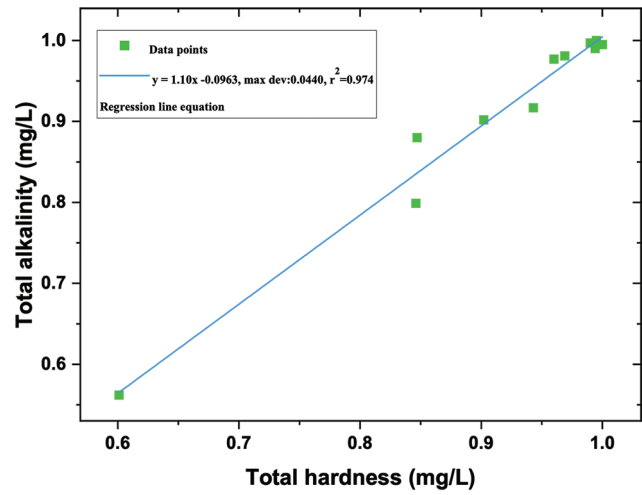
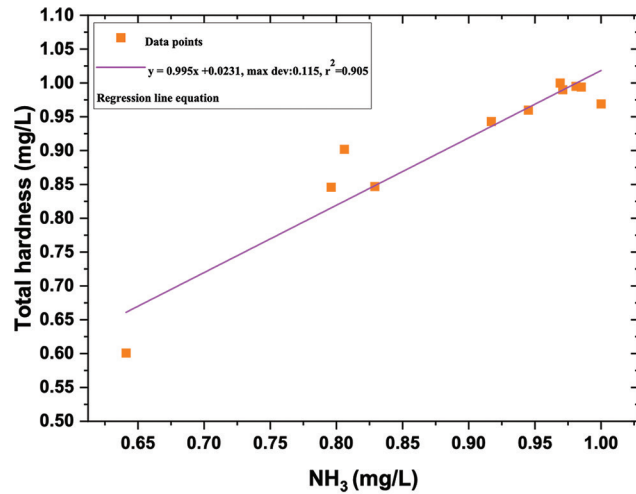


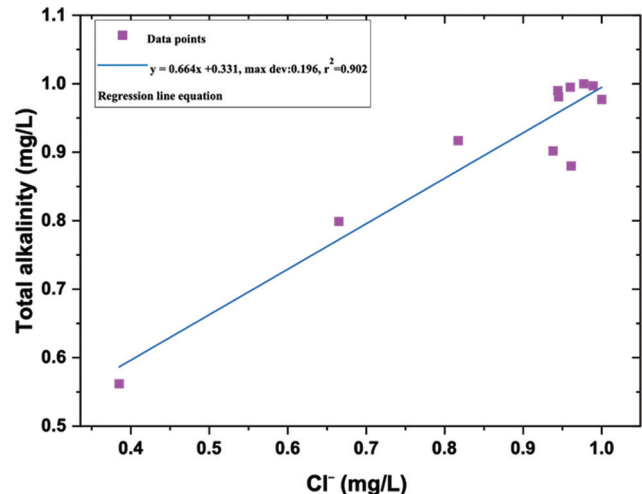
**Figure S3. Regression plot of total hardness versus free CO<sub>2</sub>**  
 Abbreviations: max dev: Maximum deviation;  
 CO<sub>2</sub>: Carbon dioxide.



**Figure S5. Regression plot of total hardness versus total alkalinity**  
 Abbreviation: max dev: Maximum deviation.



**Figure S4. Regression plot of total hardness versus ammonia (NH<sub>3</sub>)**  
 Abbreviation: max dev: Maximum deviation.



**Figure S6. Regression plot of total alkalinity versus chloride (Cl<sup>-</sup>)**  
 Abbreviation: max dev: Maximum deviation.

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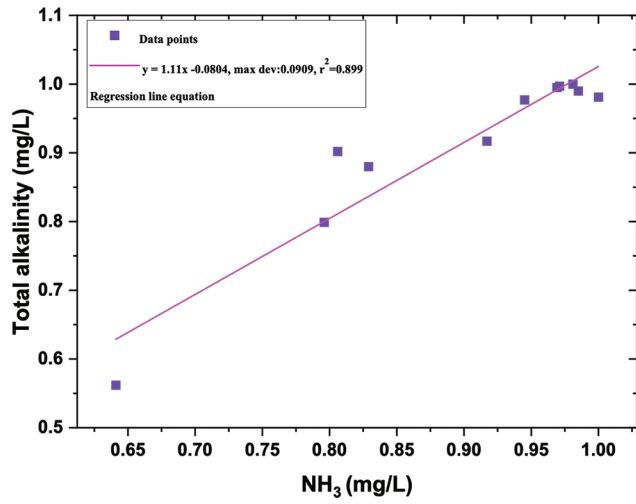


Figure S7. Regression plot of total alkalinity versus ammonia (NH<sub>3</sub>)

Abbreviation: max dev: Maximum deviation.

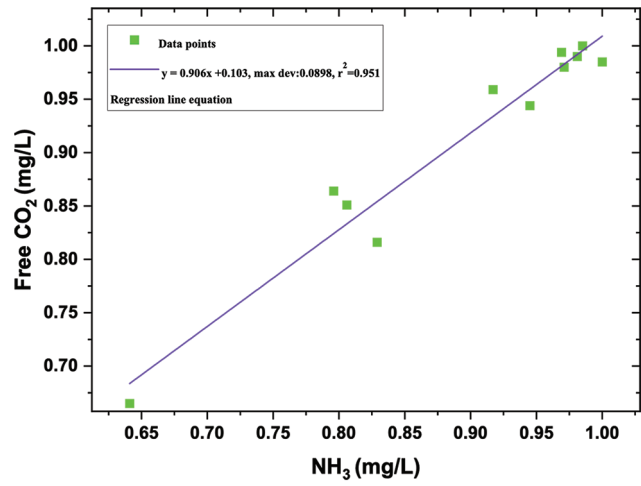


Figure S9. Regression plot of free carbon dioxide (CO<sub>2</sub>) versus ammonia (NH<sub>3</sub>)

Abbreviation: max dev: Maximum deviation.

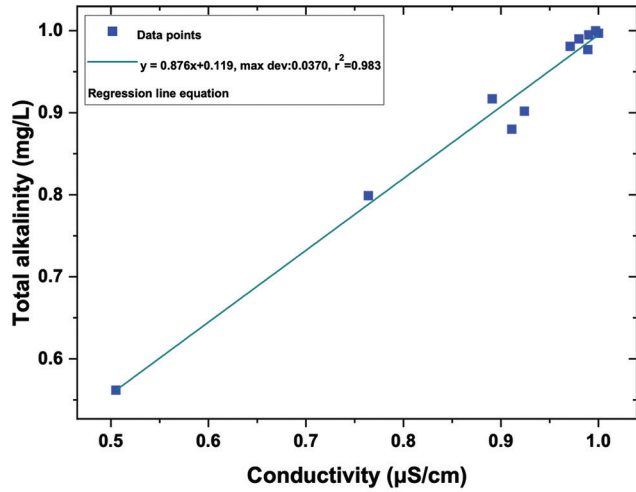


Figure S8. Regression plot of total alkalinity versus conductivity

Abbreviation: max dev: Maximum deviation.

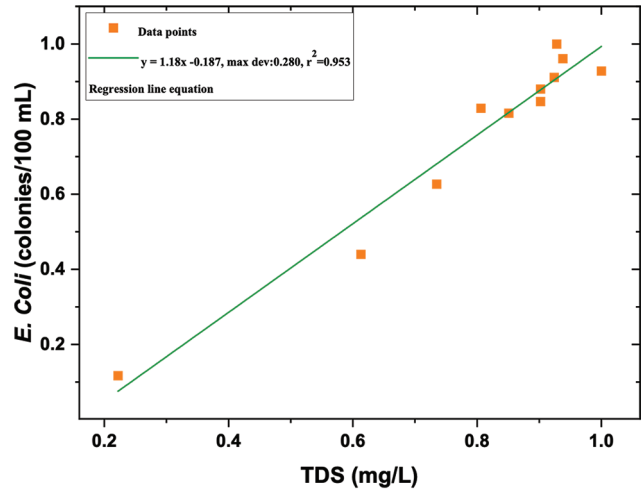


Figure S10. Regression analysis of *Escherichia coli* versus TDS

Abbreviation: max dev: Maximum deviation; TDS: Total dissolved solids.

**Table S1. WQI for each chemical parameter of the groundwater sample from the iron factory site**

Parameter	WHO standard (Sn)	1/Sn	$\sum 1/Sn$	$K=1/(\sum 1/Sn)$	Wi=K/Sn	Ideal value (Vo)	Mean conc. value (Vn)	Vn/Sn	$Vn/Sn \times 100=Qn$	WQI=WnQn
pH	8.5	0.11765	1.98498	0.503783314	0.05926863	7	7.5	0.3	33.3	2.0
Conductivity (µS/cm)	1,500	0.00067	1.98498	0.503783314	0.00033586	0	280	0.2	18.7	0.0
TDS (mg/L)	1,000	0.001	1.98498	0.503783314	0.00050378	0	225	0.2	22.5	0.0
Total hardness (mg/L)	300	0.00333	1.98498	0.503783314	0.00167928	0	136.8	0.5	45.6	0.1
Chloride (mg/L)	250	0.004	1.98498	0.503783314	0.00201513	0	50.2	0.2	20.1	0.0
Ammonia (mg/L)	1.5	0.66667	1.98498	0.503783314	0.33585554	0	8.1	5.4	541.5	181.9
Nitrate (mg/L)	50	0.02	1.98498	0.503783314	0.01007567	0	32.3	0.6	64.6	0.7
Phosphate (mg/L)	1	1	1.98498	0.503783314	0.50378331	0	6.4	6.4	644.0	324.4
Alkalinity (mg/L)	200	0.005	1.98498	0.503783314	0.00251892	0	62.25	0.3	31.1	0.1
Free CO <sub>2</sub> (mg/L)	6	0.16667	1.98498	0.503783314	0.08396389	0	36.3	6.1	605.0	50.8

Note: Please refer to Section 3.3.3 of the main text for the definitions of the equation expressions in the table heading.

Abbreviations: conc.: Concentration; CO<sub>2</sub>: Carbon dioxide; TDS: Total dissolved solids; WHO: World Health Organization; WQI: Water quality index.

**Table S2. WQI for each chemical parameter of the groundwater sample from the royal paint factory site**

Parameters	WHO standards (Sn)	1/Sn	$\sum 1/Sn$	$K=1/(\sum 1/Sn)$	Wi=K/Sn	Ideal value (Vo)	Mean conc. value (Vn)	Vn/Sn	$Vn/Sn \times 100=Qn$	WQI=WnQn
pH	8.5	0.11765	1.98498	0.503783314	0.05926863	7	7.2	0.13333	13.3	0.8
Conductivity (µS/cm)	1,500	0.00067	1.98498	0.503783314	0.00033586	0	490	0.32667	32.7	0.0
TDS (mg/L)	1,000	0.001	1.98498	0.503783314	0.00050378	0	125	0.125	12.5	0.0
Total hardness (mg/L)	300	0.00333	1.98498	0.503783314	0.00167928	0	221	0.73667	73.7	0.1
Chloride (mg/L)	250	0.004	1.98498	0.503783314	0.00201513	0	61.4	0.2455	24.6	0.0
Ammonia (mg/L)	1.5	0.66667	1.98498	0.503783314	0.33585554	0	8.0	5.34867	534.9	179.6
Nitrate (mg/L)	50	0.02	1.98498	0.503783314	0.01007567	0	38.7	0.7742	77.4	0.8
Phosphate (mg/L)	1	1	1.98498	0.503783314	0.50378331	0	7.75	7.75	775.0	390.4
Alkalinity (mg/L)	200	0.005	1.98498	0.503783314	0.00251892	0	104	0.52	52.0	0.1
Free CO <sub>2</sub> (mg/L)	6	0.16667	1.98498	0.503783314	0.08396389	0	49.225	8.20417	820.4	68.9

Note: Please refer to Section 3.3.3 of the main text for the definitions of the equation expressions in the table heading.

Abbreviations: conc.: Concentration; CO<sub>2</sub>: Carbon dioxide; TDS: Total dissolved solids; WHO: World Health Organization; WQI: Water quality index.

**Table S3. WQI for each chemical parameter of the groundwater sample from the Coca-Cola factory site**

Parameters	WHO standards (Sn)	1/Sn	$\sum 1/Sn$	$K=1/(\sum 1/Sn)$	Wi=K/Sn	Ideal value (Vo)	Mean conc. value (Vn)	Vn/Sn	$Vn/100=Qn$	WQI= $Wn/Qn$
pH	8.5	0.11765	1.98498	0.503782468	0.05926853	7	7.3	0.2	20.0	1.2
Conductivity ( $\mu S/cm$ )	1,500	0.00067	1.98498	0.503782468	0.00033585	0	601	0.40067	40.1	0.0
TDS (mg/L)	1,000	0.001	1.98498	0.503782468	0.00050378	0	175	0.175	17.5	0.0
Total hardness (mg/L)	300	0.00333	1.98498	0.503782468	0.00167927	0	275.75	0.91917	91.9	0.2
Chloride (mg/L)	250	0.004	1.98498	0.503782468	0.00201513	0	68.3	0.273	27.3	0.1
Ammonia (mg/L)	1.5	0.66667	1.98498	0.503782468	0.33585498	0	11.7	7.81333	781.3	262.4
Nitrate (mg/L)	50	0.02	1.98498	0.503782468	0.01007565	0	42.2	0.8448	84.5	0.9
Phosphate (mg/L)	1	1	1.98498	0.503782468	0.50378247	0	6.17	6.17	617.0	310.8
Alkalinity (mg/L)	200	0.005	1.98498	0.503782468	0.00251891	0	137.25	0.68625	68.6	0.2
Free CO <sub>2</sub> (mg/L)	6	0.16667	1.98498	0.503782468	0.08396374	0	62.975	10.4958	1049.6	88.1

Note: Please refer to Section 3.3.3 of the main text for the definitions of the equation expressions in the table heading.

Abbreviations: conc.: Concentration; CO<sub>2</sub>: Carbon dioxide; TDS: Total dissolved solids; WHO: World Health Organization; WQI: Water quality index.

**Table S4. Detailed physicochemical and microbiological parameters of water samples from different sites**

Sites	Samples	Temperature (°C)	pH	EC ( $\mu S/cm$ )	Hardness (mg/L)	Alkalinity (mg/L)	Free CO <sub>2</sub> (mg/L)	Chloride (mg/L)	Phosphate (mg/L)	Ammonia (mg/L)	Nitrate (mg/L)	<i>Escherichia coli</i> (colonies/100ml)	TDS (mg/L)
IF	A	22	7.6	448	207	76	39.6	120.4	6.88	7.18	23.25	0	200
	B	23	7.9	203	109	55	28.6	22.7	7.52	7.6	42.94	1	0
	C	21	7.2	208	99	53	35.2	30.3	5.62	9.78	31.6	0	400
	D	23	7.1	259	132	65	41.8	27.5	5.73	7.93	31.39	9	300
RPF	E	22	7.5	384	189	100	44	39.8	9.83	7.94	25.93	0	200
	F	21	7.1	710	266	132	70.4	88.2	4.25	8.91	43.35	1	0
	G	23	7	402	189	83	36.3	52.1	9.62	7.05	45.10	0	0
	H	22	7.3	462	240	101	46.2	65.4	7.31	8.19	40.46	6	300
CF	I	22	7.2	438	227	101	50.6	47.4	6.57	7.03	38.51	3	0
	J	21	7.4	568	262	137	66	49.3	6.78	10.88	45.10	7	400
	K	22	7.4	994	405	215	89.1	142.2	4.25	9.5	45.82	2	200
	L	22	7.1	402	209	96	46.2	34.1	7.09	19.47	39.54	5	100

Abbreviations: CF: Coca-Cola factory; CO<sub>2</sub>: Carbon dioxide; EC: Electrical conductivity; IF: Iron factory; RPF: Royal Paint factory; TDS: Total dissolved solids.