

RECLAIMED SALT-AFFECTED SOILS CAN EFFECTIVELY CONTRIBUTE TO CARBON SEQUESTRATION AND FOOD GRAIN PRODUCTION: EVIDENCE FROM PAKISTAN

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Table S1: Physicochemical properties of organic amendments used in experiment.

Properties	Farmyard manure	Poultry manure	Green manure
pH	7.8±0.3	7.0±0.5	-
Total C (%)	11±2	23±2	9.8±0.8
Total N (%)	0.8±0.2	7±1	2.5±0.6
Total P (%)	0.4±0.2	2±1	0.6±0.3
Total K (%)	1.20±0.03	2.5±0.7	1.8±0.8

Table S2: Crop management practices during the study period.

Crop	Wheat	Maize
Seed rates (kg ha ⁻¹)	150	50
Fertilizers (NPK @ kg ha ⁻¹)	79:57:62	135:63:50
Irrigation (mm)	550 (110 each), 15 days intervals	650 (130 each) 15 days intervals
Amendments (t ha ⁻¹)	12.00	12.00
Tillage	No	No
Cropping system	Wheat-maize	Wheat-maize
Planting method	Beds	Ridges
Sowing method	Broadcasting	Drilling
Sowing date	12-12-17 to 20-11-19	15-07-18 to 15-06-2020
Harvest dates	02-05-18 to 24-04-2020	21-10-2018 to 19-10-2020

Table S3: Soil physico-chemical properties used in the initialization of simulations at Dijkot, Uchkera and Jhang.

Property	Dijkot	Uchkera	Jhang
Soil thickness (cm)	30	30	30
Sand (%)	48	45	62
Silt (%)	33	25	21
Clay (%)	19	30	17
pH	9.45	9.36	9.50
EC (d S m ⁻¹)	5.14	5.28	5.38
SOC (%)	0.14	0.11	0.18
Bulk density (g cm ⁻³)	1.67	1.75	1.65

Table S4: Crop yields for the control and treatments used in the simulations of pot experiments at Dijkot, Uchkera and Jhang, and field experiment at Jhang. Note: FYM = farmyard manure, PM = poultry manure, GM = green manure (all applied at 12 t ha⁻¹); G100 = 100% soil gypsum requirement; G50 = 50% soil gypsum requirement.

Treatment	Crop yield (t ha ⁻¹) after harvest of					
	Wheat 2018	Maize 2018	Wheat 2019	Maize 2019	Wheat 2020	Maize 2020
Pot study – Dijkot						
Control	1.68	3.91	1.79	3.99	2.14	4.03
FYM+G50	2.60	5.41	2.71	5.49	3.06	5.53
PM+G50	2.68	5.60	2.79	5.67	3.14	5.71
GM+G50	2.51	5.36	2.62	5.43	2.97	5.47
Pot study – Uchkera						
Control	2.17	4.17	2.52	4.23	2.39	4.25
FYM+G50	2.76	5.59	3.11	5.65	2.99	5.67
PM+G50	2.38	5.16	2.74	5.21	2.62	5.24
GM+G50	2.40	5.44	2.75	5.49	2.63	5.52
Pot study – Jhang						
Control	1.84	3.42	2.36	3.46	2.31	3.52
G100	2.46	4.96	2.98	5.00	2.93	5.07
FYM+G50	2.77	5.88	3.29	5.92	3.24	5.98
PM+G50	2.63	5.31	3.15	5.35	3.10	5.41
GM+G50	2.69	5.36	3.22	5.40	2.98	5.46
Field study – Jhang						
Control	2.05	3.31	2.23	3.52	2.35	3.62
G100	2.87	4.39	3.11	4.47	3.33	4.83
FYM+G50	3.16	4.52	3.41	4.64	3.57	4.90
PM+G50	2.96	4.45	3.25	4.40	3.42	4.85
GM+G50	2.86	4.68	3.14	4.91	3.32	5.39

Table S5: The soil C measurements to a soil depth of 30 cm for the control and treatments used (a) to adjust the plant inputs (control) and (b) to evaluate the model (other treatments). Note: FYM = farmyard manure, PM = poultry manure, GM = green manure (all applied at 12 t ha⁻¹); G100 = 100% soil gypsum requirement; G50 = 50% soil gypsum requirement.

Site and Treatment	Measured soil carbon (t ha ⁻¹) after harvest of					
	Wheat 2018	Maize 2018	Wheat 2019	Maize 2019	Wheat 2020	Maize 2020
Pot study – Dijkot						
Control	8.0	8.5	9	9.5	9.5	10
FYM+G50	9.5	12	13.5	14.5	16	17.5
PM+G50	11	12.5	13	14	15.5	17
GM+G50	10	11	11.5	12	12.5	13
Pot study – Uchkera						
Control	7.4	7.9	7.9	8.4	9.5	10
FYM+G50	10.5	12.1	13.1	14.2	15.2	15.8
PM+G50	10.5	11	13.1	14.2	14.2	14.7
GM+G50	8.9	10	11	12.1	12.1	12.6
Pot study – Jhang						
Control	9.9	9.9	9.9	10.4	10.9	9.9
G100	13.4	15.8	16.8	17.3	18.3	18.8
FYM+G50	15.3	15.8	17.8	19.3	21.3	23.3
PM+G50	14.4	14.4	14.9	15.3	16.3	16.3
GM+G50	12.9	13.4	14.9	15.3	15.3	16.3
Field study – Jhang						
Control	9.4	9.4	9.9	11.4	11.9	12.9
G100	11.4	12.4	13.4	14.9	15.3	16.8
FYM+G50	13.9	15.3	16.3	17.8	19.3	22.3
PM+G50	12.9	13.9	14.9	16.3	17.3	18.8
GM+G50	11.9	13.4	14.4	15.8	16.3	16.3

Supplementary figures

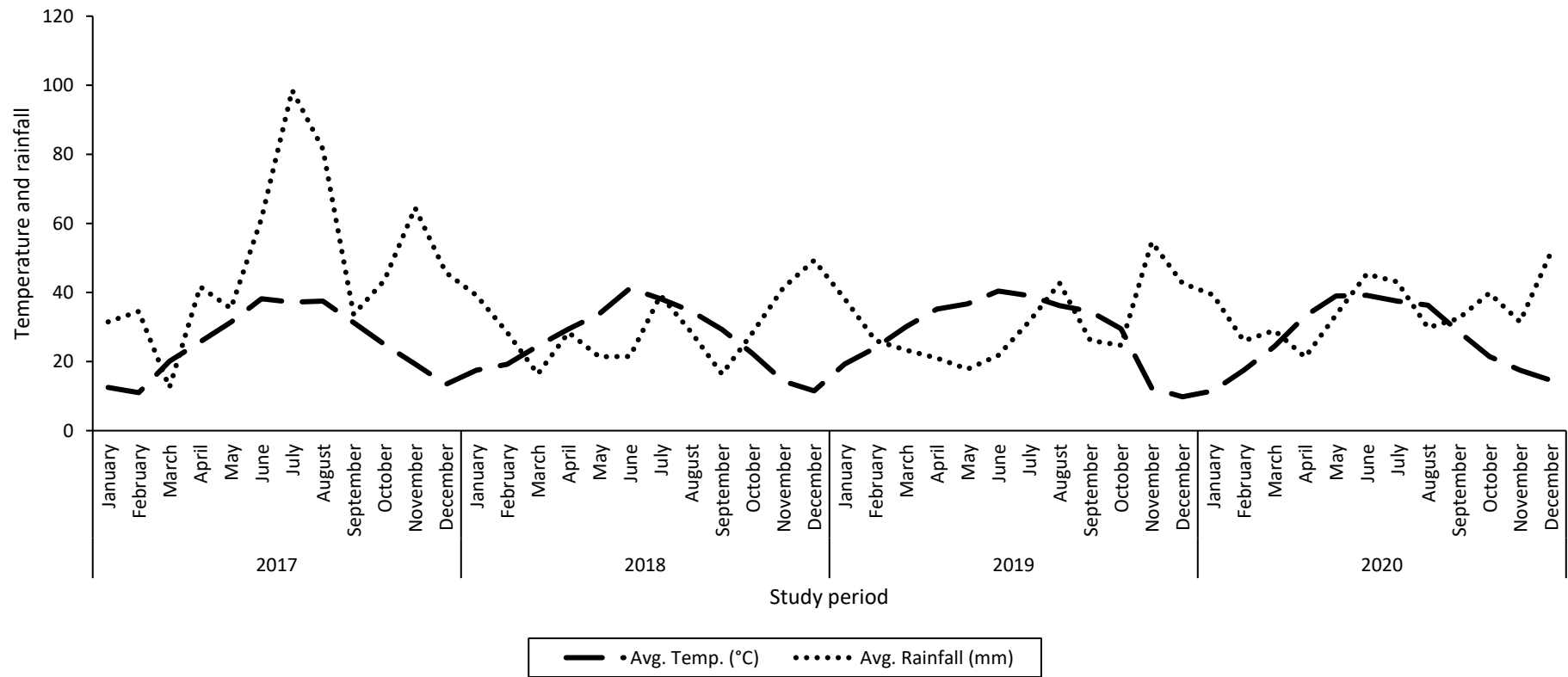


Fig. S1 Monthly average temperature and rainfall during the study period.

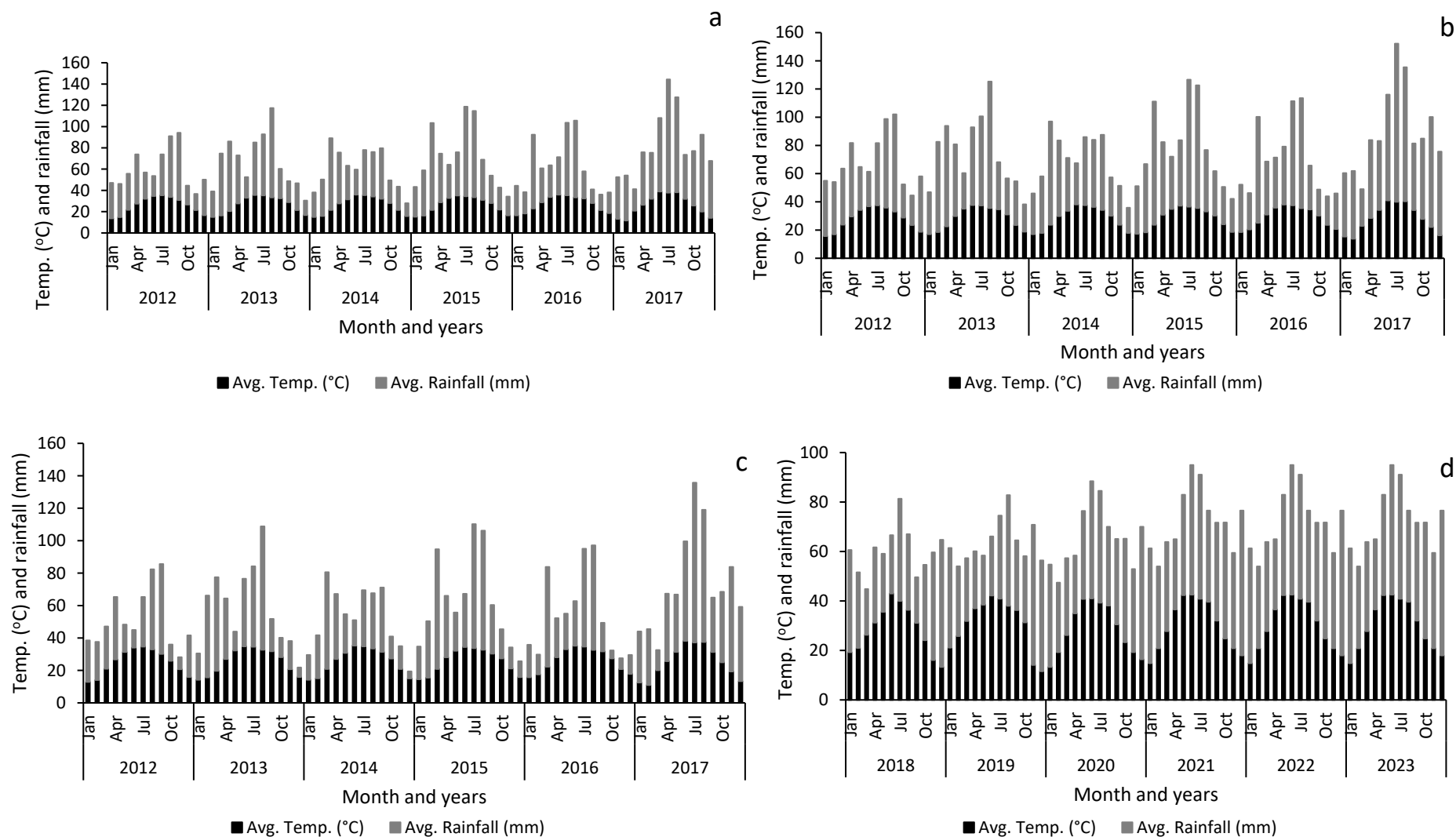


Fig. S2 The weather data used in the simulation of the pot experiment soils, a) for steady-state run in Dijkot, b) in Uchkera, c) in Jhang, and d) for forward run in Faisalabad.

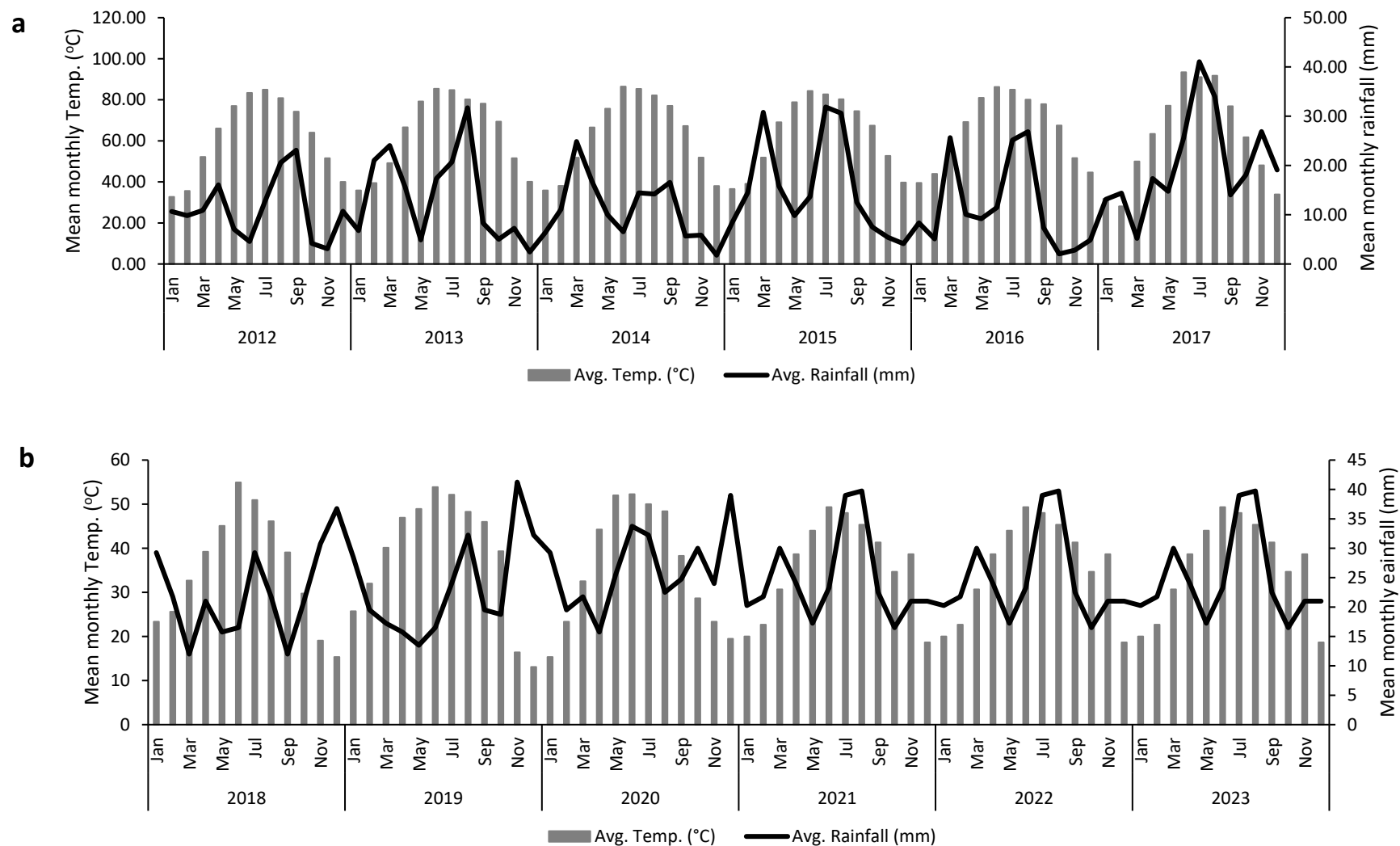


Fig. S3 The weather data used in the simulations of the field experiment (Jhang) soils, a) steady-state run, and b) forward run.