

# Chapter 3

## Developing Soil Test-based Fertilizer Recommendations

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Soil health mapping in the state of Odisha aimed at improving crop productivity and thereby the rural livelihoods of those depending on the agrarian economy. The activity began with the collection of 40,265 representative soil samples using stratified random sampling across 30 districts. This was a first of its kind, systematic exercise aimed at diagnosing soil fertility-related constraints in the state in order to ascertain macro and micronutrient deficiencies and develop practical recommendations for scaling-out.

### Determining critical limits for nutrient indices

The critical limits that differentiate between nutrient deficiency and nutrient sufficiency are presented in Table 3.1. Based on these critical limits for each of the soil nutrient parameters, deficiency and sufficiency levels were worked out (Annexures 2 to 31) to facilitate data-driven decision support for soil health management across the districts.

### Crop-wise nutrient recommendation

Based on the results of the soil analyses, fertilizer recommendations were worked out to facilitate the application of micronutrients such as sulfur, boron and zinc and secondary nutrients like nitrogen, phosphorus and potassium. Soil test-based fertilizer recommendations were made for individual farmers on whose lands sampling was done. For the non-sampled farmers, the recommendations were worked out based on the weighted average values derived at the respective villages or blocks based on soil test values of the 40,265 samples collected. For secondary and micronutrients, application of a full dose is

**Table 3.1. Critical limits in soil nutrient parameters to differentiate between sufficiency and deficiency.**

Parameter	Critical limit
Soil organic carbon	0.5%
pH	5.5-7.5 (neutral)
Electrical Conductivity (EC) (dS/m)	<1 (normal)
P <sub>2</sub> O <sub>5</sub>	10 ppm
K <sub>2</sub> O	120 ppm
Exchangeable Calcium	1000 ppm
Exchangeable Magnesium	40 ppm
Available Sulfur	10 ppm
Exchangeable Zinc	0.6 ppm
Exchangeable Copper	0.2 ppm
Exchangeable Iron	4.5 ppm
Exchangeable Manganese	2 ppm
Available Boron	0.5 ppm

being recommended where the deficiency is more than 50% for that particular nutrient in a particular village or block; half the dose when the deficiency is between 25% and 50%, one fourth dose with 10-25% deficiency and no application where the deficiency level is less than 10% (Chander et al. 2016, 2019). The suggested full dose recommended for boron is 1 kg/ha. With regard to zinc, the recommended dose for paddy and pulses is 5 kg/ha and for other cereals and oilseed crops 2.5 kg/ha and 2 kg/ha, respectively (Anonymous 2019). However, with regard to recommendations for sulfur, the use of 30 kg/ha, 40 kg/ha and 45 kg/ha in the case of cereals, pulses and oilseed crops, respectively has been suggested.

## References

**Chander G, Reddy TY, Kumar S, Padmalatha Y, Reddy S, Wani SP, Adinarayana G and Malla Reddy YV.** 2019. Low-cost interventions for big impacts in dryland production systems. *Archives of Agronomy and Soil Science* 65(3):1\_13.

**Chander G, Wani SP, Krishnappa K, Sahrawat KL, Parthasaradhi G and Jangawad LS.** 2016. Soil mapping and variety based entry-point interventions for strengthening agriculture-based livelihoods – exemplar case of 'Bhoochetana' in India. *Current Science* 110(9): 1683-1691.

## Annexures

### Annexure 2. Block-level deficiency of major and micronutrients and soil condition in Angul district.

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**									
		Neutral	Acidic	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn	
Angul	150	51	29	21	100	42	45	7	0	11	46	62	76	3	0	7	
Athmalik	130	47	31	22	100	37	42	9	5	24	28	55	70	2	0	2	
Banarpal	90	44	30	26	100	39	39	1	0	9	13	56	73	3	1	16	
Chhendipada	100	60	22	18	100	33	43	13	9	34	24	82	70	11	7	23	
Kaniha	150	93	5	1	100	34	49	25	11	35	33	76	80	1	2	17	
Kishornagar	150	80	15	5	100	27	65	12	9	25	34	72	95	4	12	4	
Pallahara	150	93	6	1	100	33	60	7	9	26	69	47	95	0	0	1	
Talcher	100	65	33	2	100	24	37	12	4	23	23	37	69	1	0	3	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 3. Block-level deficiency of major and micronutrients and soil condition in Baleswar district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**										
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min	
Bahanoga	100	100	0	0	100	65	55	77	10	44	55	72	91	0	0	1	
Baleswar Sadar	150	98	2	0	99	32	60	51	17	30	44	33	61	2	1	4	
Baliapal	150	55	43	1	99	42	23	31	7	23	20	44	32	19	6	9	
Basta	100	70	29	1	99	13	28	12	7	9	12	49	15	3	0	3	
Bhogarai	160	79	17	4	100	51	44	43	29	35	19	34	39	1	6	19	
Jaleswar	150	85	15	0	100	44	27	18	5	9	41	10	49	7	0	0	
Khaira	200	93	7	1	100	71	55	61	5	47	48	43	90	3	2	2	
Nilagiri	100	96	4	0	100	53	70	46	10	27	40	32	98	1	3	2	
Oupada	100	90	10	0	100	44	53	46	18	37	53	35	90	1	10	0	
Remuna	140	89	11	0	99	59	56	63	16	34	38	46	85	2	0	6	
Simulia	100	87	4	9	100	75	62	51	3	27	38	75	93	9	8	11	
Soro	100	90	9	1	98	73	69	65	6	50	44	46	93	4	3	11	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 4. Block-level deficiency of major and micronutrients and soil condition in Bargarh district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Ambabhona	160	85	15	0	100	23	17	15	3	33	23	34	79	0	0	0
Atabira	150	94	5	1	100	37	23	51	5	45	21	53	97	0	1	4
Bargarh	90	74	12	13	100	37	21	41	6	68	21	37	96	1	7	4
Barpali	100	85	14	1	99	34	33	39	5	33	28	60	94	2	4	2
Bhatli	100	96	4	0	100	51	15	46	22	82	23	45	98	0	6	1
Bheden	100	88	12	0	98	49	31	46	8	44	29	52	88	1	1	4
Bijepur	150	88	10	2	100	39	44	18	12	46	23	49	86	1	2	3
Gaisilat	100	59	27	14	100	34	42	12	6	17	22	58	85	2	1	1
Jharabandha	100	53	29	17	100	28	53	14	3	12	31	64	92	4	2	2
Padampur	200	74	20	6	100	32	47	14	7	23	36	64	91	2	6	3
Paikamal	150	74	19	7	100	30	62	9	2	20	49	51	89	3	1	1
Sohela	150	77	18	5	100	47	42	27	13	46	31	69	92	1	3	4

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 5. Block-level deficiency of major and micronutrients and soil condition in Bhadrak district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Basudevpur	150	91	9	0	99	39	15	43	6	13	29	52	50	0	1	3
Bhadaripokhari	120	98	0	2	100	66	55	20	0	0	80	58	78	1	0	0
Bhadrak	100	76	15	9	99	37	38	31	5	11	59	35	83	4	0	4
Bonth	150	90	10	0	100	46	59	25	0	1	77	35	70	0	0	0
Chandabali	150	98	1	1	97	19	45	4	0	0	13	36	6	0	0	0
Dhamanagar	120	100	0	0	100	38	40	32	0	0	60	33	84	0	0	0
Tihidi	120	98	2	0	100	43	38	19	0	0	33	15	47	0	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 6. Block-level deficiency of major and micronutrients and soil condition in Balangir district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal			Fields with low soil C levels and nutrient deficiencies (%)**								
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Agalpur	100	66	18	16	100	75	76	12	14	35	43	92	97	26	23	10
Bangomunda	150	41	31	28	100	52	60	9	2	10	38	73	91	10	5	9
Belpada	100	82	15	3	100	36	82	18	7	30	59	75	100	1	6	0
Balangir	120	48	34	18	100	32	58	11	0	5	34	64	87	3	0	5
Degaon	149	58	28	14	100	47	68	19	3	23	50	92	97	3	3	3
Gudbhela	100	58	20	22	100	37	52	9	0	11	48	72	96	7	4	6
Khaprakhol	150	61	23	15	100	34	73	12	2	9	60	85	98	3	3	6
Loisinga	100	29	41	30	100	36	54	21	1	10	23	69	89	10	2	6
Muribahal	150	80	15	5	100	46	72	27	7	39	64	75	95	4	8	1
Patnagarh	150	65	26	9	100	49	73	15	6	24	47	82	97	8	5	2
Puintala	150	37	33	29	100	37	65	15	1	3	27	82	78	9	1	29
Saintala	150	83	13	4	100	61	81	21	11	38	61	86	97	1	10	4
Titilagarh	150	61	27	12	100	57	59	15	3	46	31	45	88	4	8	4
Tureikela	100	42	41	17	100	42	81	15	1	9	18	67	84	0	0	13

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 7. Block-level deficiency of major and micronutrients and soil condition in Boudh district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC*	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Boudh	130	57	26	17	100	54	58	38	6	29	52	71	97	7	2	11
Harabhanga	90	62	28	9	100	53	43	23	0	8	56	54	86	8	0	4
Kantamal	150	54	33	13	100	47	49	25	7	2.1	49	69	96	8	3	3

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.



**Annexure 8. Block-level deficiency of major and micronutrients and soil condition in Cuttack district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Athgarh	200	50	30	20	100	49	8	4	1	7	4	16	64	1	0	1
Banki	120	99	1	0	100	28	8	18	3	8	62	3	96	0	0	0
Banki-Dampada	100	96	4	0	100	39	25	52	12	19	43	0	85	0	1	1
Baramba	50	82	18	0	100	34	60	24	0	2	54	40	86	0	0	0
Baranga	80	98	2	0	100	64	44	43	1	11	60	31	96	0	0	0
Choudwar	160	98	2	0	100	47	56	21	4	13	38	1	89	1	0	1
Cuttack Sadar	100	94	6	0	98	44	19	50	0	9	36	10	90	0	0	0
Kantapada	100	92	0	8	100	29	60	45	1	6	67	12	90	8	1	7
Mahanga	200	98	2	0	100	18	24	23	0	0	26	8	69	0	0	0
Narsinghpur	200	69	22	9	100	23	35	9	1	11	43	14	79	1	0	1
Niali	100	97	3	0	100	46	39	47	1	7	79	17	94	0	0	0
Nishantakoili	200	94	4	2	100	36	49	59	1	4	46	51	84	1	0	1
Salepur	160	96	4	0	100	46	43	66	0	7	38	33	84	0	0	0
Tigiria	50	98	2	0	100	34	42	38	0	10	34	16	88	2	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 9. Block-level deficiency of major and micronutrients and soil condition in Deogarh district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**								
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Barkote	90	98	2	0	100	23	87	33	12	29	70	61	93	2	1	1
Reamal	200	81	18	2	100	28	65	12	1	13	33	50	65	1	1	1
Tileibani	100	90	9	1	100	35	43	16	7	32	37	59	82	3	2	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 10. Block-level deficiency of major and micronutrients and soil condition in Dhenkanal district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**								
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Bhuban	100	99	1	0	100	42	38	45	6	23	55	33	90	0	0	1
Dhenkanal (Sadar)	150	90	9	1	100	49	51	15	9	37	68	24	84	1	0	0
Gondia	150	93	7	0	100	31	63	16	1	17	47	19	79	0	0	0
Hindol	150	56	36	8	100	25	40	5	1	3	10	23	53	3	1	7
Kamakhyanagar	100	86	9	5	100	20	68	22	2	4	47	16	80	0	0	1
Kankadahad	140	91	7	1	100	24	69	37	8	28	60	16	69	1	0	4
Odapada	100	83	16	1	100	23	38	6	2	17	23	6	75	2	0	0
Parjang	140	66	24	10	100	39	74	9	0	8	24	13	71	0	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 11. Block-level deficiency of major and micronutrients and soil condition in Gajapati district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min
Gosani	100	82	8	10	100	86	76	10	45	75	91	67	93	10	0	5
Gumma	150	95	4	1	100	56	58	13	28	67	75	41	93	0	1	3
Kasinagar	80	99	1	0	100	68	45	13	28	48	66	48	84	0	3	5
Nuagada	159	97	3	1	100	33	44	3	14	68	69	28	82	1	4	0
R.Udayagiri	140	89	4	7	100	79	56	2	66	83	84	54	92	8	2	0
Rayagada	120	99	1	0	100	45	14	3	33	94	73	21	98	0	0	1
Mohana	190	94	5	1	100	35	59	4	16	45	61	38	74	1	2	1

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 12. Block-level deficiency of major and micronutrients and soil condition in Ganjam district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under under EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC*	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Aska	100	80	11	9	100	52	72	35	1	9	68	55	73	4	0	2
Beguniapada	150	86	13	1	100	54	71	26	13	47	29	43	81	0	1	5
Bellaguntha	80	88	9	4	100	48	28	11	0	28	64	23	79	0	0	0
Bhanjanagar	150	86	11	3	100	33	75	9	5	18	59	23	82	0	0	0
Buguda	100	82	12	6	100	48	58	17	0	26	46	17	77	0	1	2
Chhatrapur	100	79	13	8	100	51	51	33	4	42	31	18	47	0	0	1
Chikiti	100	72	15	13	100	34	53	16	15	29	25	30	53	0	0	10
Dharakote	160	72	21	7	100	50	51	19	8	18	56	43	79	0	0	7
Digapahandi	200	62	34	4	100	41	83	11	0	11	27	39	73	0	0	3
Ganjam	100	34	48	18	71	53	31	3	1	6	8	13	6	0	0	9
Hinjilicut	50	60	28	12	98	70	46	32	18	28	42	44	52	0	0	0
J.N.Prasad	250	79	16	4	100	34	63	11	9	27	52	28	76	0	0	6
K.S.Nagar	50	68	16	16	100	58	62	24	2	16	32	26	64	2	0	2
Khalikote	100	85	10	5	100	53	86	29	12	30	32	15	66	1	0	3
Kukudakhandi	100	72	22	6	100	39	45	11	6	25	20	4	50	2	0	2
Patrapur	250	60	28	12	100	58	61	10	1	16	43	23	65	0	0	2
Polasara	100	78	19	3	100	18	80	20	3	14	40	49	73	0	0	1
Purusottampur	100	85	14	1	100	50	16	15	0	24	29	22	58	0	0	9
Rangeilunda	100	71	24	5	100	35	50	17	4	15	12	40	20	2	0	1
Sanakhemundi	100	61	30	9	100	44	49	16	9	25	45	47	67	2	0	1
Sheragada	100	41	43	16	100	60	23	1	0	1	30	34	27	2	0	0
Surada	270	58	29	13	100	40	39	4	6	18	50	49	71	6	0	4

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 13. Block-level deficiency of major and micronutrients and soil condition in Jagatsinghpur district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Balikuda	200	99	1	1	100	44	29	15	1	3	59	53	35	0	0	1
Biridi	80	99	1	0	100	53	33	49	0	6	38	70	75	0	0	1
Erasama	150	92	7	1	99	63	65	21	7	4	47	57	39	2	0	10
Jagatsinghpur	150	92	8	0	100	43	42	30	3	4	65	68	81	1	1	3
Kujanga	100	99	1	0	97	30	19	9	0	1	49	23	50	0	0	0
Naugaon	80	96	4	0	100	50	15	23	3	4	68	40	79	0	0	0
Raghunathpur	80	94	6	0	100	48	35	43	0	3	89	91	96	0	0	0
Tirtol	200	99	2	0	100	33	15	39	0	2	56	50	79	0	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 14. Block-level deficiency of major and micronutrients and soil condition in Jajpur district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC*		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min
Barchana	150	94	1	4	100	28	27	11	1	6	45	25	63	3	3	3
Bari	100	95	4	1	100	59	49	55	6	21	59	44	83	1	3	0
Binjharpur	100	99	1	0	100	41	61	51	4	8	59	43	84	0	2	0
Dangadi	100	93	6	0	100	42	76	47	3	15	84	13	90	0	0	0
Dasaratpur	150	78	13	9	80	20	44	19	2	3	28	9	25	13	0	15
Dharmasala	150	95	5	0	100	56	24	45	1	15	44	25	77	0	0	0
Jajpur	150	100	0	0	100	39	9	3	0	0	10	1	81	0	1	0
Korei	150	95	3	1	100	75	35	63	19	53	59	27	89	0	0	1
Rasulour	150	100	0	0	87	87	10	71	13	38	55	42	97	0	0	1
Sukinda	100	81	13	6	98	43	65	25	5	16	47	35	95	6	0	8

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 15. Block-level deficiency of major and micronutrients and soil condition in Jharsuguda district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Laikera	100	100	0	0	100	39	53	19	18	38	37	21	98	0	0	1
Lakhanpur	200	94	7	0	100	49	53	38	17	42	58	39	92	2	1	1
Jharsuguda	150	89	11	1	100	30	36	7	24	46	15	13	84	0	1	1
Kirmira	100	99	1	0	100	48	61	47	23	57	61	44	100	0	1	4
Kolabira	100	97	3	0	100	55	67	22	17	45	42	43	89	1	2	1

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 16. Block-level deficiency of major and micronutrients and soil condition in Kalahandi district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**										
		Acidic	Neutral	Alkaline	EC*	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn	
Bhawanipatna	200	48	31	22	100	63	58	2	3	12	54	77	82	7	4	5	
Dharmgarh	100	68	22	10	100	26	64	17	0	4	43	59	83	2	0	0	
Golamunda	100	60	30	10	100	36	45	7	5	18	32	70	80	10	1	0	
Jaipatna	80	71	24	5	100	36	44	6	3	18	58	18	74	6	0	0	
Junagarh	150	82	15	3	100	59	83	7	1	31	43	31	94	1	0	3	
Kalampur	50	90	10	0	100	28	78	28	0	0	82	26	100	0	0	0	
Karlamunda	60	43	40	17	100	73	80	27	0	3	68	87	95	2	0	8	
Kesinga	90	44	23	32	100	62	81	2	1	17	50	76	91	1	1	16	
Koksara	70	71	23	6	100	43	84	6	1	7	46	63	86	0	0	4	
Lanjigarh	240	72	22	6	100	57	63	12	1	22	63	38	71	1	0	1	
M.Rampur	250	60	30	10	100	56	68	14	6	27	55	61	89	1	3	2	
Narla	100	48	27	25	100	36	64	10	5	15	30	84	70	3	0	11	
Thuamul Rampur	180	38	56	4	100	11	17	1	2	5	38	11	33	0	0	0	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.



**Annexure 17. Block-level deficiency of major and micronutrients and soil condition in Kandhamal district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min
Daringbadi	140	98	2	0	100	34	54	6	17	68	79	36	88	0	4	1
G.Udayagiri	100	94	5	1	100	32	62	5	12	74	80	23	89	0	1	0
K. Nuagaon	100	97	3	0	100	36	30	5	17	68	80	26	84	2	4	0
Khajuripada	150	89	11	0	100	41	47	15	5	45	65	41	86	6	6	1
Kotagarh	100	98	2	0	100	21	37	3	1	33	54	44	68	1	26	0
Phulbani	150	98	2	0	100	81	49	15	7	58	73	56	95	0	9	3
Raikia	110	98	2	0	100	40	63	15	12	69	56	34	90	1	5	0
Tikabali	106	85	14	1	100	64	40	4	7	48	59	37	91	4	2	0
Tumudibandha	150	95	3	1	100	43	68	30	1	33	93	52	94	2	1	0
Balliguda	149	93	6	1	100	36	54	5	9	51	64	35	90	3	4	0
Chakapad	100	95	5	0	100	35	28	13	11	55	66	24	84	0	5	0
Phiringia	199	97	7	1	100	25	57	7	2	38	74	53	80	2	2	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 18. Block-level deficiency of major and micronutrients and soil condition in Kendrapara district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Aul	100	100	0	0	100	64	76	18	0	0	19	28	15	0	0	0
Derabish	140	99	1	0	100	33	9	36	2	9	25	6	90	0	0	0
Garadpur	100	92	8	0	100	57	9	46	0	0	71	59	85	0	0	0
Kendrapada	100	91	7	2	98	18	54	23	0	1	45	26	51	0	0	0
Mahakalapada	200	100	0	0	96	10	47	6	0	0	28	4	4	0	0	0
Marshaghai	100	99	1	0	100	37	45	41	3	4	67	48	80	0	0	0
Pattamundai	100	99	1	0	100	18	53	4	0	0	60	10	31	0	0	0
Rajanagar	220	99	1	0	98	23	51	0	0	0	24	13	0	0	0	0
Rajkanika	90	100	0	0	100	7	32	0	0	0	16	6	19	0	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 19. Block-level deficiency of major and micronutrients and soil condition in Kendujhar district.**

Block	No of samples	Fields under various pH conditions (%)				Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn		
		10	12	100														
Sadar	100	77	10	12	100	45	52	28	15	41	62	54	87	4	0	8		
Anandapur	120	89	10	1	100	34	56	43	3	18	59	53	85	0	3	2		
Banspal	150	97	3	0	100	12	66	10	3	13	81	59	85	1	1	0		
Champua	120	97	2	2	100	49	70	33	32	66	64	57	91	1	3	0		
Ghasipura	120	80	19	1	100	63	57	17	12	19	58	39	83	1	1	0		
Ghatagaon	110	95	5	1	100	65	82	45	32	63	74	63	94	0	3	5		
Harichandanur	200	96	5	0	100	39	76	40	13	40	69	59	90	1	2	2		
Hatadihi	150	96	4	0	100	71	67	51	16	40	81	53	91	2	5	5		
Jhumpura	120	91	9	0	100	65	63	26	43	77	73	59	91	3	25	0		
Joda	50	94	6	0	100	22	66	12	10	22	60	38	82	2	2	0		
Patna	100	94	6	0	100	68	74	57	28	74	77	73	98	0	3	4		
Saharpada	100	98	0	2	100	41	92	65	22	63	92	84	100	0	1	3		
Telkoi	100	97	3	0	100	44	84	26	11	25	78	39	96	0	0	0		

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 20. Block-level deficiency of major and micronutrients and soil condition in Khorda district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Balianta	100	91	7	2	100	69	16	34	0	14	62	25	97	0	0	0
Balipatna	120	97	3	1	100	35	14	25	3	10	57	33	70	0	1	1
Banapur	150	98	2	0	100	91	11	83	13	15	88	47	95	0	1	6
Begunia	150	93	3	4	100	41	59	45	33	48	63	13	93	0	0	9
Bhubaneswar	100	89	10	1	100	45	33	7	19	36	42	24	82	0	0	0
Bolagarh	200	99	1	0	100	95	95	11	1	4	95	10	99	0	0	0
Chilika	130	88	8	4	100	32	63	28	8	24	35	39	48	0	0	2
Jatni	100	98	2	0	100	65	61	43	10	55	45	11	67	0	0	0
Khorda	100	81	14	5	100	66	71	53	15	40	63	21	79	0	0	3
Tangi	150	84	16	0	100	58	54	53	25	44	68	35	83	0	0	3

\* EC = Electrical Conductivity.

\*\* OC = Organic Carbon, P = Phosphorous, K = Potassium, Ca = Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 21. Block-level deficiency of major and micronutrients and soil condition in Koraput district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC*	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Koraput	140	98	2	0	100	21	42	15	2	16	91	36	87	1	1	0
Kotpad	210	99	1	0	100	22	61	24	10	43	93	59	94	0	1	0
Kundura	100	100	0	0	100	28	50	28	20	69	78	58	89	0	0	0
Lamtaput	189	97	3	1	100	13	37	5	21	51	85	44	78	0	2	0
Laxmipur	100	60	34	6	100	8	6	0	0	17	48	3	41	2	0	0
Nandapur	450	99	1	0	100	27	58	6	18	50	92	51	78	0	1	0
Pattangi	100	98	2	0	100	37	19	1	3	20	81	41	58	0	3	0
Semliguda	100	98	2	0	100	38	37	3	24	65	92	58	80	0	0	0
Borigumma	220	100	0	0	100	26	47	27	14	44	92	60	89	0	1	0
Dasamantpur	60	97	3	0	100	20	32	8	20	53	97	63	97	0	0	0
Joypore	100	100	0	0	100	4	72	24	6	39	89	32	93	1	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 22. Block-level deficiency of major and micronutrients and soil condition in Malkangiri district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn	
Kalimela	129	76	22	1	100	43	60	36	8	19	51	48	97	1	2	2	
Khairiput	100	97	2	1	100	27	63	16	11	31	64	40	98	1	7	3	
Korkunda	148	95	4	1	100	34	61	30	2	26	39	38	97	1	3	1	
Mathili	200	95	5	1	100	49	70	50	11	57	55	57	88	1	2	2	
Podia	60	88	10	2	100	32	73	15	13	37	72	53	85	0	0	0	
Chittrakonda	300	39	34	27	100	31	83	28	1	9	23	33	45	0	1	0	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 23. Block-level deficiency of major and micronutrients and soil condition in Mayurbhanj district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)			Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn	
Badasahi	200	99	1	0	100	47	50	44	5	24	40	25	81	0	1	1	
Bahalda	90	97	3	0	100	49	76	61	20	46	60	47	96	0	4	9	
Bangriposi	200	92	7	2	99	33	72	17	4	13	38	34	82	2	1	1	
Baripada	100	100	0	0	100	64	85	68	54	69	79	33	97	0	0	6	
Betnati	250	100	0	0	100	71	84	82	45	79	80	46	98	0	3	1	
Bijatala	100	99	1	0	100	29	64	36	17	29	72	34	89	0	0	0	
Bisoi	150	98	2	0	100	29	69	36	29	40	71	54	89	0	2	0	
Gopobandhunar	100	100	0	0	100	39	70	41	15	62	77	33	96	0	1	0	
Jamda	50	100	0	0	100	52	92	50	24	38	80	62	96	0	2	6	
Jashipur	200	100	1	0	100	53	88	32	18	44	88	64	100	1	4	3	
Kaptipada	100	100	0	0	100	32	84	49	35	49	80	49	98	0	0	0	
Karanjia	140	99	1	0	100	36	81	48	23	69	85	42	98	0	2	0	
Khunta	100	98	2	0	99	15	86	31	24	45	81	17	97	0	0	0	
Kuliana	200	99	1	0	100	57	86	54	37	51	75	39	84	0	1	2	
Kusumi	99	96	4	0	100	39	84	36	14	24	76	32	90	0	0	0	
Morada	150	99	1	0	100	70	75	72	45	67	65	47	97	0	1	5	
Rairangpur	90	100	0	0	99	36	87	61	32	58	77	46	94	0	0	0	
Raruan	100	100	0	0	100	27	66	25	18	35	46	30	83	1	2	0	
Rasgobindopur	150	99	1	0	100	31	57	68	41	71	51	32	88	0	0	1	
Samakhunta	99	97	3	0	100	41	81	56	13	34	76	37	97	2	0	1	
Saraskana	150	97	3	0	100	47	77	42	9	45	53	53	97	0	0	1	
Sukruli	79	100	0	0	100	41	62	44	28	68	70	29	97	0	0	0	
Suliapada	170	75	25	1	100	45	56	37	26	59	48	23	87	9	0	0	
Thakurmunda	150	98	2	0	100	47	68	31	35	69	69	33	87	1	1	1	
Tiring	50	100	0	0	100	56	78	48	42	56	46	36	94	0	0	10	
Udala	50	100	0	0	100	56	72	28	30	54	72	40	84	0	0	0	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 24. Block-level deficiency of major and micronutrients and soil condition in for Nabarangpur district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal			Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min	
Chandahandi	100	72	20	8	100	30	67	5	2	12	25	65	83	1	2	7	
Dabugam	148	95	5	0	100	63	80	31	11	35	82	71	99	0	0	0	
Jharigan	101	95	5	0	100	27	69	22	4	26	76	63	93	0	0	0	
Kosagumunda	119	99	1	0	100	34	66	18	19	50	76	58	97	0	0	0	
Nabarangpur	20	65	35	0	100	10	60	30	0	0	60	75	100	0	0	0	
Nabarangpur	70	90	10	0	100	30	57	23	4	21	79	44	100	0	0	0	
Nandahandi	88	98	2	0	100	24	55	25	17	41	66	38	94	0	3	2	
Papadahandi	100	99	1	0	100	24	43	23	7	28	58	45	90	0	1	0	
Raigarh	161	96	2	2	100	54	75	30	21	58	84	86	99	1	1	31	
Sanmasigan	10	90	10	0	100	0	70	30	0	0	50	20	100	0	0	0	
Tentuli Khunti	198	97	3	0	100	32	53	10	7	29	68	48	95	0	0	0	
Umarkote	98	99	0	1	100	58	35	23	27	66	82	59	96	1	9	0	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.



**Annexure 25. Block-level deficiency of major and micronutrients and soil condition in Nayagarh district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**								
		Acidic	Neutral	Alkaline	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Bhapur	100	92	5	3	100	66	58	35	11	20	53	59	90	0	0
Dasapalla	200	63	29	9	100	49	32	15	2	10	40	53	73	3	1
Gania	100	76	17	6	100	33	50	10	0	6	53	51	89	0	2
Khandapada	120	93	7	0	100	55	58	18	7	27	52	31	92	0	0
Nayagarh	100	66	23	10	100	57	35	23	0	1	42	46	75	4	3
Nuagaon	120	62	32	7	100	41	40	18	3	9	40	35	75	0	1
Odagaon	150	72	18	10	100	53	41	18	0	0	45	41	73	0	1
Ranpur	150	79	15	5	100	77	37	57	9	27	61	23	88	0	3

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 26. Block-level deficiency of major and micronutrients and soil condition in Nuapada district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**								
		Acidic	Neutral	Alkaline	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Boden	100	42	33	25	100	24	80	0	0	3	31	71	91	2	1
Khariar	100	28	28	44	100	18	56	1	0	2	15	61	69	1	13
Komna	150	41	40	19	100	29	63	1	1	1	25	67	81	3	7
Nuapada	147	60	27	13	100	21	69	3	2	10	18	84	89	1	12
Sinapali	150	47	37	16	100	20	58	0	0	2	43	74	71	1	4

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 27. Block-level deficiency of major and micronutrients and soil condition in Puri district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min
Astarang	100	94	6	0	99	63	29	29	3	3	46	12	50	0	0	1
Brahmagiri	150	96	3	1	100	49	29	41	29	33	45	36	64	1	7	19
Delang	90	89	10	1	100	33	36	41	2	13	42	17	69	0	0	3
Gop	150	98	2	0	100	32	26	22	1	1	73	28	37	0	0	1
Kakatpur	100	98	0	2	100	58	39	43	0	1	79	45	84	0	0	0
Kanas	150	95	5	0	97	31	47	7	0	3	31	13	35	0	0	0
Krushnaprasad	100	90	9	1	100	95	19	74	80	89	72	45	97	0	40	62
Nimapada	180	98	2	0	100	18	20	16	0	0	43	33	56	0	0	0
Pipili	150	97	3	0	100	43	11	49	3	15	40	30	83	0	0	1
Purisdar	100	96	1	3	100	49	37	51	7	14	43	48	64	0	1	2
Satyabadi	150	99	0	1	100	39	29	39	0	5	44	24	73	0	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 28. Block-level deficiency of major and micronutrients and soil condition in Rayagada district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Bissamcuttack	130	90	8	2	100	42	42	3	8	46	51	25	64	1	2	1
Chandrapur	100	91	8	1	100	37	53	12	3	21	54	36	91	0	1	1
Gudari	100	72	21	7	100	47	34	8	6	24	44	50	72	7	4	2
Kalyansingpur	130	91	8	2	100	55	15	5	4	38	54	19	85	2	2	0
Kolnara	100	94	4	2	100	68	8	2	7	30	32	16	89	0	0	0
Muniguda	200	89	11	1	100	62	18	6	10	41	50	22	86	1	7	0
Padmapur	100	49	38	13	100	80	21	2	5	23	44	59	77	18	1	2
Rayagada	180	74	21	6	100	35	14	0	9	32	32	15	62	4	1	3
Kashipur	200	100	0	0	100	42	62	8	5	28	99	71	57	8	1	0
Gunpur	190	81	18	2	100	57	53	13	3	26	62	50	73	4	2	4

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 29. Block-level deficiency of major and micronutrients and soil condition in Sambalpur district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**										
		Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC											
Bamara	150	87	9	3	97	57	56	15	12	30	40	41	84	7	3	3	
Dhankauda	100	99	1	0	100	33	44	48	20	59	27	31	96	1	1	9	
Jamankira	250	94	4	2	98	42	62	14	10	29	48	45	96	3	2	1	
Jujumura	100	84	2	14	100	35	59	17	8	40	43	46	89	7	0	12	
Kuchinda	100	92	7	1	100	53	32	9	17	48	61	58	91	2	1	3	
Maneswara	100	87	9	4	100	48	43	9	2	17	36	56	98	0	1	1	
Nakatideula	150	90	7	3	100	25	53	23	19	34	47	31	93	0	0	1	
Rairakhola	150	76	17	7	100	17	61	15	9	26	41	25	95	1	3	1	
Rengali	70	93	6	1	100	56	56	26	20	49	60	39	84	0	3	1	

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.

**Annexure 30. Block-level deficiency of major and micronutrients and soil condition in Subarnapur district.**

Block	No of samples	Fields under various pH conditions (%)			Fields under normal EC* conditions (%)		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Min
Binka	90	97	2	1	100	52	57	43	14	48	17	28	99	0	12	0
Birmaharajpur	130	67	22	11	100	33	56	16	1	16	28	63	85	5	0	3
Dunguripali	100	74	19	7	100	22	56	40	3	39	6	45	93	2	0	3
Subarnapur	120	68	24	8	100	40	50	25	8	34	34	72	92	1	2	2
Tarbha	140	38	37	25	100	36	74	16	1	4	28	88	95	2	1	7
Ullunda	200	73	21	7	100	34	47	15	8	24	27	69	84	1	1	5

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K= Potassium, Ca= Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Min = Manganese.

**Annexure 31. Block-level deficiency of major and micronutrients and soil condition in Sundargarh district.**

Block	No of samples	Fields under various pH conditions (%)			Fields undernormal		Fields with low soil C levels and nutrient deficiencies (%)**									
		Acidic	Neutral	Alkaline	EC* conditions (%)	OC	P	K	Ca	Mg	S	Zn	B	Fe	Cu	Mn
Badagaon	100	98	2	0	70	61	53	18	15	34	55	61	98	0	4	1
Balisankara	100	79	14	7	100	46	57	9	8	43	39	51	90	2	6	4
Bonigarh	100	100	0	0	100	38	72	17	9	21	35	20	86	0	0	0
Birsa	300	92	7	0	100	53	81	25	8	25	50	38	96	0	1	2
Hemgir	240	95	5	0	100	38	79	27	21	48	55	43	97	0	3	2
Koira	10	100	0	0	100	10	70	20	60	60	70	60	70	0	0	0
Kuarmunda	250	97	3	0	100	70	90	17	41	65	41	62	98	4	31	0
Kutra	190	97	3	0	100	35	72	11	19	44	44	34	97	3	4	0
Gurundia	10	90	10	0	100	90	90	0	0	10	90	90	100	10	0	0
Lahunipara	200	100	0	0	100	25	83	16	5	31	77	20	99	0	0	0
Lathikata	100	92	7	1	100	40	80	17	15	39	41	40	95	0	1	2
Lephripara	130	90	6	2	100	51	65	16	2	20	28	38	98	0	1	2
Rajangpur	100	87	12	1	100	54	81	14	5	29	28	40	93	3	2	3
Subdega	100	98	1	1	100	61	63	14	10	28	50	45	97	1	3	1
Sadar	100	100	0	0	100	65	57	32	13	43	37	39	96	0	1	1
Tangarpalli	100	97	3	0	100	41	57	20	5	24	16	19	90	1	0	0

\*EC = Electrical Conductivity.

\*\*OC = Organic Carbon, P = Phosphorous, K = Potassium, Ca = Calcium, Mg = Magnesium, S = Sulfur, Zn = Zinc, B = Boron, Fe = Iron, Cu = Copper and Mn = Manganese.