).
Average daily intake = (volume of milk per day in ml)x(% lipid in milk/100)x(concentration of chemical in pg/g)/(infant weight in kg).
[2] 3.5% lipid, as suggested by WHO/EURO (1989).

Table 2.15 Concentrations of TCDD in human breast milk (pg/g [ppt], lipid basis) and daily intake (pg/kg body weight/day) of contaminants from a multiparous female (10 children), Aluoi Valley, Viet Nam, 1999 (notations for Table 2.14, above, also apply to Table 2.15).

Sample Location	Sample ID	Donor Age (yrs)	% Lipid	TCDD (pg/g)	Total TEQ (pg/g)	%TCDD of Total TEQ	Intake[1] (actual % lipid used in determination)		Intake[1] (3.5% lipid used in determination)[2]	
							TCDD	Total TEQ	TCDD	Total TEQ
A So Commune	99VN628	50	3.2	32.0	34.1	93.8%	143.4	152.8	156.8	167.1

Table 2.16 Summary of information regarding lactating primaparous/multiparous females who contributed to a composite breast milk sample (5 ml from each individual) for pesticide and PCB analyses, Aluoi Valley, Viet Nam, June 1999.

Commune	Composite #	Patient ID Number	Milk Sample Number	Age (years)	Number of Children	Age of Children (y=years; mo=months)	Duration of Breastfeeding (y=years; mo=months)	Total Sample Volume (ml)
A So	3	H380	99VN660	30	2	12 y, 1 y	2 y, 1 y	30
A So	3	H274	99VN653	29	2	4 y, 2 y	1.5 y, 2 y	30
A So	3	H202	99VN640	26	2	4 y, 3 y	2 y, 3 y	25
A So	3	H275	99VN654	25	3	6 y, 4 y, 1 y	2 y, 2y 1 y	25
A So	3	H183	99VN630	24	2	3.5 y, 1 y	1 y, 1 y	15
A So	3	H209	99VN643	24	2	4 y, 5 mo	2 y, 5 mo	15
A So	3	H191	99VN635	23	3	5 y, 4 y, 2 y	1 y each	20
A So	3	H200	99VN639	23	2	4 y, 1.5 mo	2.5 y, 1.5 mo	40
A So	3	H363	99VN657	22	2	3 y, 1 y	3 y, 1 y	40
A So	3	H361	99VN656	20	2	2 y	2 y	15-20
Huong Lam	2	H094	99VN611	26	2	4 y, 1.5 y	1 y, 1.5 y	35
Huong Lam	2	H087	99VN616	25	2	4 y, 8 mo	1.5 y, 8 mo	35
Huong Lam	2	H090	99VN613	24	2	5 y, 5 mo	1 y, 5 mo	60
Huong Lam	2	H128	99VN619	24	1	10 mo	10 mo	35
Huong Lam	2	H095	99VN610	22	1	2 y	2 y	20
Huong Lam	2	H091	99VN612	22	1	1.5 y	1.5 y	40
Huong Lam	2	H088	99VN615	22	2	3 y, 11 mo	14 mo, 11 mo	40
Huong Lam	2	H086	99VN617	22	3	5 y, 2 y, 7 mo	1 y, 8 mo, 7 mo	40
Huong Lam	2	H085	99VN618	22	1	9 mo	9 mo	30
Huong Lam	2	H078	99VN620	21	1	2 y	2 y	30
Hong Thuong	1	H587	99VN585	24	2	3 y, 1.5 y	2 mo, 1.5 y	25
Hong Thuong	1	H574	99VN578	23	1	1.5 y	1.5 y	25
Hong Thuong	1	H581	99VN581	22	2	3 y, 1.5 y	1 y, 1.5 y	20
Hong Thuong	1	H583	99VN582	22	1	1.5 y	1.5 y	35

Table 2.16 Cont'd.

Commune	Composite #	Patient ID Number	Milk Sample Number	Age (years)	Number of Children	Age of Children (y=years; mo=months)	Duration of Breastfeeding (y=years; mo=months)	Total Sample Volume (ml)
Hong Thuong	1	H611	99VN592	22	1	1 y	1 y	30
Hong Thuong	1	H584	99VN584	21	1	1 y	1 y	35
Hong Thuong	1	H588	99VN586	21	1	6 mo	6 mo	30
Hong Thuong	1	H580	99VN580	20	2	3 y, 1.5 y	2 y, 1.5 y	40
Hong Thuong	1	H623	99VN594	19	1	2 mo	2 mo	40
Hong Thuong	1	H576	99VN579	17	1	5 mo	5 mo	40
Hong Van	4	H493	99VN683	26	1	4 mo	4 mo	10
Hong Van	4	H492	99VN682	22	1	1 y	1 y	40
Hong Van	4	H453	99VN663	21	2	4 y, 1.5 y	2 y, 1.5 y	25
Hong Van	4	H460	99VN668	21	1	1.5 y	1.5 y	35
Hong Van	4	H464	99VN671	21	2	2 y, 2 mo	1 y, 2 mo	15
Hong Van	4	H491	99VN681	21	1	6 mo	6 mo	40
Hong Van	4	H454	99VN664	20	2	3 y, 1 y	1 y, 1 y	35
Hong Van	4	H483	99VN679	20	1	7.5 mo	7.5 mo	50
Hong Van	4	H474	99VN676	19	1	1.5 y	1.5 y	35
Hong Van	4	H486	99VN680	19	1	9 mo	9 mo	35

Table 2.17 Concentration of pesticide and PCB residues in human breast milk (ng/g [ppb], lipid basis), including p,p'-DDE:p,p'-DDT ratios, Aluoi Valley, Viet Nam, 1999. Age structure of participants in the composite sample is presented.

Residue	Sample Location/Concentration (ng/g)			
	A So Commune (composite #3) n=10 3.2% lipid	Huong Lam Commune (composite #2) n=10 2.4% lipid	Hong Thuong Commune (composite #1) n=10 2.8% lipid	Hong Van Commune (composite #4) n=10 2.9% lipid
Pesticide				
Hexachloro-benzene (HCB)	1.4	2.2	1.7	2.1
alpha HCH	ND	ND	ND	ND
beta HCH	1.1	9.5	4.8	6.0
gamma HCH	ND	ND	ND	ND
Hepta-chlor	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND
Oxy-chlordane	ND	ND	ND	ND
trans-Chlordane	ND	ND	ND	ND
cis-Chlordane	ND	ND	ND	ND
trans-Nonachlor	ND	1.3	ND	0.46
cis-Nonachlor	ND	0.32	ND	ND
o,p'-DDE	1.7	0.95	1.6	1.8
p,p'-DDE	8900	1900	3200	5900
o,p'-DDD	1.3	0.9	2.0	2.3
p,p'-DDD	25	16	20	30
o,p'-DDT	83	16	26	53
p,p'-DDT	1600	410	530	1500
Total DDT/DDD/DDE	10611.0	2343.9	3779.6	7487.1
p,p'-DDE:p,p'-DDT ratio	***5.6***	***4.6***	***6.0***	***3.9***
Mirex	0.53	0.35	1.3	2.2
Heptachlor Epoxide	ND	ND	ND	ND
alpha-Endosulphan (I)	ND	ND	ND	ND
Dieldrin	0.63	0.3	0.32	0.31
Endrin	ND	ND	ND	ND
Methoxy-chlor	ND	ND	ND	ND
PCB				
Aroclor 1242	ND	ND	ND	ND
Aroclor 1254	ND	5.9	ND	4.4
Aroclor 1260	16	44	54	47
Total PCB	**16**	**50**	**54**	**51**

Age Structure	A So	Huong Lam	Hong Thuong	Hong Van
Mean Age (years)	24.6	20.9	21.1	17.4
± 1 SD	11.0	7.2	2.0	8.8
Range	20-50	19-26	17-24	19-26

Table 2.18 **Tolerable daily intake (TDI)[1] and average daily intake of pesticides and PCBs (µg/kg body weight/day)[2] in composite human breast milk, Aluoi Valley, Viet Nam, June 1999 (*cf.*, Table 2.17).**

Contaminant	TDI	Commune/Concentration (µg/kg bw/d)			
		A So (n=10)	Huong Lam (n=10)	Hong Thuong (n=10)	Hong Van (n=10)
Pesticides					
HCB	0.27	0.007	0.011	0.008	0.01
beta-HCH	0.3	0.005	0.047	0.024	0.029
Total DDT/DDD/DDE	20	52.0	11.5	18.5	36.7
Mirex	0.07	0.003	0.002	0.006	0.011
Dieldrin	0.1	0.003	0.001	0.002	0.002
Total PCBs	1.0	0.078	0.245	0.265	0.250

1 Health Canada 1996.

2 Average daily intake via human milk based on a 5 kg infant consuming 700 ml of milk per day containing 3.5% lipid (WHO/EURO 1989). Average daily intake = (volume of milk per day in ml)x(%lipid in milk/100)x(concentration of chemical in µg/g)/(infant weight in kg). Note: µg/g = (ng/g)/(1000).

Table 3.1 Elemental concentrations (mg/L) in water samples from selected sites in the Aluoi Valley, Viet Nam, 1999.

Element	Commune & Water Source											CDWG[1]
	A So	A Dot	Huong Lam	Bo Dot	Phu Vinh		Hong Thuong	Hong Van		Hong Kim	Ta Bat	
	Well	Well	River	Well	River	Well	Well	Rice Paddy	Well	Well	Well	
Aluminum	.014	.134	.014	.035	.012	.016	.142	1.08	.182	.420	.014	
Antimony	.00005	.00020	<.00005	<.00005	.00005	<.00005	<.00005	.00015	<.00005	.00008	.00018	
Arsenic	.0002	.0006	.0005	.0002	0016	.0002	.0001	.0019	.0002	.0010	.0002	.025
Barium	.009	.018	.016	.075	.009	.025	.008	.015	.007	.026	.0150	1.0
Beryllium	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	
Bismuth	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	
Boron	.005	.007	.002	.005	.002	.004	.001	.002	<.001	.003	.004	5.0
Cadmium	<.00005	<.00005	<.00005	.00005	<.00005	.00010	<.00005	<.00005	<.00005	<.00005	<.00005	.005
Calcium	12.6	43.8	1.65	8.64	12.9	11.9	.06	2.11	.13	9.91	21.6	
Chromium	<.0005	.0023	<.0005	<.0005	<.0005	<.0005	<.0005	.0016	<.0005	<.0005	<.0005	.05
Cobalt	.0005	<.0001	.0002	.0003	<.0001	.0006	.0005	.0010	.0002	.0008	.0006	
Copper	.0004	.0007	.0003	.0005	.0002	.0004	.0003	.0025	.0004	.0102	.0032	</=1.0
Lead	.00005	.00017	.00014	.00028	.00007	.00019	.00029	.00466	.00155	.00089	.00016	.01
Lithium	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.001	
Magnesium	.404	.644	.947	.758	1.84	.459	.109	1.51	.108	2.76	.364	
Manganese	.301	.011	.015	.017	.011	.051	.0135	.132	.0223	.0593	.146	.05[2]
Mercury	.00051	.00036	.00043	.00052	.00032	<.00005	.00023	.00096	.00030	.00023	<.00005	.001
Molybdenum	<.00005	.00009	<.00005	<.00005	<.00005	<.00005	<.00005	<.00005	<.00005	<.00005	<.00005	
Nickel	.0009	.0004	.0002	.0003	<.0001	.0010	.0003	.0007	.0001	.0003	.0006	
Potassium	.69	1.42	.75	1.4	.63	1.43	.11	.70	.36	1.77	.80	
Selenium	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	.01
Silver	<.00001	<.00001	<.00001	<.00001	<.00001	<.00001	<.00001	.00001	<.00001	<.00001	<.00001	
Strontium	.0116	.0611	.0126	.0265	.0297	.0292	.0008	.0096	.0010	.0469	.0378	
Thallium	0.00005	.00005	<.00005	.00010	<.00005	.00008	<.00005	.00005	<.00005	.00011	.00007	
Tin	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	
Uranium	.00002.	.00025	.00001	<.00001	.00002	<.00001	.00001	.00026	.00005	.00036	.00002	.1
Vanadium	<.001	.001	<.001	<.001	<.001	<.001	<.001	.004	<.001	.002	<.001	
Zinc	.004	.003	.002	.007	.004	.686	.002	.003	.004	.002	.009	<5.0

[1]CDWG Canadian Drinking Water Guidelines (1989).

[2]Based on aesthetics.

Table 3.2 Descriptive statistics of participants in the blood donor and food survey, Aluoi Valley, Viet Nam, 1999.

Parameter		Commune			
		A So	Huong Lam	Hong Thuong	Hong Van
Total number of households		172	145	146	168
Total number of participants		199	150	163	179
Males/females		94/105	79/71	85/78	93/83
Average number of persons in household (Range)		6.4 (1-14)	5.6 (2-13)	6.5 (1-13)	6.2 (2-11)
Average age of blood donors [years] (Range)		34.8 (15-79)	25.8 (15-60)	36.8 (15-78)	33.7 (15-70)
Average female age (Range)		31.5 (15-68)	25.5 (17-50)	35.0 (17-75)	31.1 (16-70)
	Total number of smokers	33	13	26	24
	Pipe only	32	10	25	24
	Cigs. only	0	3	1	0
	Pipe+cigs.	1	0	0	0
Average male age (Range)		38.4 (16-79)	26.1 (15-60)	38.5 (15-78)	36.1 (16-70)
	Total number of smokers	46	40	49	49
	Pipe only	45	33	41	44
	Cigs. only	1	7	8	5
	Pipe+cigs.	0	0	0	0

Table 3.3 Overview of food utilization and percent of individuals who are 100% or 75% dependent on that food source, Aluoi Valley, Viet Nam, 1999.

Food Type and Source		Commune									
		A So[1]		Huong Lam		Hong Thuong		Hong Van		All Combined	
		100%	75%	100%	75%	100%	75%	100%	75%	100%	75%
Fish[1]											
% of people that:	purchased	1.2[1]	2.9[1]	11	7.6	3	10.1	.7	12.3	3.8	8.1
	grown at home	43	51.7	28.3	50	22	60.7	15.1	63	27.6	56.4
	locally caught	0	0	0	0	0	0	0	0	0	0
Meat											
% of people that:	purchased	4.1	52.9	21.4	43.4	1.4	73.4	2.4	55.4	7.0	56.1
	grown at home	21.5	18.0	20.0	13.1	8.2	11.6	8.3	27.4	14.6	17.9
	locally caught	0	0	.7	0	0	0	0	0	.2	0
Vegetables											
% of people that:	purchased	0	0	3.4	1.4	0	0	1.2	0	1.1	.3
	grown at home	98.3	0	89.0	5.5	89.0	8.2	95.8	1.8	93.3	3.6
	locally caught	0	0	0	0	0	0	0	0	0	0
Fruit											
% of people that:	purchased	0	0	6.2	.7	0	.7	1.2	0	1.7	.3
	grown at home	98.3	0	84.8	2.8	91.1	5.5	97.0	.6	93.2	2.1
	locally caught	0	0	0	0	0	0	0	0	0	0

[1]Example: 1.2% of the people in A So are totally (i.e., 100%) dependant on purchasing fish; 2.9% of the people in A So are 75% dependent on purchasing fish.

Table 3.4 Average amount of various food items consumed over a 1-year period per household, Aluoi Valley, Viet Nam, 1999. Asterisk (*) indicates some households reported their consumption pattern in numbers of items, others used kilograms; one category does not include the other.

Food Item	Commune				
	A So	Huong Lam	Hong Thuong	Hong Van	All Combined
Eggs					
Avg. # of eggs consumed per household per year (range)	62 (1-520)	185 (10-1456)	114 (5-676)	71 (1-520)	-
# of households consuming eggs/total households	151/172	133/145	10/146	130/168	524/631
Chicken					
Avg. kg of chicken consumed per household per year (range)*	39.5 (2-52)	35.5 (12-52)	58.5 (52-156)	56.7 (52-104)	48.4 (2-156)
Avg. # of chickens consumed per household per year (range)*	9.9 (1-104)	45 (2-600)	14.6 (1-104)	13.4 (1-208)	17.5 (1-600)
# of households consuming chicken/total households	150/172	134/145	139/146	148/168	571/631
Duck					
Avg. kg of duck consumed per household per year (range)*	60.0 (60)	52 (52)	65 (52-104)	-	62 (52-104)
Avg. # of ducks consumed per household per year (range)*	4.6 (2-36)	-	4.2 (1-10)	8.8 (1-52)	5.8 (1-52)
# of households consuming ducks/total households	43/172	7/145	25/146	25/168	100/631
Fish					
Avg. # of **pond fish** consumed per household per year (range)*	156 (156)	104 (104)	-	-	114 (52-260)
Avg. kg of **pond fish** consumed per household per year (range)*	88.4 (12-208)	63.0 (12-260)	52 (52-52)	52 (52-52)	74 (12-260)
# of households consuming **pond fish**/total households	43/172	49/145	4/146	1/168	100/631
Avg. # of **wild fish** consumed per household per year (range)*	-	114.4 (52-156)	-	-	114 (52-260)
Avg. kg of **wild fish** consumed per household per year (range)*	76.3 (12-208)	62.6 (12-156)	96.4 (52-312)	64.3 (52-104)	72.9 (12-312)
# of households consuming **wild fish**/total households	49/172	76/145	35/146	40/168	200/631

Table 3.4 cont'd.

Food Item	Commune				
	A So	Huong Lam	Hong Thuong	Hong Van	All Combined
Wild and pond fish combined					
Avg. # of wild and pond fish consumed per household per year (range)*	-	52 (52)	-	-	114 (52-260)
Avg. kg of wild and pond fish consumed per household per year (range)*	31.8 (1-208)	77.3 (2-364)	80.2.4 (2-364)	70.5 (2-520)	67.5 (1-520)
# of households consuming wild and pond fish/total households	56/172	39/145	101/146	112/168	200/631
Pork (pig)					
Avg. kg of pork consumed per household per year (range)*	23.2 (5-156)	46.4 (1-156)	48.1 (2-156)	42.0 (1-156)	40.4 (1-156)
# of pig meals consumed per household per year (range)*	44.5 (1-260)	105.4 (1-364)	153.1 (1-3560)	62.6 (4-416)	90 (1-3560)
# of households consuming pig/total households	138/172	134/145	139/146	150/168	561/631
Beef (cow)					
Avg. kg of beef (cow) consumed per household per year (range)	-	24.0 (24)	5.0 (4-6)	4.3 (2-6)	6.3 (2-24)
# of households consuming beef/total households	2/172	2/145	3/146	7/168	14/631
Goat					
Avg. kg of goat consumed per household per year (range)*	9.7 (2-52)	37.0 (12-60)	8.6 (1-52)	18.6 (1-156)	15.2 (1-156)
# of goat meals consumed per household per year (range)*	32.1 (2-72)	12.0 (12)		28.6 (2-156)	29.3 (2-156)
# of households consuming goat/total households	45/172	54/145	75/146	93/168	267/631
Buffalo					
Avg. kg of buffalo consumed per household per year (range)		156.0 (156)		7.7 (5-12)	44.7 (5-156)
# of households consuming buffalo/total households	2/172	7/145	0/146	3/168	12/631
Wild animals					
Avg. kg of wild animals consumed per household per year (range)*	13.9 (2-52)	78.0 (12-156)	18.2 (4-260)	20.2 (3-104)	22.1 (2-260)
# of wild animal meals consumed per household per year (range)*	18.9 (2-60)	25.3 (12-52)	1.0 (1)	16.7 (1-60)	18.4 (1-60)
# of households consuming wild animals/total households	52/172	16/145	22/146	40/168	130/631

Table 3.5 Foods eaten (number and % of individuals in each commune) during the week prior to the time of the survey, Aluoi Valley, Viet Nam, 1999.

Food Source	Commune (%)				
	A So	Huong Lam	Hong Thuong	Hong Van	All Combined
Manioc	164 (95.3)	97 (66.9)	64 (43.8)	84 (50.0)	409 (8)
Rice	171 (99.4)	144 (99.3)	145 (99.3)	166 (98.8)	626 (12.3)
Rau Tau Bay	1 (.6)	2 (1.4)	0 (0)	0 (0)	3 (.5)
Carrots	2 (1.2)	2 (1.4)	6 (4.0)	0 (0)	10 (.2)
Cucumber	6 (3.5)	40 (27.6)	28 (19.2)	25 (14.9)	99 (1.9)
Bean	3 (1.7)	28 (19.3)	38 (26.0)	50 (29.8)	119 (2.3)
Wheat	7 (4.0)	12 (8.3)	9 (6.2)	19 (11.3)	47 (.9)
Chili	163 (94.8)	134 (92.4)	145 (99.3)	161 (95.8)	603 (11.8)
Other vegetables	46 (26.7)	11 (7.6)	56 (38.4)	75 (44.6)	188 (3.7)
Beef	16 (9.3)	39 (26.9)	17 (11.6)	21 (12.5)	93 (1.8)
Buffalo	1 (0.6)	14 (14.7)	0 (0)	1 (.6)	16 (.3)
Goat	0 (0)	4 (2.8)	0 (0)	1 (.6)	5 (.1)
Fish	157 (91.3)	134 (92.4)	139 (95.2)	148 (88.0)	578 (11.3)
Wild animals	11 (6.4)	7 (4.8)	2 (1.4)	2 (1.2)	22 (.4)
Grapefruit	1 (0.6)	0 (0)	0 (0)	0 (0)	1 (.0)
Banana	148 (86.0)	134 (92.4)	132 (90.4)	148 (88.0)	562 (11.0)
Jackfruit	16 (9.3)	62 (42.8)	51 (34.9)	83 (49.4)	212 (4.2)
Watermelon	1 (0.6)	8 (5.5)	8 (5.5)	2 (1.2)	19 (.4)
Oranges	0 (0)	3 (2.0)	2 (1.4)	4 (2.4)	9 (.2)
Mangos	1 (0.6)	3 (2.0)	3 (2.0)	35 (20.8)	42 (.8)
Papaya	87 (50.6)	95 (65.5)	81 (55.5)	104 (61.9)	367 (7.2)
Sugar cane	161 (93.6)	123 (84.8)	125 (85.6)	107 (63.7)	516 (10.1)
Coffee	0 (0)	2 (1.4)	2 (1.4)	0 (0)	4 (.1)
Chicken	65 (37.8)	78 (53.8)	43 (29.5)	78 (46.4)	264 (5.2)
Pork	54 (31.4)	68 (46.9)	71 (48.6	83 (49.4)	276 (5.4)
Duck	3 (1.7)	7 (4.8)	4 (2.7)	2 (1.2)	16 (.3)
Other animals	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)

Table 3.6 Fish pond ownership (number of households and % of total households) and use of fish produced, Aluoi Valley, Viet Nam, 1999.

		Commune				
		A So	Huong Lam	Hong Thuong	Hong Van	All Combined
Total households in commune		172	145	146	168	631
Owner of fish pond		132 (76.7%)	59 (41%)	108 (74%)	86 (51.2%)	385 (61.1%)
Type of fish grown						
	Common Carp	111 (64.5%)	47 (32.4%)	99 (67.8%)	83 (49.4%)	340 (53.9%)
	Grass Carp	126 (73.3%)	49 (33.8%)	104 (71.2%)	82 (48.8%)	361 (57.2%)
Use of fish grown						
	Personal use	131 (76.2%)	55 (37.9%)	106 (72.6%)	85 (50.6%)	377 (59.7%)
	Trade/sell	71 (41.3%)	20 (13.8%)	78 (53.4%)	42 (25%)	626 (12.3%)

Table 3.7 Use of pesticides (number of households and % of total households) in the communes of interest, Aluoi Valley, Viet Nam, 1999.

		Commune				
		A So	Huong Lam	Hong Thuong	Hong Van	All Combined
Total households in commune		172	145	146	168	631
Use of pesticides		8 (4.7%)	19 (13.2%)	109 (74.7%)	24 (14.3%)	160 (25.4%)
Type of pesticide						
	Unknown	7	18	72	23	120
	Volvatox	-	1	24	1	26
	Bosodin	1	-	6	-	7
	Monitor	-	-	3	-	3
	DDT	-	-	3	-	3
	666	-	-	4	-	4
	Falizan	-	-	3	-	3
	Funtgrun	-	-	1	-	1

Table 3.8 Pesticide use (kg) in the Aluoi Valley, Viet Nam, over the period 1993-1999.

Pesticide Common Name	Manufacturer	Agricultural Use	Amount (kg) and Year of Use							Location	Details
			1993	1994	1995	1996	1997	1998	1999		
Volvatox	Bayer-Duc	Wet rice	42	40	0	0	0	0	0	Son Thuy	Fenitrothion
Monitor	Bayer-Duc	Rice	20	20	15	0	0	0	0	Son Thuy	Methamidophos
Ofatox 400 EC	Bayer-Duc	Rice	0	0	0	8	7.2	15.4	0	?	Fenitrothion
Bassa	Somitomo (Japan, Kumiai?)	Rice	5	5	2	0	15	50	0	All locations	Fenobucarb
Vibam 5H	Vipesco	Sugar cane	-	-	-	-	-	100	100	All locations	Fenobucarb
Basodin	?	Rice and sugar cane	-	-	-	-	-	24	0	All locations	Diazinon
Dipterex	Tsuong qnoi (China)	Rice and animal parasites	-	-	-	-	4	5	5	?	Trichlorfon
Lifosat	Vipesco	Insect control	-	-	-	-	-	-	-	?	?
Sofit 300 ND	Novartis	Rice	-	-	-	-	42	42	50	All locations	Pretilachlor
Falezan	?	Manioc	-	-	-	-	-	-	-	?	?
DDT.666	?	Mosquitto control	-	-	-	-	-	-	-	?	DDT
Roundup	Monsanto	Weed control	-	-	-	-	-	-	?	?	Glyphosate

Table 3.9 Prevalence of birth defects in four communes in the Aluoi Valley, Viet Nam, 1999.

Category		Commune			
		A So	Huong Lam	Hong Thuong	Hong Van
Total population		1076	1500	1528	2018
% with birth defects		2.8	1.2	0.5	1.2
Birth Defect Type	**ICD 10 Code[1]**				
Infantile cerebral palsy	G80	0.28	0.07	0.07	0.05
Central nervous system	Q00,03,06.07	0.37	0.07	0	0
Eye	Q12,15	0.09	0	0	0.1
Ear	Q17	0.46	0.27	0.07	0
Cleft lip/palate	Q36,37	0.18	0.13	0	0.15
Upper alimentary tract	Q38,40	0.09	0.2	0	0.05
Skeletal	Q66-72,74	0.65	0.35	0	0.55
Skin	Q81,82,L8O,81	0.38	0.14	0.26	0.05
Down's syndrome	Q90	0	0	0	0.05
Other mental retardation	F79	0.28	0	0.07	0.15

[1]International Classification of Diseases.

Table 5.1 Current (1990-1995) land cover data for Aluoi District (data from FIPI 1995).

Type of Land Cover	Area (ha)	% of Total
Total Forest Land	60,095	51.5
Natural forest	59,502	
Rich forest	19,541	
Medium forest	20,557	
Poor forest	17,707	
Recovered forest	1,697	
Plantation[1]	593	
Total Bare Land	40,950	35.2
Grassland	8,122	
Brushland	5,773	
Mixed grass/brush land with some trees	26,698	
Rocky mountain	357	
Total Non-forest Land	15,598	13.4
Agriculture land	3,504	
Potential agriculture land	10,661	
Shifting cultivation land	462	
Other land (village, road)	971	
Total	116,642	100
Total wood volume:	8,699,400 m^3	
Rich Forest:	4,357,000 m^3	
Medium Forest:	2,615,700 m^3	
Poor Forest:	1,726,700 m^3	

[1] Plantation trees are: *Pinus, Eucalyptus, Acacia* and *Cinnamon*.

Table 5.2 Post-war (1975) planned land use for Aluoi District (data from FIPI 1995).

Type		Area (ha)	%
1.	Protected area of watershed	41,489	35.5
2.	Natural regeneration forest	20,797	17.9
3.	Tending forest	19,504	16.7
4.	Exploitation forest	4,181	3.6
5.	Plantation forest	593	0.5
6.	Land for forest planting	14,024	12.1
7.	Agriculture land and potential agriculture land	14,265	12.2
8.	Shifting cultivation land	462	0.4
9.	Rocky mountain	357	0.3
10.	Other land (resident land, road, etc.)	971	0.8
Total		116,642	100

Table 5.3 Background of planned land use types as listed by FIPI (1995).

1. Protected watershed area *Function*: Regulating water resources, flood limitation and supplying water for streams in the dry season, counteracting soil erosion and limiting sedimentation in rivers, streams and lakes. *Objectives*: Improving forest quality, increasing forest cover and soil conservation. *Targets*: Including medium/poor forest in watersheds at high altitudes and on slopes with soils <50 cm deep.
2. Natural regeneration forest *Function:* Silviculture using natural regeneration in forest succession for rehabilitation through. Prevention of forest fires and excessive logging. *Targets:* Bare land with scattered trees and shrub land with good natural regeneration potential.
3. Tending forest *Function:* Silviculture of young forests by excluding competitors of commercial species and increasing forest production and quality. *Targets:* Plantation and regenerating forests on the former shifting cultivation land.
4. Exploiting forest *Function:* Silviculture for improved forest harvest and local economic development. *Targets:* Natural forest, mature plantation and mature regenerating forest for exploitation.
5. Plantation forest *Targets:* All plantations established prior to 1990.
6. Land for forest planting *Function:* Silviculture applied to grasslands for establishing plantations and includes activities of seedling production, planting, tending and forest protection. *Targets:* Bare lands with poor natural regeneration capacity, e.g., lands near villages and along roads.
7. Agricultural land and potential agricultural land *Targets:* All areas used for agriculture such as flat and alluvium areas along rivers, areas at low altitudes and near villages with good soils (may be covered with poor forest, brush land and grassland).
8. Shifting cultivation land *Targets:* Marginal agricultural land used in rotation according to soil fertility and ease of access.
9. Rocky mountain *Targets:* Steep slopes with >70% rocky cover that may have some forest cover.
10. Other lands (residential, etc.) *Targets:* Includes villages, towns and roads.

Table 5.4 Mammals of Aluoi Valley according to three surveys from 1952 to 1995 (data courtesy of FIPI).

Scientific Name	Common Name	Local Name	Before* 1952	1982	1995
Elephas maximus	Voi		+	No	Endangered
Bubalus bubalus	Trau rung		+	No	No
Bos garus	Bo tot		+	No	No
Cervus unicolor	Nai	Nai	+	+	++
Muntiacus muntiak	Hoang	Mang	+	+	++
Sur scrofa	Lon rung	Heo rung	+	++	++
Capricorius sumatraentis	Son duong	De rung	+	No	Rare
Tragulus javanicus	Cheo		+	Rare	Rare
Panthera tigris	Ho	Cop	+	Rare	Rare
P. pardus	Bao		+	++	++
Paradoxurus hermaphroditus	Cay voi		+	++	++
Vivera zibetha	Cay giong		+	+	Rare
Viverricula indica	Cay huong	Cay huong	+	+	+
Helarotos malyanus	Gau cho		+	Rare	+
Selenarctos thibetanus	Gau ngua		No	Rare	+
Lutra lutra	Rai ca		+	+	+
Felis nebulosa	Meo gau		+	++	++
Hylobates concolor	Vuon den		+	No	+
Pygathrix nemaeus	Vooc va		+	No	+
Macaca mulata	Khi vang		+	Rare	Rare
Nycticebus sp.	Culi		+	No	No
Pataurista pentaurista	Soc bay		+	No	No
Calloscuirus erythraens	Soc bung do		+	++	++
Menetes berdmorei	Soc lung van		+	++	++
Taminops sp.	Soc chuot		+	++	++
Hystrix hogeoni	Nhim		+	++	++
Atherurus macrourus.	Don		+	++	++
Rhzomys sp.	Dui		+	++	++
Rattus sp.	Chuot		+	++	++
Manis pentadactyla	Tete		+	++	++
Chiroptera sp.	Doi		+	++	++
Rhinocros sendasicus	Te giac		+	No	No

* + = Present / ++ = common.