Table S1:- Physiochemical characteristics of groundwater samples (before purification) collected from Al-Hassa Oasis, KSA; during December 2015 and May 2016.

First Sampling Trip on Decmber 2015

Sampling ID	Place	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)	Fe (µg/l)	Mn (µg/l)
GW 1	Al-Hofuf	20.4	7.45	2065	3455	0.583	0.050	675.3	192.0	395.3	8.46	1.134	342.4	43.18	175.0	55.23	664.6	166.4	23.18
GW 2	Al-Hofuf	20.2	7.37	1355	2265	0.100	0.040	378.6	185.5	339.2	6.60	0.988	219.4	24.33	154.8	30.32	511.4	38.02	17.11
GW 3	Al-Hofuf	26.5	7.41	1303	2155	0.100	0.065	397.6	199.4	285.5	5.55	0.835	227.4	24.94	122.7	41.44	477.2	48.44	11.04
GW 4	Al-Hofuf	26.2	7.69	1444	2400	0.187	0.030	429.4	209.8	266.7	6.58	0.861	228.1	26.30	154.8	32.08	518.7	65.49	29.24
GW 5	Al-Hofuf	26.6	6.77	1526	2525	0.227	0.085	511.9	206.4	187.9	6.95	0.848	267.3	30.45	139.8	34.45	490.9	105.8	40.01
GW 6	Al-Hofuf	25.7	7.42	1327	2205	0.117	0.040	378.1	199.9	233.0	6.20	0.814	212.6	25.92	119.9	44.90	484.4	45.12	23.18
GW 7	Al-Hofuf	19.9	7.17	1435	2395	0.373	0.110	407.9	173.7	277.9	1.42	1.859	214.4	28.56	129.5	59.49	568.2	30.44	30.76
GW 8	Al-Hofuf	20.0	7.19	1476	2455	0.193	0.050	469.3	157.2	284.2	8.69	0.912	250.5	48.65	116.4	66.72	565.5	67.86	32.28
GW 9	Al-Hofuf	19.8	7.16	2095	3485	0.117	0.043	685.2	191.1	308.0	7.25	0.988	322.9	45.97	151.1	103.66	804.2	29.49	32.28
GW 10	Al-Hofuf	21.6	7.27	1442	2410	0.153	0.160	441.0	169.6	250.4	5.85	0.905	244.7	42.29	118.5	52.01	510.2	35.65	59.58
GW 11	Al-Hofuf	19.7	7.12	1689	2835	0.277	0.085	543.7	186.7	259.6	5.63	1.388	276.7	37.85	161.0	46.85	595.0	29.01	74.75
GW 12	Al-Mubarraz	19.8	7.15	1785	2985	0.193	0.075	599.1	172.7	246.8	6.95	0.863	272.9	32.49	135.9	74.80	647.3	34.70	64.13
GW 13	Al-Mubarraz	19.9	7.59	1915	3185	0.180	0.070	623.4	178.5	276.1	8.11	0.912	224.0	63.31	146.2	85.86	718.6	39.44	58.82
GW 14	Al-Mubarraz	19.6	7.31	1928	3170	0.143	0.105	678.7	154.9	225.8	5.58	0.912	322.2	45.41	127.7	57.66	556.5	43.23	24.69
GW 15	Al-Mubarraz	21.5	7.04	1711	2865	0.103	0.090	739.2	186.7	211.0	6.41	0.943	377.9	35.97	120.9	75.10	611.3	165.9	12.56
GW 16	Al-Mubarraz	19.6	7.09	1018	1697	0.187	0.070	318.9	177.6	166.8	6.57	0.880	135.2	18.25	119.1	45.27	483.9	26.17	30.93
GW 17	Al-Mubarraz	20.1	7.23	850	1416	0.417	0.060	252.9	150.1	239.2	4.99	0.740	117.2	16.14	82.5	59.49	450.9	89.66	12.56
GW 18	Al-Mubarraz	20.0	6.93	1821	3002	0.683	0.090	595.3	130.5	236.1	6.61	0.905	296.1	35.74	139.3	54.87	573.7	55.55	41.99
GW 19	Northern Village	20.4	7.32	1935	3235	0.307	0.120	689.2	175.6	236.1	5.85	1.128	315.6	41.44	176.2	57.48	676.8	33.28	9.53
GW 20	Northern Village	19.6	7.27	1945	3255	0.393	0.115	705.4	180.9	256.3	6.02	1.056	321.2	41.21	179.0	50.13	653.6	72.13	55.03
GW 21	Northern Village	19.6	7.36	2709	4505	0.180	0.070	953.4	195.7	350.3	5.43	1.001	377.3	66.37	249.8	77.35	942.3	30.44	39.10
GW 22	Northern Village	19.9	7.27	2181	3638	0.327	0.085	720.1	195.1	295.3	5.19	1.103	336.0	48.36	196.9	55.52	720.3	93.86	44.50
GW 23	Northern Village	20.2	7.14	2135	3555	0.423	0.080	782.5	228.3	221.9	3.48	1.229	359.9	47.14	186.5	34.70	608.5	251.2	50.65
GW 24	Eastern Villages	19.5	7.11	2310	3820	0.117	0.065	802.1	195.1	277.4	6.00	0.956	346.6	45.63	205.1	52.13	726.9	215.7	42.90
GW 25	Eastern Villages	19.9	7.26	3404	5635	0.530	0.055	1358.6	220.2	257.3	6.17	1.026	485.2	69.43	291.5	101.11	1144.2	72.13	32.28
GW 26	Eastern Villages	19.6	7.26	1274	2155	0.527	0.070	390.8	182.2	266.1	5.64	1.045	217.7	26.41	131.4	54.56	552.7	73.07	17.11
GW 27	Eastern Villages	21.2	7.01	3225	5385	0.240	0.060	1260.4	226.6	323.7	9.63	1.128	477.6	52.47	300.6	83.43	1094.2	53.18	6.49
GW 28	Eastern Villages	21.3	7.06	1418	2365	0.140	0.070	495.1	152.3	365.2	0.635	1.751	163.1	22.97	242.1	70.48	894.8	100.1	20.14
GW 29	Eastern Villages	20.6	7.16	1285	2150	0.143	0.120	371.3	171.2	302.4	5.58	1.070	205.9	23.39	140.7	55.84	581.3	73.07	23.18
GW 30	Eastern Villages	21.1	7.04	4024	6685	0.240	0.110	1655.8	208.8	424.8	13.25	0.581	566.7	84.82	459.4	83.12	1489.5	285.9	61.10

Second Sampling Triop on May 2016

Sampling ID	Place	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)	Fe (µg/l)	Mn (µg/l)
GW 1	Al-Hofuf	26.7	7.43	1756	2916	0.300	0.060	645.6	197.2	286.9	8.15	0.835	349.2	65.1	125.0	43.62	491.7	128.8	39.86
GW 2	Al-Hofuf	29.1	7.06	1456	2400	0.240	0.100	498.2	190.5	225.7	6.50	1.337	282.9	27.6	93.7	37.67	389.1	310.7	15.59
GW 3	Al-Hofuf	30.7	7.08	1188	1961	0.350	0.080	376.5	191.2	192.3	5.73	1.117	234.0	27.3	91.2	36.31	377.2	288.2	30.00
GW 4	Al-Hofuf	28.8	7.06	1417	2365	0.355	0.110	473.3	193.7	234.9	7.24	1.168	268.3	35.0	101.7	39.19	415.4	304.4	33.79
GW 5	Al-Hofuf	28.8	7.03	1445	2410	0.250	0.100	489.6	189.3	307.7	7.47	0.615	301.8	56.1	103.2	37.52	412.2	306.3	27.73
GW 6	Al-Hofuf	29.6	7.09	1162	1937	0.300	0.100	376.2	186.3	210.4	6.02	0.538	220.9	27.7	105.7	22.03	354.7	278.0	29.24
GW 7	Al-Hofuf	32.9	7.03	1592	2662	0.350	0.080	533.9	188.3	276.3	1.40	1.654	299.3	44.3	103.2	40.10	422.9	302.4	36.98
GW 8	Al-Hofuf	33.5	7.08	1519	2518	0.250	0.100	500.6	196.6	251.4	8.75	1.045	277.1	52.5	102.4	36.76	407.2	157.7	89.92
GW 9	Al-Hofuf	32.8	7.04	2127	3523	0.200	0.120	780.3	200.7	341.7	7.32	0.866	393.5	73.3	169.6	41.79	595.5	282.9	36.83
GW 10	Al-Hofuf	29.1	7.03	1225	2049	0.250	0.100	340.7	178.2	243.2	6.44	0.897	230.2	44.4	106.0	19.29	344.0	224.2	40.62
GW 11	Al-Hofuf	30.1	7.02	1616	2699	0.250	0.100	604.1	197.9	279.9	6.07	0.840	325.5	58.6	135.8	30.38	464.2	46.17	82.33
GW 12	Al-Mubarraz	28.4	7.02	1555	2578	0.390	0.097	586.0	196.1	185.6	5.91	0.687	296.2	51.1	119.0	29.62	419.1	54.97	41.38
GW 13	Al-Mubarraz	28.5	7.04	2249	3752	0.390	0.100	755.9	218.0	325.9	7.63	1.020	393.5	76.3	140.3	53.62	571.1	64.75	38.34
GW 14	Al-Mubarraz	33.4	7.03	1946	3226	0.200	0.070	673.3	163.5	260.9	5.65	0.989	368.4	68.1	124.2	23.39	406.6	48.12	31.52
GW 15	Al-Mubarraz	29.7	7.03	1604	2668	0.250	0.100	528.2	197.1	231.5	6.76	0.646	285.3	35.7	126.2	29.47	436.6	55.95	14.83
GW 16	Al-Mubarraz	28.2	7.04	1599	2664	0.345	0.100	506.3	187.6	237.3	6.49	0.840	278.7	39.7	123.2	29.77	430.4	156.2	23.94
GW 17	Al-Mubarraz	30.0	7.05	1779	2953	0.390	0.100	582.8	183.3	232.5	6.31	0.974	316.4	37.0	134.3	24.15	434.8	50.57	40.62
GW 18	Al-Mubarraz	31.4	7.05	1759	2916	0.395	0.100	569.4	187.2	234.1	6.38	1.127	314.6	36.9	107.7	36.00	417.2	59.86	12.56
GW 19	Northern Village	24.1	6.81	1917	3189	0.390	0.080	653.8	196.0	240.7	5.83	0.938	345.2	63.7	107.7	43.29	447.3	81.38	10.28
GW 20	Northern Village	24.7	7.19	1931	3206	0.390	0.077	674.3	192.0	239.5	5.98	0.810	318.0	46.4	147.8	49.22	571.7	116.6	45.78
GW 21	Northern Village	24.2	7.16	3542	5905	0.290	0.060	1446.1	223.8	415.0	5.71	1.050	573.8	118.0	265.9	105.7	1099.1	92.14	31.06
GW 22	Northern Village	23.9	7.20	2783	4648	0.295	0.083	1095.5	223.1	320.5	4.65	0.968	483.7	94.70	203.5	64.98	775.7	73.31	33.57
GW 23	Northern Village	23.7	7.25	2025	3391	0.300	0.105	744.9	222.3	226.0	3.58	0.887	393.5	71.4	141.0	24.31	452.3	54.48	36.07
GW 24	Eastern Villages	24.6	7.29	2232	3733	0.250	0.050	781.7	199.6	281.5	6.07	0.615	398.7	67.7	146.5	41.62	537.3	282.9	89.16
GW 25	Eastern Villages	23.7	7.07	3040	5086	0.355	0.100	1234.1	209.3	307.5	6.00	0.943	501.7	89.2	218.3	92.43	925.8	111.7	38.65
GW 26	Eastern Villages	24.7	7.19	1250	2091	0.745	0.100	362.3	196.8	204.0	5.47	0.902	220.0	26.6	121.0	20.96	388.5	229.1	30.76
GW 27	Eastern Villages	23.9	7.01	3204	5332	0.190	0.070	1288.7	211.1	310.1	9.59	0.805	526.8	96.5	222.8	96.22	952.7	59.86	30.94
GW 28	Eastern Villages	23.9	7.07	1323	2216	0.250	0.073	376.5	198.9	387.3	1.090	1.941	248.9	29.7	145.3	48.46	562.4	49.59	21.36
GW 29	Eastern Villages	24.1	7.05	1203	2013	0.250	0.050	376.5	185.1	194.8	5.77	1.265	231.1	24.6	93.9	27.50	347.8	50.57	49.72
GW 30	Eastern Villages	24.0	7.03	5513	9173	0.200	0.100	2357.2	228.0	595.9	14.57	0.866	988.4	216.6	369.1	141.0	1502.6	59.86	52.00

Table S2: - Physiochemical characteristics of purified drinking water samples collected from Al-Hassa Oasis, KSA; during December 2015 and May 2016.

First Sampling Trip on Decmber 2015

Sampling ID	Place	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)	Fe (µg/l)	Mn (µg/l)
PW 1	Al-Hofuf	20.2	7.16	72.30	120.7	0.220	0.100	24.22	9.64	11.71	1.017	0.085	16.43	3.18	3.73	1.68	16.21	43.37	18.63
PW 2	Al-Hofuf	20.1	7.54	166.65	278.5	0.277	0.075	48.71	19.40	27.24	1.023	0.170	28.00	3.68	15.15	4.13	54.85	43.23	14.23
PW 3	Al-Hofuf	20.2	7.21	150.00	250.5	0.153	0.110	44.25	20.44	23.88	0.881	0.289	25.68	3.84	6.25	8.60	51.04	56.49	15.59
PW 4	Al-Hofuf	24.8	7.21	101.35	169.3	0.140	0.155	38.54	14.22	13.22	1.926	0.229	25.46	3.58	5.05	3.91	28.72	131.8	23.18
PW 5	Al-Hofuf	26.5	7.44	98.15	159.6	0.107	0.050	38.26	12.63	13.72	1.118	0.083	20.77	3.59	6.25	5.44	38.03	100.8	33.79
PW 6	Al-Hofuf	25.2	7.28	78.75	131.9	0.107	0.135	30.75	9.09	11.22	0.935	0.134	15.44	3.59	4.57	4.42	29.63	58.86	26.21
PW 7	Al-Hofuf	19.9	7.56	138.00	231.5	0.300	0.040	50.43	12.87	29.56	0.191	0.356	26.93	4.65	6.81	9.02	54.15	25.70	24.69
PW 8	Al-Hofuf	19.9	7.94	114.85	191.4	0.323	0.050	30.06	11.59	21.59	1.261	0.195	20.60	4.50	7.78	2.72	30.63	42.28	29.24
PW 9	Al-Hofuf	20.0	7.91	108.15	180.0	0.183	0.040	37.51	10.43	19.33	0.742	0.185	26.96	3.95	5.05	2.94	24.72	25.70	28.49
PW 10	Al-Hofuf	21.3	7.63	82.30	136.9	0.327	0.085	33.25	12.75	6.17	0.980	0.104	18.13	3.56	3.79	3.78	25.02	34.27	40.62
PW 11	Al-Hofuf	19.6	7.88	146.45	244.5	0.140	0.055	46.73	32.58	9.52	0.949	0.229	36.76	4.29	3.81	4.35	27.42	66.44	57.30
PW 12	Al-Mubarraz	19.8	7.36	61.75	102.5	0.283	0.050	25.22	9.52	8.58	0.756	0.287	12.42	2.87	4.41	4.06	27.72	42.75	48.96
PW 13	Al-Mubarraz	20.4	8.00	110.80	185.5	0.180	0.105	36.02	8.85	15.97	0.728	0.170	23.61	3.53	5.61	2.92	26.02	40.38	42.14
PW 14	Al-Mubarraz	19.6	7.68	154.35	256.5	0.153	0.040	56.37	12.39	17.02	0.992	0.179	33.84	4.42	6.09	3.52	29.73	20.49	21.66
PW 15	Al-Mubarraz	21.5	7.29	110.25	183.2	0.160	0.105	41.34	12.57	9.21	1.181	0.248	26.64	3.82	3.97	3.09	22.62	150.2	8.77
PW 16	Al-Mubarraz	19.6	7.71	155.85	261.0	0.767	0.040	56.58	19.59	13.41	1.133	0.274	35.82	4.92	4.05	5.44	32.53	43.23	24.69
PW 17	Al-Mubarraz	20.1	7.55	171.75	286.5	0.333	0.048	54.74	20.32	22.78	0.782	0.128	33.96	4.41	7.86	5.74	43.24	47.49	10.28
PW 18	Al-Mubarraz	20.1	7.17	91.85	152.9	0.240	0.060	36.60	25.73	4.09	0.396	0.204	24.20	3.13	2.12	3.45	19.52	48.44	43.65
PW 19	Northern Village	20.3	7.63	96.85	161.5	0.147	0.060	40.49	10.68	6.70	0.580	0.121	23.67	3.31	4.21	3.09	23.22	31.52	6.49
PW 20	Northern Village	19.6	7.76	169.05	281.5	0.783	0.050	57.43	29.78	9.60	1.063	0.210	42.71	4.93	3.79	3.39	23.42	38.49	39.10
PW 21	Northern Village	19.6	7.14	96.25	160.0	0.207	0.060	36.09	18.55	8.16	0.572	0.147	26.02	3.49	2.20	3.40	19.52	53.18	33.79
PW 22	Northern Village	19.6	7.17	265.47	441.5	0.247	0.050	130.25	33.44	21.84	1.323	0.395	83.56	9.82	7.90	3.77	35.23	32.09	21.66
PW 23	Northern Village	20.4	7.42	110.65	183.9	0.143	0.120	35.59	25.38	11.14	0.203	0.128	23.43	3.18	6.33	2.09	24.42	140.8	44.41
PW 24	Eastern Villages	19.4	7.21	92.45	154.7	0.153	0.060	37.98	24.60	3.70	0.443	0.179	27.78	3.57	3.17	1.68	14.81	113.8	34.55
PW 25	Eastern Villages	20.9	7.21	93.75	156.3	0.240	0.060	38.61	10.25	5.69	0.273	0.276	23.79	3.21	2.69	2.60	17.42	50.81	28.49
PW 26	Eastern Villages	19.7	7.92	118.15	197.1	0.193	0.120	42.06	27.38	2.33	0.667	0.181	29.07	3.62	4.81	1.02	16.21	113.9	14.08
PW 27	Eastern Villages	21.6	7.33	148.59	248.5	0.187	0.040	61.19	11.65	4.35	1.705	0.183	38.81	4.64	3.79	2.88	21.32	86.43	5.13
PW 28	Eastern Villages	21.2	7.41	84.25	140.8	0.103	0.155	32.65	17.15	11.14	0.173	0.210	21.69	3.32	4.97	1.12	17.01	98.92	17.11
PW 29	Eastern Villages	21.3	6.74	131.15	218.5	0.240	0.485	39.78	18.06	19.58	0.508	0.276	24.80	3.54	8.74	4.20	39.13	59.62	18.63
PW 30	Eastern Villages	21.4	7.41	125.08	209.5	0.377	0.085	47.65	6.83	12.69	0.947	0.068	26.48	3.53	7.29	1.65	25.02	143.0	48.96

Second Sampling Triop on May 2016

Sampling ID	Place	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)	Fe (µg/l)	Mn (µg/l)
PW 1	Al-Hofuf	27.8	7.83	95.00	159.03	0.345	0.105	30.87	16.65	10.93	0.888	0.114	22.04	3.03	3.56	3.01	21.27	157.8	16.35
PW 2	Al-Hofuf	28.9	7.62	157.75	259.00	0.150	0.115	59.73	15.07	16.62	0.834	0.201	39.34	2.87	4.96	3.19	25.52	121.5	13.32
PW 3	Al-Hofuf	27.4	7.59	111.01	184.9	0.290	0.080	33.33	18.85	20.30	1.004	0.057	25.86	3.48	6.24	2.43	25.58	91.65	17.87
PW 4	Al-Hofuf	29.7	7.67	102.33	169.47	0.250	0.070	37.84	18.24	3.97	1.706	0.057	25.78	3.24	2.23	3.77	21.08	133.7	30.00
PW 5	Al-Hofuf	29.2	7.55	112.52	187.1	0.150	0.080	34.18	13.97	16.48	1.008	0.042	26.01	3.57	3.46	3.31	22.27	147.1	21.66
PW 6	Al-Hofuf	30.1	7.80	50.59	82.805	0.190	0.110	17.42	11.65	2.83	0.392	0.036	8.33	1.60	1.78	3.81	20.14	39.32	23.18
PW 7	Al-Hofuf	31.6	7.57	159.50	264.00	0.290	0.070	61.17	21.23	8.50	0.276	0.579	43.95	3.72	2.00	3.55	19.64	48.12	32.28
PW 8	Al-Hofuf	31.3	7.64	141.75	235.00	0.150	0.080	49.43	12.39	18.05	1.958	0.088	34.69	5.37	4.48	3.02	23.65	74.53	79.30
PW 9	Al-Hofuf	29.4	7.44	125.55	206.7	0.290	0.110	42.69	21.47	11.00	0.950	0.083	31.91	4.87	2.50	3.52	20.77	126.4	19.38
PW 10	Al-Hofuf	28.0	7.35	127.70	209.3	0.300	0.080	40.98	21.23	23.24	1.099	0.108	30.03	4.51	7.41	3.10	31.28	53.99	14.08
PW 11	Al-Hofuf	33.4	7.67	110.25	187.65	0.340	0.120	38.62	17.76	11.53	1.020	0.037	28.37	3.31	2.45	3.68	21.27	37.36	77.78
PW 12	Al-Mubarraz	28.1	7.73	114.75	191.25	0.290	0.100	40.17	12.45	12.63	1.454	0.190	29.22	3.66	2.00	3.28	18.52	40.79	18.63
PW 13	Al-Mubarraz	32.6	7.57	126.52	206.878	0.250	0.110	39.67	19.42	15.15	1.202	0.277	28.66	3.26	2.00	6.20	30.53	45.68	36.07
PW 14	Al-Mubarraz	32.7	7.48	97.19	161.415	0.250	0.070	33.79	11.53	10.90	0.665	0.078	23.01	2.96	2.03	3.89	21.08	39.32	29.24
PW 15	Al-Mubarraz	28.0	7.60	118.93	198.135	0.100	0.110	39.67	17.51	9.33	1.487	0.062	29.81	3.65	2.33	3.66	20.89	40.30	10.28
PW 16	Al-Mubarraz	28.8	7.51	136.19	228.298	0.150	0.150	51.60	19.10	13.40	1.239	0.037	33.08	5.15	4.86	2.55	22.64	167.0	16.35
PW 17	Al-Mubarraz	29.0	7.52	120.37	198.79	0.150	0.150	41.94	17.69	16.08	0.776	0.052	28.50	3.58	5.01	3.16	25.52	116.1	17.87
PW 18	Al-Mubarraz	31.7	8.08	76.16	126.565	0.340	0.200	26.66	18.97	3.51	0.297	0.078	17.55	2.26	2.58	2.87	18.27	54.97	11.04
PW 19	Northern Village	24.3	7.67	120.54	200.125	0.150	0.120	44.29	12.94	11.42	0.966	0.067	30.54	3.97	2.25	3.55	20.27	137.6	7.25
PW 20	Northern Village	24.8	7.06	128.42	213.925	0.150	0.100	48.36	28.37	10.01	1.359	0.078	36.38	4.20	2.45	3.37	20.02	60.35	37.13
PW 21	Northern Village	23.8	7.54	125.14	208.425	0.335	0.090	46.87	30.45	3.41	0.801	0.073	33.41	3.72	1.90	3.25	18.14	67.68	24.69
PW 22	Northern Village	23.9	7.4	126.49	210.43	0.243	0.075	47.01	26.82	10.18	0.516	0.124	32.22	3.73	3.57	3.23	22.21	59.13	29.62
PW 23	Northern Village	24.0	7.22	127.84	212.425	0.150	0.060	47.15	23.19	16.96	0.231	0.175	31.04	3.73	5.24	3.21	26.27	50.57	34.55
PW 24	Eastern Villages	24.2	7.57	112.57	187.425	0.245	0.085	42.81	25.89	2.63	0.499	0.175	31.62	2.81	1.95	2.13	13.64	186.5	70.20
PW 25	Eastern Villages	24.1	7.87	103.11	171.275	0.150	0.080	40.74	14.52	3.29	0.421	0.154	26.11	3.08	3.18	1.72	15.01	50.57	30.76
PW 26	Eastern Villages	24.1	7.87	110.31	183.175	0.390	0.075	38.90	27.96	3.65	0.636	0.354	28.82	2.63	2.63	2.29	16.01	41.28	8.77
PW 27	Eastern Villages	23.9	7.77	121.95	202.675	0.290	0.070	46.41	17.69	2.66	1.413	0.503	29.76	3.53	3.51	3.10	21.52	133.3	27.73
PW 28	Eastern Villages	23.8	7.87	71.03	118.368	0.285	0.105	23.37	15.16	9.00	0.210	0.441	15.77	2.35	2.35	3.36	19.70	43.23	14.83
PW 29	Eastern Villages	23.9	7.59	120.83	201.375	0.150	0.840	42.08	26.28	14.33	0.937	0.262	30.19	3.29	4.36	3.40	24.90	109.3	30.00
PW 30	Eastern Villages	23.3	7.89	102.65	171.925	0.100	0.050	40.63	12.02	2.73	1.173	0.088	24.66	2.32	3.46	2.95	20.77	83.33	36.83

Table S3: - Regular monitoring results of both groundwater and purified drinking water samples collected from three purification plants (Al-Hofuf Water Company, Al-Doha purification Plant and Rayan Al-Baraka Purification Plant) in Al-Hassa Oasis, KSA; over the period December 2015 to May 2016.

First Groundwater samples (before purification)

Sampling ID	Water Purification plant	Sampling Trip	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)
RB 1	Rayan Al-Baraka	01-Dec-15	20.0	7.19	1476	2455	0.193	0.050	469.3	157.2	284.2	8.69	0.912	250.5	48.65	116.4	66.72	565.5
RB 2	Rayan Al-Baraka	01-Jan-16	25.8	6.78	1472	2450	0.225	0.060	387.1	162.7	501.6	8.92	0.988	238.5	53.34	150.1	45.15	560.7
RB 3	Rayan Al-Baraka	01-Feb-16	27.7	6.28	1482	2470	0.150	0.056	391.1	162.2	377.9	8.70	0.975	222.8	50.18	160.7	34.33	542.7
RB 4	Rayan Al-Baraka	01-Mar-16	25.3	6.80	1484	2465	0.225	0.080	386.3	164.5	392.9	8.63	1.039	229.5	51.51	153.6	45.33	570.2
RB 5	Rayan Al-Baraka	20-Mar-16	30.4	6.86	1560	2590	0.100	0.115	432.8	184.6	435.4	8.66	0.956	233.9	54.79	163.7	44.24	591.0
RB 6	Rayan Al-Baraka	10-Apr-16	29.1	6.99	1534	2565	0.150	0.070	396.2	156.9	476.7	9.20	0.981	233.3	58.54	155.3	43.99	569.0
RB 7	Rayan Al-Baraka	01-May-16	33.5	7.08	1519	2518	0.250	0.100	500.6	196.6	251.4	8.75	1.045	277.1	52.47	102.4	36.76	407.2
HF 1	Hofuf Water Compan	01-Dec-15	19.9	7.17	1435	2395	0.373	0.110	407.9	173.7	277.9	1.42	1.859	214.4	28.56	129.5	59.49	568.2
HF 2	Hofuf Water Compan	01-Jan-16	27.9	6.44	1386	2310	0.200	0.060	398.2	181.3	430.4	1.74	1.814	227.1	29.92	128.8	57.66	559.0
HF 3	Hofuf Water Compan	01-Feb-16	31.3	6.46	1440	2445	0.250	0.040	393.1	174.4	337.9	1.26	1.814	205.5	28.25	161.2	55.66	631.8
HF 4	Hofuf Water Compan	01-Mar-16	30.9	6.76	1432	2390	0.150	0.040	425.5	167.7	298.6	1.16	1.795	208.7	22.88	147.5	46.06	558.0
HF 5	Hofuf Water Compan	20-Mar-16	33.2	6.98	1517	2530	0.150	0.100	435.4	173.7	317.9	1.31	1.782	212.9	32.14	154.4	57.97	624.3
HF 6	Hofuf Water Compan	10-Apr-16	30.3	6.88	1519	2540	0.325	0.090	420.0	177.4	472.8	1.22	1.770	220.3	31.42	145.3	66.72	637.6
HF 7	Hofuf Water Compan	01-May-16	32.9	7.03	1592	2662	0.350	0.080	533.9	188.3	276.3	1.40	1.654	299.3	44.25	103.2	40.10	422.9
AD 1	Al-Doha	01-Dec-15	20.2	7.37	1355	2265	0.100	0.040	378.6	185.5	339.2	6.60	0.988	219.4	24.33	154.8	30.32	511.4
AD 2	Al-Doha	01-Jan-16	24.9	6.56	1323	2210	0.150	0.097	391.4	192.2	300.4	6.40	0.950	206.6	26.29	147.0	44.90	552.0
AD 3	Al-Doha	01-Feb-16	26.5	6.40	1304	2180	0.175	0.070	410.7	186.1	285.4	6.46	0.956	206.7	25.54	138.8	49.04	548.5
AD 4	Al-Doha	01-Mar-16	26.7	6.81	1368	2280	0.325	0.070	394.8	164.0	248.5	6.55	1.013	205.8	27.59	143.8	47.52	554.7
AD 5	Al-Doha	20-Mar-16	28.8	7.00	1370	2280	0.050	0.050	399.9	181.7	335.5	6.45	0.886	207.2	27.95	138.7	50.74	555.2
AD 6	Al-Doha	10-Apr-16	27.3	6.62	1348	2240	0.225	0.050	392.8	188.7	302.3	6.51	0.920	205.0	26.87	145.8	46.67	556.2
AD 7	Al-Doha	01-May-16	29.1	7.06	1456	2400	0.240	0.100	498.2	190.5	225.7	6.50	1.337	282.9	27.59	93.7	37.67	389.1

Second Purified water samples (after purification)

Sampling ID	Water Purification plant	Sampling Trip	Temp.	pH	TDS (mg/l)	EC (µs/cm)	Turbidity (NTU)	Free Cl_2 (mg/l)	Cl (mg/l)	HCO_3 (mg/l)	SO_4 (mg/l)	NO_3 (mg/l)	F (mg/l)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/L)	Hardness (mg/l)
RB 1	Rayan Al-Baraka	01-Dec-15	19.9	7.94	115	191	0.323	0.050	30.1	11.6	21.6	1.26	0.195	20.6	4.5	7.8	2.72	30.6
RB 2	Rayan Al-Baraka	01-Jan-16	26.2	6.83	111	181	0.150	0.070	27.2	19.2	20.8	1.39	0.136	20.6	3.8	4.4	4.91	31.2
RB 3	Rayan Al-Baraka	01-Feb-16	27.7	6.25	122	203	0.100	0.200	38.6	12.7	22.8	1.38	0.117	27.1	3.9	7.1	2.78	29.2
RB 4	Rayan Al-Baraka	01-Mar-16	27.1	6.57	117	194	0.100	0.050	36.3	14.0	22.4	1.40	0.257	26.4	3.9	5.4	3.65	28.6
RB 5	Rayan Al-Baraka	20-Mar-16	30.2	7.26	136	226	0.100	0.530	43.4	15.6	22.0	1.54	0.162	29.3	4.2	5.0	3.87	28.5
RB 6	Rayan Al-Baraka	10-Apr-16	29.3	6.88	135	223	0.150	0.070	40.3	13.7	26.9	1.65	0.155	28.6	4.6	3.7	5.59	32.2
RB 7	Rayan Al-Baraka	01-May-16	31.3	7.64	142	235	0.150	0.080	49.4	12.4	18.1	1.96	0.088	34.7	5.4	4.5	3.02	23.6
HF 1	Hofuf Water Compan	01-Dec-15	19.9	7.56	138	232	0.300	0.040	50.4	12.9	29.6	0.19	0.356	26.9	4.7	6.8	9.02	54.1
HF 2	Hofuf Water Compan	01-Jan-16	27.6	6.56	163	272	0.100	0.060	53.1	26.2	22.8	0.30	0.479	37.4	3.9	5.9	5.00	35.3
HF 3	Hofuf Water Compan	01-Feb-16	29.9	6.40	146	243	0.150	0.050	50.8	23.6	18.4	0.32	0.435	35.1	3.8	5.2	3.86	29.0
HF 4	Hofuf Water Compan	01-Mar-16	30.2	6.78	157	262	0.225	0.050	49.9	30.0	21.6	0.28	0.409	37.5	4.0	3.7	5.38	31.5
HF 5	Hofuf Water Compan	20-Mar-16	32.7	7.19	154	256	0.100	0.050	49.0	25.2	18.0	0.24	0.492	37.0	3.9	2.7	4.42	25.0
HF 6	Hofuf Water Compan	10-Apr-16	30.2	6.56	185	308	0.250	0.210	62.8	21.0	27.0	0.27	0.560	40.8	4.9	4.5	7.02	40.0
HF 7	Hofuf Water Compan	01-May-16	31.6	7.57	160	264	0.290	0.070	61.2	21.2	8.5	0.28	0.579	44.0	3.7	2.0	3.55	19.6
AD 1	Al-Doha	01-Dec-15	20.1	7.54	167	279	0.277	0.075	48.7	19.4	27.2	1.02	0.170	28.0	3.7	15.1	4.13	54.8
AD 2	Al-Doha	01-Jan-16	25.9	6.55	156	261	0.100	0.060	50.1	22.8	24.9	1.07	0.155	31.5	3.3	8.7	5.99	46.3
AD 3	Al-Doha	01-Feb-16	27.4	6.62	169	282	0.100	0.040	52.5	26.2	29.7	1.20	0.225	34.9	3.7	9.4	6.26	49.4
AD 4	Al-Doha	01-Mar-16	27.1	6.60	165	274	0.275	0.060	54.2	22.5	28.6	1.09	0.257	32.5	3.6	5.6	8.58	49.4
AD 5	Al-Doha	20-Mar-16	28.7	7.25	171	285	0.100	0.080	51.2	21.8	26.9	1.07	0.282	34.6	3.6	7.0	7.29	47.5
AD 6	Al-Doha	10-Apr-16	28.6	7.09	67	112	0.275	0.070	32.8	10.9	4.6	1.00	0.219	18.7	2.5	1.6	3.86	19.8
AD 7	Al-Doha	01-May-16	28.9	7.62	158	259	0.150	0.115	59.7	15.1	16.6	0.83	0.201	39.3	2.9	5.0	3.2	25.5