

Table S1: Details of the sampling districts, IDs along with concentrations of essential and non-essential metals.

	Area	Variety	Sample ID	Essential metals				Non-essential metals		
				Cu	Fe	Mn	Zn	Cd	Ni	Pb
Non-conventional	Bahawalnagar	Supra	BWP-1	1.54	42.55	2.54	16.54	0.3	0.1	0.62
		Super Kainat	BWP-2	1.61	51.77	2.61	15.61	0.1	0.1	0.71
		Basmati-2000	BWP-3	1.63	52.44	1.63	19.63	0.1	0.12	0.3
		PK-86	BWP-4	1.91	53.31	1.91	14.65	0.2	ND	0.44
		IRRI Fine	BWP-5	3.64	64.14	1.64	15.64	0.4	ND	0.96
		Super Kernel	BWP-6	2.68	74.11	1.68	18.45	0.3	0.2	0.54
	Chiniot	Supri Lal-86	CHT-1	2.7	32.44	1.74	12.74	0.2	0.01	0.81
		Super Kianat-1121	CHT-2	1.61	43.44	2.61	14.61	0.11	0.03	0.72
		Super Basmati	CHT-3	1.88	31.11	2.88	15.88	0.15	0.01	0.84
		Supri-86	CHT-4	1.09	45.66	3.09	17.09	0.4	0.02	0.9
		Supri white-86	CHT-5	1.01	44.44	2.01	16.01	0.13	0.04	1.2
		PK-386	CHT-6	1.13	45.65	2.43	15.76	0.23	0.05	0.85
	Jhang	Super Kernel	JHG-1	1.91	35.34	1.91	16.91	0.22	0.05	0.7
		Super Fine	JHG-2	1.76	36.22	3.76	18.76	0.36	0.04	0.9
		Basmati-515	JHG-3	2.66	55.11	5.66	15.66	0.47	0.03	1.1
		Kainat	JHG-4	1.65	34.11	3.65	15.65	0.32	0.01	0.98
		kainat-1121	JHG-5	1.63	33.22	2.63	16.63	0.21	0.02	0.85
		Variety-5015	JHG-6	1.18	37.53	2.33	16.76	0.33	ND	0.51
	Shorkot	Supra	SHK-1	1.81	34.44	4.81	16.81	0.11	0.06	0.91
		Kainat	SHK-2	1.51	33.42	2.51	15.51	0.22	0.04	0.88
		Supri	SHK-3	2.21	35.44	1.21	15.21	0.37	0.04	1.14
		Variety-1550	SHK-4	3.13	32.31	1.13	19.13	0.43	0.03	0.99
	Toba Tek Singh	Super Basmati	TTS-1	3.05	38.15	4.05	18.05	0.31	0.02	0.91
		Kainat	TTS-2	2.81	35.16	3.04	17.04	0.32	0.01	0.94
	Faisalabad	Sharshar	FSD-1	3.32	45.68	3.54	16.86	0.21	0.02	0.94
		Kainat	FSD-2	3.76	56.76	4.11	14.54	0.23	0.02	0.92
		Super-515	FSD-3	2.67	47.87	3.87	17.65	0.3	0.01	0.76
Conventional	Narowal	Super Lal 2500	NRW-1	2.61	45.11	4.61	15.61	0.2	0.01	0.93
		Kainat	NRW-2	3.81	46.22	4.81	13.81	0.45	0.01	0.87
		Supri	NRW-3	3.54	53.22	4.54	16.54	0.37	0.02	0.67
		Super Basmati	NRW-4	4.54	36.23	3.54	17.54	0.21	0.01	0.66
	Gujranwala	Supri-KS 86	GRW-1	3.61	35.62	2.61	12.61	0.23	0.01	0.71
		Basmati 386	GRW-2	3.88	45.61	2.88	14.88	0.32	0.01	0.88
		Super Kernel	GRW-3	2.09	55.81	3.09	15.09	0.51	0.02	0.78

	Variety 515	GRW-4	2.01	56.22	3.01	16.01	0.21	0.03	0.91
Hafizabad	Super	HFZ-1	1.91	36.32	2.91	14.91	0.1	0.02	0.78
	Super 86	HFZ-2	2.76	36.34	1.76	13.76	0.16	0.02	0.75
	Supri Lal 86	HFZ-3	2.66	26.45	1.66	15.66	0	0.02	1.1
	Super Kernel	HFZ-4	3.65	36.91	1.65	14.65	0.13	0.01	0.6
Mandi Bahaudin	Super Basmati	MBD-1	2.45	46.72	1.63	15.63	0.23	0.02	0.87
	PK-386	MBD-2	1.36	47.11	1.45	16.45	0.41	0.01	0.91
	Supri	MBD-3	1.61	52.44	3.36	15.36	0.31	0.05	0.12
	Kainat	MBD-4	2.47	32.55	4.61	18.61	0.22	0.01	0.77
Sialkot	Super Basmati	SLK-1	1.81	36.11	4.47	17.47	0.27	0.03	0.77
	Super Fine	SLK-2	1.51	46.43	2.81	19.81	0.31	0.02	0.75
	PK-86	SLK-3	1.21	56.45	2.51	21.51	0.41	0.01	0.95
	PS-2	SLK-4	1.13	25.43	2.21	20.21	0.3	0.03	0.81
	Supri	SLK-5	4.05	26.12	2.13	19.13	0.47	0.05	0.89
	White-86	SLK-6	3.04	66.01	1.05	14.05	0.5	0.03	0.94
Sheikhupura	Super	SKP-1	2.81	64.49	2.04	15.04	0.21	0.03	0.82
	Super Fine	SKP-2	1.82	35.11	4.81	16.82	0.51	0.02	0.92
	Kainat	SKP-3	1.91	36.32	4.82	16.91	0.54	0.04	0.62
	PK-386	SKP-4	2.33	47.32	3.91	17.61	0.2	ND	0.91