Title: Distribution and Risk Assessment of Organochlorine Contaminants in Surface Water from River Chenab, Pakistan.

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Table. S1 Basic quality parameters (average values) of water sample s collected from River Chenab, Pakistan during summer and winter from 2007-2009.

Site location	pH	Spec. Cond. (µS/cm)	Sal (ppt)	TDS (ppm)	LDO (ppm)	Free CO_2 (ppm)	Alkalinity(ppm)	Chlorides(ppm)	Phosphates(ppm)	Nitrates(ppm)	Sulphates(ppm)	Turbidity(NTU)	Temp (^oC)
S-1	8.18±1.03	216±21	0.18±0.12	1008±1033	8.51±1.8	68±73	116±0.47	154±78	4.7±3.1	5.4±3.6	56.3±57	263±81	23±6
S-2	8.88±0.28	667±311	0.59±0.53	275±34	8.44±1.5	106±119	189±123	272±88	3.4±0.7	4.3±0.15	46.5±36	182±15	27±6
S-3	8.78±0.22	354±145	0.17±0.1	250±70	10.3±3.7	41±44	128±31	157±74	5.3±2.5	2±2	38.8±39	173±185	24±7
S-4	8.67±0.04	407±221	0.2±0.12	300±141	10.4±4.5	27±8	127±27	202±138	2.3±0.32	1.8±1.7	49.2±46	213±125	25.3±8
S-5	8.92±0.24	357±150	0.21±0.02	250±68	11±7.5	37±32	122±15	171±54	2.5±0.16	29.6±38	50.8±37	170±138	26±7.3
S-6	8.47±0.77	364±155	0.18±0.08	250±64	9.2±1.2	39±29	121±16	143±52	3.2±0.6	7.3±6	14.3±1.9	246±209	26.3±5.7
S-7	8.85±0.5	375±171	0.18±0.09	250±70	7.7±2.9	43±41	123±9.4	157±60	2.3±0.58	4.2±1.4	40.7±31	134±74	27.6±7.5
S-8	8.9±0.44	594±467	0.3±0.25	390±268	6±0.6	41±35	108±25	335±303	2.8±1.2	2.8±0.13	36.2±25	157±70	27.3±7.8
S-9	8.49±0.38	379±219	0.18±0.12	230±98	8.2±4.2	36±33	115±7	133±37	2.4±0.34	1.4±1.6	30.2±30	265±144	26.4±7.4
S-10	8.89±0.35	386±185	0.18±0.11	250±70	6.3±1.5	80.3±93	135±21	178±100	2.2±0.11	3.6±0.2	27.4±6	219±115	27±7.1
S-11	8.58±0.61	391±189	0.19±0.1	250±70	12.3±5.6	41±35	119±19	174±92	2±0.16	2.4±1.6	24.8±11	117±50	26±5
S-12	8.90±0.52	393±192	0.19±0.11	245±34	9.7±2.7	44.3±31	129±29	147±46	2.8±1	7.7±6.3	28.3±16	337±47	25±4.3
S-13	8.87±0.25	419±228	0.21±0.14	300±141	8.3±0.2	26±33	117±0.94	169±99	2.8±0.8	1.9±1.4	17±10.5	352±373	25±6
S-14	8.94±0.47	392±191	0.19±0.12	250±70	9.1±0.25	45.5±41	155±39	178±30	2.9±1.3	4.7±2.4	34.3±11	358±329	26±6
S-15	8.96±0.41	354±134	0.17±0.08	250±70	10.9±0.9	42±25	121±21	160±98	3.9±0.27	1.9±2.6	18.8±20	121±30	26.8±5.4
S-16	8.93±0.3	338±130	0.17±0.07	260±55	7.9±2	31.3±21	110±4	156±118	2.7±0.32	5.1±2.7	36.5±3	363±287	26±6.2
S-17	8.88±0.37	374±77	0.18±0.04	255±78	7.5±0.1	46±16	123±19	120±56	3.8±0.3	16.2±5	21±6.8	96±54	25.7±4.8

	8.99±0.49	1428±535	0.75±0.29	920±311	1.68±0.6	118±21	391±22	306±0.13	6.1±0.25	6.8±2.8	27.1±22.7	52±125	25.6±5
S-18													
	9.05±0.14	316±159	0.15±0.08	200±141	8.83±1	103±51	147±17	71±18	3.5±0.06	1.2±1.7	7.8±6.5	18±54	25.2±7
S-19													
	8.96±0.23	5537±187	3±0.11	3550±70	0.65±0.09	425±112	1113±267	977±27	33±0.2	15±14.1	460±58	107±87	26.7±6.8
S-20													
	7.75±0.64	270±84	0.47±0.44	180±56	12.5±0.9	10.4±13	60±22	93±78	0	1.6±1.7	65.8±40	9.2±4.5	28.5±3
S-21													
	7.95±0.61	285±77	0.43±0.4	180±70	8.5±1.1	10.3±14	84±36	65±46	0.22±0.32	4.5±5.9	58.4±14	100±112	22.5±4.9
S-22													
	8.15±0.1	330±88	0.22±0.13	220±43	9.22±1.5	5.3±6.5	111±69	67±44	0	7.2±9.8	48.5±19	65±24	31±10
S-23													
	8.3±0.28	475±190	0.53±0.38	315±120	7.96±2.5	5.4±6.4	120±53	81±32	0	2.5±3	65.3±13	52±56	28±4.6
S-24													
	7.6±0.27	233±137	0.86±0.43	572±491	11±2	10.4±13	121±26	145±52	0	1.2±1	101±18	178±162	32±9
S-25													

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Table S2. Values of seven extracted factor loadings for the studied OCs and physicochemical parameters

Parameters	Region-1							Region-2							Region-3							Region-4						
	VF1	VF2	VF3	VF4	VF5	VF6	VF7	VF1	VF2	VF3	VF4	VF5	VF6	VF7	VF1	VF2	VF3	VF4	VF5	VF6	VF7	VF1	VF2	VF3	VF4	VF5	VF6	VF7
pH								**0.83**																				
Specific Cond.	**0.98**							**0.86**							**0.71**													
Sal	**0.98**							**0.85**							**0.70**											**-0.82**		
TDS	**0.97**							**0.88**																				
LDO																												
Free CO2	**0.95**														**0.89**													
Alkalinity	**0.98**										**0.90**																	
Chlorides	**0.97**										**-0.94**													**-0.80**				
Phosphates	**0.97**																**0.92**											
Nitrates							**0.83**						**-0.85**			**0.72**												
Sulphates	**0.91**										**-0.88**									**0.80**								
Turbidity	**0.78**											**-0.89**																
Temperature			**-0.91**																					**-0.76**				
α-HCH		**0.83**								**0.92**						**0.82**						**0.89**						
β-HCH																												
γ-HCH			**0.76**						**0.93**						**0.95**							**0.72**						
δ-HCH					**0.85**												**0.86**								**0.78**			
HCB								**0.82**								**0.96**												
Heptachlor	**0.85**							**0.93**							**-0.82**													
Hep-epoxide							**-0.94**			**0.92**					**0.98**													**0.72**

Aldrin										**0.88**								**0.71**								
Dieldrin									**0.88**					**0.87**											**0.72**	
Endrin								**0.83**							**0.77**						**0.82**					
α-Endosulphan																**0.85**							**0.78**			
β-Endosulphan										**0.76**					**0.94**											
Endo-sulphate.		**-0.95**							**0.97**						**0.73**						**0.83**					
Methoxychlor					**0.97**				**0.80**						**0.73**									**-0.80**		
TC												**-0.84**						**0.90**								
CC			**0.74**											**0.86**												
non-TC										**0.93**				**0.89**							**0.86**					
o,p'-DDE											**-0.82**						**-0.91**					**0.76**				
p, p'-DDE								**0.89**						**0.73**												
o,p'-DDD				**-0.79**																		**0.71**				
p, p'-DDD								**0.92**							**0.84**											**0.81**
o,p'-DDT		**0.91**										**-0.74**														
p, p'-DDT	**0.73**							**0.88**																		
∑PCBs	**0.87**												**0.79**													
Eigen value	15.85	6.06	5.24	4.25	2.38	2.04	1.18	13.28	7.26	5.27	4.55	3.21	2.12	16.40	6.32	4.91	3.39	2.09	1.34	8.53	4.53	3.76	3.08	2.89	2.29	1.88
% Total Variance	42.82	16.38	14.15	11.49	6.44	5.51	3.19	35.89	19.63	14.26	12.29	8.67	5.72	44.34	17.09	13.27	9.16	5.66	3.63	23.06	12.25	10.16	8.33	7.81	6.18	5.09
Cumulative % Variance	42.82	59.21	73.36	84.85	91.29	96.81	100	35.89	55.52	69.78	82.07	90.74	96.45	44.34	61.43	74.70	83.85	89.51	93.15	23.06	35.31	45.47	53.8	61.62	67.80	72.89

*values of significant loadings >0.70 in each factor are only presented.

Table S3. Mean values of RQ (CCC_s) and RQ (CMCs) for OCPs and PCBs in surface water (ng l^{-1}) of Chenab River

Criteria Guidelines by USEPA,2006.	γ-HCH	Heptachlor	Aldrin	Endosulfans	Chlordanes	DDEs	DDDs	p, p'-DDT	PCBs
CMC[a] (ng/L)	950	520	3000	220	2400	1100	1100	1100	-
CCC[b](ng/L)	-	3.8	-	56	4.3	1	1	1	14
MEC[c]	25	23	5	4.3	18.6	11.8	22.92	27.2	30
RQ_{CMC}	0.03	0.04	0.006	0.02	0.01	0.01	0.02	0.02	-
RQ_{CCC}	-	6.05	-	0.08	4.33	11.80	22.92	27.20	2.14

a. **Criteria Maximum Concentration:** is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect **(USEPA, 2006)**[40]
b. **Criteria Continuous Concentration:** is an estimate of the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect **(USEPA, 2006)**[40]
c. **Average Measured Concentration for OCPs and PCBs (Table 1 and 2)**