

Rice

Andhra Pradesh (Rice)

Name of the Centre	: Guntur (Amaravathi)	Soil phosphorus range	: 50 -55
Soil	: Black soil (Vertisols)	Soil potassium range	: 150 – 650
Crop and variety	: Rice-Mashuri	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Kharif</i> , 1986	FYM rate	: 10 t ha ⁻¹
Target range	: 50 q ha ⁻¹ – 55 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	: 10 t ha ⁻¹

Fertilizer adjustment equations

$$FN = 3.79 T - 0.50 SN, \quad FP_2O_5 = 3.19 T - 3.17 SP, \quad FK_2O = 1.60 T - 0.19 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of					
KmnO 4 N	Olsens' P	Amm. Ac-K	50 (q ha ⁻¹)			55 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	5	150	115	144	52	133	144	60
175	10	200	102	128	42	121	128	50
200	15	250	90	112	33	108	112	40
225	20	300	77	96	23	96	96	31
250	25	350	65	80	14	83	80	22
275	30	400	52	64	4	71	65	12
300	35	450	40	49	0	58	49	0
325	40	500	27	33	--	46	33	--
350	45	550	14	17	--	33	17	--
375	50	600	2	1	--	21	1	--
400	55	650	0	0	--	8	--	--

Verification: The above Fertilizer adjustment equations were tried on the farmers' fields in Guntur district with yield targets of 55 and 60 q ha⁻¹ during *kharif* 1997 and all the yield targets could be achieved at the place tried.

Applicability

Soil Testing Laboratories	:	Guntur, Vijayawada and Ongole
Soil type	:	Black soils
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Upto 55 q ha⁻¹

Note : The above equations may be tested in soils other than black soil in the farmers' fields in above districts with three or four yield targets and pickup the best one for making recommendations.

Name of the Centre	: Jagtial	Soil phosphorus range	: 5 -55 kg ha ⁻¹
Soil	: Inceptisols (Sandy loam)	Soil potassium range	: 100 – 600 kg ha ⁻¹
Crop and Variety	: Rice-Pothana	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Kharif</i> , 1993	FYM rate	:
Target range	: 50 q ha ⁻¹ – 60 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.78 T - 0.44 SN, \quad FP_2O_5 = 1.96 T - 2.13 SP, \quad FK_2O = 2.96 T - 0.36 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
mnO 4 N	Olsens' P	Amm. Ac-K	50 (q ha ⁻¹)			60 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	5	100	123	87	112	161	107	142
175	10	150	112	77	94	150	96	124
200	15	200	101	66	76	139	86	106
225	20	250	90	55	58	128	75	88
250	25	300	79	45	40	114	65	70
275	30	350	68	34	22	106	54	52
300	35	400	57	23	4	95	44	34
325	40	450	46	13	0	84	33	16
350	45	500	35	12	--	73	23	--
375	50	550	24	1	--	62	12	--
400	55	600	13	--	--	51	2	--

Verification: **The above results are yet to be verified in the farmers' fields.**

Applicability

Soil Testing Laboratories	:	Khammam, Nizamabad, Adilabad (Northern Telangana Zone)
Soil type	:	Chalka soils
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Upto 60 q ha⁻¹

Name of the Centre	: Maruteru	Soil phosphorus range	: 5 -55 kg ha ⁻¹
Soil	: Alluvial	Soil potassium range	: 100 – 600 kg ha ⁻¹
Crop and Variety	: Rice-MTU-2067	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Kharif</i> , 1993 & 1994	FYM rate	:
Target range	: 50 q ha ⁻¹ – 60 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 2.30 T - 0.32 SN, \quad FP_2O_5 = 1.91 T - 1.90 SP, \quad FK_2O = 2.27 T - 0.27 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
mn O ₄ N	Olsens' P	Amm. Ac-K	55 (q ha ⁻¹)			60 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
200	10	200	63	86	71	74	96	82
225	15	250	55	77	57	66	86	69
250	20	300	47	67	44	58	77	55
275	25	350	39	58	30	50	67	42
300	30	400	31	48	17	42	58	28
325	35	450	23	39	3	34	48	15
350	40	500	15	29	0	26	39	1
375	45	550		20	--	18	29	0
400	50	600	0	10	--	10	20	--
425	55	650	--	0	--	2	10	--
450	60	700	--	--	--	--	--	--

Verification: The above equations are to be verified in the farmers' fields.

Applicability

Soil Testing Laboratories : Tadepalligudem, Samalkot and Vijayawada
(East and West Godavari and Krishna districts)

Soil type : Alluvial (Heavy)
Crop : Rice - high yielding variety
Season developed : *Kharif*
Yield target : Upto 60 q ha⁻¹

Note : The above equations may be tested in soils other than Alluvial soil (Heavy) on the farmers' fields with three or four targets and the best one may be picked up for making recommendations.

Name of the Centre	: Nandyal	Soil phosphorus range	: 10 -60 kg ha ⁻¹
Soil	: Black soil	Soil potassium range	: 200 – 700 kg ha ⁻¹
Crop and Variety	: Rice-MTU-5182	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Kharif</i> , 1987	FYM rate	:
	(pooled data)	Green manure composition	: 0.6%N :
Target range	: 60 q ha ⁻¹ – 70 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹		

Fertilizer adjustment equations

$$FN = 3.35 T - 0.33 SN, \quad FP_2O_5 = 2.52 T - 4.53 SP, \quad FK_2O = 1.24 T - 0.12 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	60 (q ha ⁻¹)			70 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	200	152	106	50	185	131	63
175	15	250	143	83	44	177	108	57
200	20	300	135	61	38	169	86	51
225	25	350	127	38	32	160	63	45
250	30	400	119	15	26	152	41	39
275	35	450	110	--	20	144	18	33
300	40	500	102	--	14	136	--	27
325	45	550	94	--	8	127	--	21
350	50	600	86	--	2	119	--	15
375	55	650	77	--	--	111	--	

Verification: The above equations are to be verified in black sols of Kurnool district with yield targets of 60 and 70 q ha⁻¹. Yield targets could be achieved at the places tested.

Applicability

Soil Testing Laboratories : Yemmiganoor, Anantapur & Cuddapah

Soil type : Black soils

Crop : Rice - high yielding varieties

Season developed : *Kharif*

Yield target : Up to 70 q ha⁻¹

Note : For adoption in soils other than black soils in the above districts, it is better to test on the farmers' fields with three or four targeted yields and pick up the best one among them for making recommendations.

Name of the Centre	: Nellore	Soil Nitrogen range	: 150 – 350 kg ha ⁻¹
Soil	: Sandy clay loam (Alluvial)	Soil phosphorus range	: 10 -50 kg ha ⁻¹
Crop and Variety	: Rice-NLR-9672	Soil potassium range	: 150 – 550 kg ha ⁻¹
Season developed	: <i>Kharif</i> , 1995 & 1994 (pooled data)	FYM composition	: 1%N : 0.4P : 1.2K
Target range	: 45 q ha ⁻¹ – 50 q ha ⁻¹	FYM rate	:
		Green manure composition	: 0.6%N :
		Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.47 T - 0.37 SN, \quad FP_2O_5 = 2.53 T - 2.12 SP, \quad FK_2O = 1.89 T - 0.20 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
mnO ₄ N	Olsens' P	Amm. Ac-K	45 (q ha ⁻¹)			50 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	101	93	55	118	105	65
175	15	200	91	82	45	109	95	55
200	20	250	82	71	35	100	84	45
225	25	300	73	61	25	90	74	35
250	30	350	64	50	15	81	63	25
275	35	400	54	40	5	72	52	15
300	40	450	45	29	0	63	42	5
325	45	50	36	18	--	53	31	0
350	50	550	27	8	--	44	20	--

Verification: The above equations are to be verified on the farmers' fields of Nellore district with yield targets of 45 and 50 q ha⁻¹ and in Prakasam district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Nellore, Ongole, Tirupati and Cuddapah

Soil type : Sandy clay loam

Crop : Rice - high yielding varieties

Season developed : *Kharif*

Yield target : Upto 50 q ha⁻¹

Note : The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centr	: Rajendranagar	Soil phosphorus range	: 10 -60 kg ha ⁻¹
Soil	: Light black soil (Sandy clay)	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Rice-Tellahamsa	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Kharif</i> , 1979, 1980, 1981 & 1982 (pooled data)	FYM rate	:
Target range	: 50 q ha ⁻¹ – 55 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.20 T - 0.55 SN, \quad FP_2O_5 = 2.70 T - 2.67 SP, \quad FK_2O = 2.22 T - 0.21 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	50 (q ha ⁻¹)			55 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	128	108	80	149	122	91
175	15	200	114	95	69	135	108	80
200	20	250	100	82	59	121	94	70
225	25	300	86	68	48	108	81	59
250	30	350	73	55	38	94	67	49
275	35	400	59	41	27	80	53	38
300	40	450	45	28	17	66	39	28
325	45	500	31	15		53	26	17
350	50	550	18	2	--	39	12	7
375	55	600	4	--	--	25	0	0
400	60	650	--	--	--	12	--	

Verification: The above fertilizer adjustment equations were tested on the farmers' fields of Ranga Reddy district (Black and Chalka sols) during *kharif*, 1983 with yield targets 50 and 55 q ha⁻¹ and on the farmers' fields of Nalgonda district (Chalka soils) with yield targets of 55 and 65 q ha⁻¹ during *kharif*, 1997. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Rajendranagar, Jadcherla, Sanga Reddy and Nalgonda

Soil type : Black and light soils
Crop : Rice
Season developed : *Kharif*
Yield target : Upto 50 q ha⁻¹ in Ranga Reddy district, upto and 55 q ha⁻¹ in Nalgonda district

Note : The above equations may be verified in Mahaboobnagar and Medak districts with two or three yield targets and pick up the best one for making recommendations.

Name of the Centre : Warangal

Soil : Black soil (Vertisol)

Crop and Variety : Rice-Pothana

Season developed : *Kharif*, 1988

Target range : 50 q ha⁻¹ – 55 q ha⁻¹

Soil nitrogen range : 150 – 400 kg ha⁻¹

Soil phosphorus range : 10 -60 kg ha⁻¹

Soil potassium range : 150 – 650 kg ha⁻¹

FYM composition : 1%N : 0.4P : 1.2K

FYM rate :

Green manure composition : 0.6%N :

Green manure rate :

Fertilizer adjustment equations

FN = 4.75 T – 0.75 SN, FP₂O₅ = 2.75 T – 4.20 SP, FK₂O = 1.99T – 0.15 SK

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient m(kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	50 (q ha ⁻¹)			55 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	125	96	77	149	109	87
175	15	200	106	75	70	130	88	79
200	20	250	88	54	62	111	67	72
225	25	300	69	33	55	93	46	64
250	30	350	50	12	48	74	25	57
275	35	400	31	--	40	55	4	49
300	40	450	12	--	33	36	--	42
325	45	500	--	--	25	17	--	34
350	50	550	--	--	18	--	--	27
375	55	600	--	--	10	--	--	19
400	60	650	--	--	3	--	--	12

Verification: The above fertilizer adjustment equations were verified on the on the farmers' fields of Warangal district for 55 and 60 q ha⁻¹ yield targets. All the yield targets could be obtained at the places tested.

Applicability

Soil Testing Laboratories : Warangal, Karimnagar, Nizamabad, Adilabad

Soil type : Black soils

Crop : Rice-high yield varieties

Season developed : *Kharif*

Yield target : Upto 55 q ha⁻¹

Note : Equations may be tested in Karimnagar, Nizamabad and Adilabad districts under submerged condition.

RICE - *Rabi*

Name of the Centre : Nandyal

Soil : Black soil

Crop and Variety : Rice-Tellahamsa

Season developed : *Rabi*, 1984

Target range : 50 q ha⁻¹ – 55 q ha⁻¹

Soil nitrogen range : 150 – 350 kg ha⁻¹

Soil phosphorus range : 10 -50 kg ha⁻¹

Soil potassium range : 200 – 600 kg ha⁻¹

FYM composition : 1%N : 0.4P : 1.2K

FYM rate :

Green manure composition : 0.6%N :

Green manure rate :

Fertilizer adjustment equations

$$FN = 2.83 T - 0.32 SN, \quad FP_2O_5 = 2.29 T - 2.98 SP, \quad FK_2O = 1.34 T - 0.17 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac- K	50 (q ha ⁻¹)			55 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	200	122	108	46	150	131	60
175	15	250	114	93	38	142	116	51
200	20	300	106	78	29	134	101	43
225	25	350	98	63	21	126	86	34
250	30	400	90	48	12	118	71	26
275	35	450	82	33	4	110	56	17
300	40	500	74	18	0	102	41	8
325	45	550	66	3	--	94	26	0
350	50	600	58	--	--	86	11	--

Verification: The above results were verified in black soils of Kurnool district with yield targets of 60 and 70 q ha⁻¹. All the yield targets could be attained at all the places tested.

Applicability

Soil Testing Laboratories : Yemmiganoor, Anantapur & Cuddapah

Soil type : Black soils

Crop : Rice-high yield varieties

Season developed : *Rabi*

Yield target : Upto 70 q ha⁻¹

Note :For adoption in soils other than black soils in the above districts, it is better to test in

the farmers' fields with three or four yield targets and pick up the best one for adoption.

Name of the Centre : Nellore	Soil phosphorus range : 10 -60 kg ha ⁻¹
Soil : Alluvial soils (Sandy loam)	Soil potassium range : 150 – 650 kg ha ⁻¹
Crop and Variety : Rice-NLR 33057	FYM composition : 1%N : 0.4P : 1.2K
Season developed : <i>Rabi</i> , 1994-95	FYM rate :
Target range : 45 q ha ⁻¹ – 50 q ha ⁻¹	Green manure composition : 0.6%N :
Soil nitrogen range : 150 – 400 kg ha ⁻¹	Green manure rate :

Fertilizer adjustment equations

FN = 4.53 T – 0.51 SN, FP₂O₅ = 2.12 T – 2.06 SP, FK₂O = 2.35 T – 0.21 SK

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	45 (q ha ⁻¹)			50 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	127	75	74	150	85	86
175	15	200	115	65	64	137	75	76
200	20	250	102	54	53	125	65	65
225	25	300	89	44	43	112	55	55
250	30	350	76	34	32	99	44	44
275	35	400	64	23	22	86	34	34
300	40	450	51	13	12	74	24	23
325	45	500	38	3	2	61	13	13
350	50	550	25	0	0	48	3	2
375	55	600	12	--	--	35	0	
400	60	650	--	--	--	--	--	--

Verification: The above equation was tested on the farmers' fields with yield targets of 45 and 50 q ha⁻¹ in Nellore district and 50 and 55 q ha⁻¹ in Chittoor district during *Rabi* 1996-97. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Nellore, Chittoor, Cuddapah and Prakasam
Soil type	:	Sandy clay loam
Crop	:	Rice-high yield varieties
Season developed	:	<i>Rabi</i>
Yield target	:	Upto 50 q ha⁻¹

Note : The above equations may be tested in soils other than sandy clay loam with three or four targets yield and pickup the best one for making recommendations.

Name of the Centre	: Maruteru	Soil phosphorus range	: 10 -60 kg ha ⁻¹
Soil	: Alluvial	Soil potassium range	: 200 – 700 kg ha ⁻¹
Crop and Variety	: Rice-IR-64	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Rabi</i> , 1993-94	FYM rate	:
Target range	: 70 q ha ⁻¹ – 80 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil nitrogen range	: 200 – 450 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 2.65 T - 0.28 SN, \quad FP_2O_5 = 2.00 T - 2.16 SP, \quad FK_2O = 1.96 T - 0.21 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	70 (q ha ⁻¹)			80 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
200	10	200	130	118	95	156	138	115
225	15	250	123	108	85	149	128	101
250	20	300	116	97	74	142	117	94
275	25	350	109	86	64	135	106	85
300	30	400	102	75	53	128	95	75
325	35	450	95	64	43	121	84	66
350	40	500	88	54	32	114	74	56
375	45	550	81	43	22	107	63	47
400	50	600	74	32	11	100	52	37
425	55	650	67	21	0	93	41	28
450	60	700	60	10	0	86	30	18

Verification: The above equations were tested on the farmers' fields of West Godavari district with yield targets of 60 and 70 q ha⁻¹ during *rabi*, 1996-97. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Tadepalligudem, Samarlakota and Vijayawada (East and West Godavari and Krishna district)
Soil type	:	Alluvial soils
Crop	:	Rice
Season developed	:	<i>Rabi</i>
Yield target	:	Upto 80 q ha⁻¹

Note : The above equations may be tested in East Godavari and Krishna districts and in soils other than alluvial at two or three targets and select the best one for making recommendations.

Name of the Centre	: Rajendranagar	Soil phosphorus range	: 10 -60 kg ha ⁻¹
Soil	: Chalka soils	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Rice-Tellahamsa	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Rabi</i> , 1979-80	FYM rate	:
Target range	: 70 q ha ⁻¹ – 80 q ha ⁻¹	Green manure composition	: 0.6%N :
Soil nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.23 T - 0.26 SN, \quad FP_2O_5 = 1.51 T - 1.80 SP, \quad FK_2O = 1.65 T - 0.16 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	70 (q ha ⁻¹)			80 (q ha ⁻¹)		
			N	P ₂ O	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	139	65	67	155	73	75
175	15	200	132	56	59	148	64	67
200	20	250	126	47	51	142	55	59
225	25	300	119	38	43	135	46	51
250	30	350	113	29	35	129	37	43
275	35	400	106	20	27	122	28	35
300	40	450	100	11	19	116	19	27
325	45	500	93	2	11	109	10	19
350	50	550	87	--	3	103	1	11
375	55	600	80	--	--	96	--	3
400	60	650	74	--	--	90	--	--

Verification: The above equations were tested on the farmers' fields of Ranga Reddy district with yield targets of 50 and 60 q ha⁻¹ during *rabi*, 1984-85. The yield targets could be achieved at the places tested.

Applicability

Soil Testing Laboratories : Rajendranagar, Miryalaguda, Jadcherla and Sanga Reddy

Soil type : Chalka soils
Crop : Rice-high yielding varieties
Season : *Rabi*
Yield target : Upto 60 q ha⁻¹

Note : The above equations may be tested in Nalgonda, Mahaboobnagar and Medak districts

also and in soils other than chalka soils at 2 or 3 yield levels. The best one may be adopted for making recommendations.

Name of the Centre	: Rajendranagar	Soil nitrogen range	: 150 – 400 kg ha ⁻¹
Soil	: Light Black Soil (Sandy clay)	Soil phosphorus range	: 10 -60 kg ha ⁻¹
Crop and Variety	: Rice-Tellahamsa	Soil potassium range	: 150 – 650 kg ha ⁻¹
Season developed	: <i>Rabi</i> , 1979-80, 1980-81 & 1981-82	FYM composition	: 1%N : 0.4P : 1.2K
Target range	: 60 q ha ⁻¹ – 70 q ha ⁻¹	FYM rate	:
		Green manure composition	: 0.6%N :
		Green manure rate	:

Fertilizer adjustment equations

FN = 3.58 T – 0.57 SN, FP₂O₅ = 1.71 T – 2.46 SP, FK₂O = 1.48 T – 0.16 SK

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	60 (q ha ⁻¹)			70 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	129	78	65	165	95	80
175	15	200	115	66	57	151	83	72
200	20	250	101	53	49	137	71	64
225	25	300	87	41	41	122	58	56
250	30	350	72	29	33	108	46	48
275	35	400	58	17	25	94	34	40
300	40	450	44	4	15	80	21	32
325	45	500	30	-	7	65	9	24
350	50	550	15	--	--	51	--	16
375	55	600	--	--	--	37		8
400	60	650	--	--	--	23	--	0

Verification: The above fertilizer adjustment equations were tested on the farmers' fields of Ranga Reddy district (black and sandy clay loam) with yield targets of 60 and 70 q ha⁻¹ during *Rabi*, 1996-97 and in Mahaboobnagar district (Sandy clay loam) with yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Rajendranagar, Miryalaguda, Jadcherla and Sanga Reddy
Soil type	:	Black soil (Light & Heavy)
Crop	:	Rice
Season	:	<i>Rabi</i>
Yield target	:	Upto 70 q ha⁻¹

Note : The above equations may be tested in Nalgonda and Medak districts also.

Name of the Centre	: Warangal	Soil potassium	: 150 – 650 kg ha ⁻¹
Soil	: Black Soils	range	
Crop and Variety	: Rice-Pothana	FYM composition	: 1%N : 0.4P : 1.2K
Season developed	: <i>Rabi</i> , 1988-89	FYM rate	:
Target range	: 55 q ha ⁻¹ – 60 q ha ⁻¹	Green manure	: 0.6%N
Soil nitrogen range	: 150 – 400 kg ha ⁻¹	composition	
Soil phosphorus range	: 10 -60 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.97 T - 0.50 SN, \quad FP_2O_5 = 2.65 T - 3.52 SP, \quad FK_2O = 1.51 T - 0.08 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	55 (q ha ⁻¹)			60 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	143	111	64	163	124	79
175	15	200	130	93	60	151	106	75
200	20	250	118	75	56	138	87	71
225	25	300	106	58	52	126	71	67
250	30	350	93	40	48	113	53	63
275	35	400	81	23	44	101	36	59
300	40	450	68	5	40	88	18	55
325	45	500	56	0	36	76	1	51
350	50	550	43	--	32	63	--	47
375	55	600	31	--	28	51	--	43
400	60	650	18	--	24	38	--	39

Verification: The above equations were tested on the farmers' fields of Warangal and Karimnagar in both black and chalka soils with yield targets of 55 and 60 q ha⁻¹ in Karimnagar district and 60 and 70 q ha⁻¹ in Warangal district during *Rabi*, 1996-97 season. All the yield targets were attained at the places tested.

Applicability

Soil Testing Laboratories	:	Warangal, Karimnagar, Nizamabad and Adilabad
Soil type	:	Black and Chalka Soils
Crop	:	Rice-high yielding varieties
Season	:	<i>Rabi</i>
Yield target	:	Upto 60 q ha ⁻¹ target in light and black soils

Note : The equations area to be tested in Nizamabad and Adilabad districts under submerged conditions.

IPNS ON RICE

Name of the Centre : Nellore

Soil : Sandy clay loam
(Alluvial)
Crop and Variety : Rice-NLR-9672
Season developed : *Kharif*, 1995 & 1994
(pooled data)
Target range : 80 q ha⁻¹
Soil nitrogen range : 120 – 240 kg ha⁻¹

Soil phosphorus range : 10 -40 kg ha⁻¹
Soil potassium range : 150 – 300 kg ha⁻¹
FYM composition : 0.6N : 0.30.4P : 1.2K
FYM rate : 10 t ha⁻¹
Green manure composition :
Green manure rate : 10 t ha⁻¹

Fertilizer adjustment equations

$$N = 3.43 T - 1.45 SN - 0.70 FYM N$$

$$FP_2O_5 = 1.30 T - 4.83 SP - 0.43 FYM P$$

$$FK_2O = 1.93 T - 0.56 SK - 0.104 FYM K$$

$$FN = 3.43 T - 1.45 SN - 0.65 GM N$$

$$FP_2O_5 = 1.30 T - 4.83 SP - 0.38 GM P$$

$$FK_2O = 1.93 T - 0.56 SK - 0.14 GM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 80 q ha ⁻¹								
Kmn O ₄ -N	Olsen -P	AmmA oc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	100	56	70	65	45	70	61	50	57
140	15	175	71	32	56	36	21	56	32	26	53
160	20	200	42	7	42	7	0	42	3	2	39
180	25	225	13	0	28	0		28	0	0	25
200	30	250	0		14			14			11
220	35	275									
240	40	300									

Verification: The above equations were verified on the farmers' fields of Nellore district with yield targets of 70 and 80 q ha⁻¹ and in Prakasam district with yield targets of 60 and 65 q ha⁻¹ during *kharif*, 1997, 1998 and 1999. The yield targets were attained at most of the places tested.

Applicability

Soil Testing Laboratories : Nellore, Ongole, Tirupati and Cuddapah
Soil type : Alluvial soils and Sandy clay loam soils
Crop and variety : Rice - high yielding varieties
Season developed : *Kharif*
Yield target : Up to 70-80 q ha⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centre	: Nellore	Soil phosphorus range	: 10 -30 kg ha ⁻¹
Soil	: Sandy clay loam (Alluvial)	Soil potassium range	: 150 – 520 kg ha ⁻¹
Crop and Variety	: Rice-NLR-9672	FYM composition	:
Season developed	: <i>Kharif</i> , 1995 & 1994 (pooled data)	FYM rate	: 10 t ha ⁻¹
Target range	: 80 q ha ⁻¹	Green manure composition	:
Soil nitrogen range	: 120 – 200 kg ha ⁻¹	Green manure rate	: 10 t ha ⁻¹

Fertilizer adjustment equations

$$FN = 3.47 T - 0.37 SN - 0.19 FYM N$$

$$FP_2O_5 = 2.53 T - 2.12 SP - 0.97 FYM P$$

$$FK_2O = 1.89 T - 0.20 SK - 0.05 FYM K$$

$$FN = 3.47 T - 0.37 SN - 0.70 GM N$$

$$FP_2O_5 = 2.53 T - 2.12 SP - 0.48 GM P$$

$$FK_2O = 1.89 T - 0.20 SK - 0.04 GM K$$

Applicability

Soil Testing Laboratories	:	Nellore, Ongole, Tirupati and Cuddapah
Soil type	:	Alluvial soils and Sandy clay loam soils
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Up to 70-80 q ha⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centre : Nandyal

Soil : Vertisol (Clay)

Crop and Variety : Rice- MTV 5182

Season developed : *Kharif*, 1989 & 1990

and modified in 1999

& 2000
Target range : 60 q ha⁻¹

Soil nitrogen range : 120 – 340 kg ha⁻¹

Soil phosphorus range : 10 -65 kg ha⁻¹

Soil potassium range : 150 – 425 kg ha⁻¹

FYM composition : 1%N :

FYM rate : 10 t ha⁻¹

Green manure composition :

Green manure rate : 10 t ha⁻¹

Fertilizer adjustment equations

$$FN = 3.36 T - 0.33 SN - 0.74 FYM N$$

$$FP_2O_5 = 2.53 T - 4.53 SP - 0.81 FYM P$$

$$FK_2O = 1.42 T - 0.12 SK - 0.15 FYM K$$

$$FN = 3.36 T - 0.33 SN - 1.62 GLM N$$

$$FP_2O_5 = 2.53 T - 4.53 SP - 1.30 GLM P$$

$$FK_2O = 1.42 T - 0.12 SK - 1.09 GLM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 60 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	162	107	54	88	74	36	120	99	51
140	15	175	155	84	48	81	51	3	113	77	46
160	20	200	149	61	43	75	29	25	107	54	40
180	25	225	142	39	38	68	6	20	100	31	35
200	30	250	136	16	33	62	0	15	94	9	30
220	35	275	129	0	27	55		9	87	0	25
240	40	300	122		22	48		4	80		19
260	45	325	116		17	42		0	74		14
280	50	350	109		12	35			67		
300	55	375	103			29			61		
320	60	400	96			22			54		
340	65	425	89			15			47		

Verification: The above equations were verified on the farmers' fields of Nandyal, Kurnool district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. and 1998. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Nandyal, Ongole, Kurool and Cuddapah
Soil type	:	Clay, Clay Loam, Sandy clay loam
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Up to 70 q ha ⁻¹

Note: **The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.**

Name of the Centre	: Nandyal	Soil phosphorus range	: 10 -75 kg ha ⁻¹
Soil	: Vertisol (Clay)	Soil potassium range	: 150 – 475 kg ha ⁻¹
Crop and Variety	: Rice-MTU-5182	FYM composition	:
Season developed	: <i>Kharif</i> , 1999 & 2000	FYM rate	: 10 t ha ⁻¹
Target range	: 70 q ha ⁻¹	Green manure composition	:
Soil nitrogen range	: 120 – 380 kg ha ⁻¹	Green manure rate	: 10 t ha ⁻¹

Fertilizer adjustment equations

$$\begin{aligned} \text{FN} &= 3.36 \text{ T} - 0.33 \text{ SN} - 0.74 \text{ FYM N} \\ \text{FP}_2\text{O}_5 &= 2.53 \text{ T} - 4.53 \text{ SP} - 0.81 \text{ FYM P} \\ \text{FK}_2\text{O} &= 1.42 \text{ T} - 0.12 \text{ SK} - 0.15 \text{ FYM K} \end{aligned}$$

$$\begin{aligned} \text{FN} &= 3.36 \text{ T} - 0.33 \text{ SN} - 1.62 \text{ GLM N} \\ \text{FP}_2\text{O}_5 &= 2.53 \text{ T} - 4.53 \text{ SP} - 1.30 \text{ GLM P} \\ \text{FK}_2\text{O} &= 1.42 \text{ T} - 0.12 \text{ SK} - 1.09 \text{ GLM K} \end{aligned}$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 70 q ha ⁻¹								
KMnO ₄ -N	Olsen-P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	196	132	68	163	124	49	128	126	51
140	15	175	189	109	63	157	101	46	122	103	48
160	20	200	182	87	57	150	78	43	115	80	45
180	25	225	176	64	52	143	56	40	109	58	42
200	30	250	169	41	47	137	33	37	102	3	39
220	35	275	163	19	42	130	10	34	95	12	36
240	40	300	156	0	36	124	0	31	89	0	33
260	45	325	149		31	117		28	82		30
280	50	350	143		26	110		25	76		27
300	55	375	136		21	104		22	69		24
320	60	400	130		15	97		19	62		21
340	65	425	123		10	91		16	56		18
360	70	450	116			84		13	49		15
380	75	475	110			77		10	43		12

Verification: The above equations were verified on the farmers' fields of Nandyal, Kurnool district with yield targets of 55 and 60 q ha⁻¹ during *kharif, 2000*. and 2001. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Nandyal, Ongole, Kurnool and Cuddapah

Soil type : Clay, Clay Loam, Sandy clay loam

Crop : Rice - high yielding varieties

Season developed : *Kharif*

Yield target : Up to 70 q ha⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centre : Rajendranagar

Soil : Sandy clay loam
(Tropaquept)

Crop and Variety : Rice-Tella hamsa

Season developed : *Kharif*, 1981 & 1982
modified in 1989 & 1990

Target range : 70 q ha⁻¹

Soil nitrogen range : 120 – 340 kg ha⁻¹

Soil phosphorus range : 10 -65 kg ha⁻¹

Soil potassium range : 150 – 425 kg ha⁻¹

FYM composition : 0.4N :

FYM rate : 10 t ha⁻¹

Green manure composition : 1.3%

Green manure rate : 10 t ha⁻¹

Fertilizer adjustment equations

$$FN = 4.20 T - 0.55 SN - 0.74 FYM N$$

$$FP_2O_5 = 2.7 T - 2.67 SP - 0.81 FYM P$$

$$FK_2O = 2.22 T - 0.21 SK - 0.15 FYM K$$

$$FN = 4.20 T - 0.55 SN - 1.62 GLM N$$

$$FP_2O_5 = 2.7 T - 2.67 SP - 1.30 GLM P$$

$$FK_2O = 2.22 T - 0.21 SK - 1.09 GLM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients(kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 60 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	186	135	102	112	115	84	90	96	97
140	15	175	175	122	96	101	102	78	79	82	91
160	20	200	164	109	91	90	88	73	68	69	86
180	25	225	153	95	86	79	75	68	57	56	81
200	30	250	142	82	81	68	62	63	46	42	76
220	35	275	131	69	75	57	48	57	35	29	70
240	40	300	120	55	70	46	35	52	24	15	65
260	45	325	109	43	65	35	21	47	13	2	60
280	50	350	98	29	60	24	8	42	2	0	55
300	55	375	87	15	54	13	0	36			49
320	60	400	76	2	49			31			44
340	65	425	65	0	44			26			39

Verification: The above equations were verified on the farmers' fields of Rajendranagar, Raga Reddy district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. and 1998. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Raga Reddy and Mahabubnagar districts

Soil type : Clay, Clay Loam, Sandy clay loam

Crop : Rice - high yielding varieties

Season developed : *Kharif*

Yield target : Up to 60 - 70 q ha⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centre : Rudrur, Nizamabad

Soil : Vertisols

Crop and Variety : Rice

Season developed : *Kharif*, 1984 & 1985
modified in 1992 & 1993

Target range : 60 q ha⁻¹

Soil nitrogen range : 120 – 400 kg ha⁻¹

Soil phosphorus range : 10 -80 kg ha⁻¹

Soil potassium range : 150 – 500 kg ha⁻¹

FYM composition :

FYM rate : 10 t ha⁻¹

Green manure composition :

Green manure rate : 10 t ha⁻¹

Fertilizer adjustment equations

$$FN = 3.79 T - 0.50 SN - 0.43 FYM N$$

$$FN = 3.79 T - 0.50 SN - 0.94 GLM N$$

$$FP_2O_5 = 3.19 T - 3.17 SP - 0.34 FYM P$$

$$FP_2O_5 = 3.19 T - 3.17 SP - 1.38 GLM P$$

$$FK_2O = 1.60 T - 0.19 SK - 0.24 FYM K$$

$$FK_2O = 1.60 T - 0.19 SK - 1.38 GLM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 60 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc- K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	167	160	68	124	139	56	85	129	58
140	15	175	157	144	63	114	123	51	75	113	53
160	20	200	147	128	58	104	108	46	65	98	48
180	25	225	137	112	53	94	92	41	55	82	44
200	30	250	127	96	49	84	76	37	45	66	39
220	35	275	117	80	44	74	60	32	35	50	34
240	40	300	107	65	39	64	44	27	25	34	29
260	45	325	97	49	34	54	28	22	15	18	25
280	50	350	87	33	30	44	13	18	5	3	20
300	55	375	77	17	25	34	0	13	0	0	15
320	60	400	67	1	20	24					10
340	65	425	57	0	15	14					
360	70	450	47		11						

Verification: The above equations were verified on the farmers' fields of Rajendranagar, Raga Reddy district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. and 1998. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Raga Reddy and Mahabubnagar districts
Soil type	:	Clay, Clay Loam, Sandy clay loam
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Up to 60 - 70 q ha ⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Name of the Centre : Maruteru, East Godavari district		Soil nitrogen range	: 120 – 400 kg ha ⁻¹
		Soil phosphorus range	: 10 -80 kg ha ⁻¹
Soil	: Alluvial	Soil potassium range	: 150 – 500 kg ha ⁻¹
Crop and Variety	: Rice-MTU-2067	FYM composition	: 0.7N%
Season developed	: <i>Kharif</i> , 1993 & 1994	FYM rate	: 10 t ha ⁻¹
	modified in 1995 & 1996	Green manure composition	:
Target range	: 70 q ha ⁻¹	Green manure rate	: 10 t ha ⁻¹

Fertilizer adjustment equations

$$\begin{aligned} \text{FN} &= 2.30 \text{ T} - 0.32 \text{ SN} - 0.74 \text{ FYM N} \\ \text{FP}_2\text{O}_5 &= 1.91 \text{ T} - 1.90 \text{ SP} - 0.36 \text{ FYM P} \\ \text{FK}_2\text{O} &= 2.27 \text{ T} - 0.27 \text{ SK} - 0.29 \text{ FYM K} \end{aligned}$$

$$\begin{aligned} \text{FN} &= 2.30 \text{ T} - 0.32 \text{ SN} - 0.57 \text{ GLM N} \\ \text{FP}_2\text{O}_5 &= 1.91 \text{ T} - 1.90 \text{ SP} - 2.43 \text{ GLM P} \\ \text{FK}_2\text{O} &= 2.27 \text{ T} - 0.27 \text{ SK} - 1.35 \text{ GLM K} \end{aligned}$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 70 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	123	115	118	71	93	87	60	76	109
140	15	175	116	105	112	64	84	80	53	66	102
160	20	200	110	96	105	58	74	73	47	57	95
180	25	225	103	86	98	52	65	66	41	47	89
200	30	250	97	77	91	45	55	60	34	38	82
220	35	275	91	67	85	39	46	53	28	28	75
240	40	300	84	58	78	32	36	46	21	19	68
260	45	325	78	48	71	26	27	39	15	9	62
280	50	350	71	39	64	20	17				55
300	55	375	65	29	58	13	8	26			48
320	60	400	59	20	51	7		19			41
340	65	425	52	10	44	0		12			35

Verification: The above equations were verified on the farmers' fields of Maruteru Tadepalligudem, East Godavari district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. and 1998. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : East Godavari district in Krishna Godavari Zone

Soil type : Alluvial

Crop : Rice –MTU-2067

Season developed : *Kharif*

Yield target : Up to 70 - 80 q ha⁻¹

Note: The above equations may be tested in soils other than Alluvial in the farmers' fields with three or four targets and pick up the best one for making recommendations in Krishna Godavari zone.

Name of the Centre : Warangal

Soil : Vertisol

Crop and Variety : Rice-Pothana

Season developed : *Kharif*, 1988 & 1989

modified in 1995 & 1996

Target range : 60 q ha⁻¹Soil nitrogen range : 120 – 400 kg ha⁻¹Soil phosphorus range : 10 -80 kg ha⁻¹Soil potassium range : 150 – 500 kg ha⁻¹

FYM composition : 1N%

FYM rate : 10 t ha⁻¹

Green manure composition : 0.75%N

Green manure rate : 10 t ha⁻¹**Fertilizer adjustment equations**

$$FN = 4.75 T - 0.75 SN - 0.76 FYM N$$

$$FP_2O_5 = 2.75 T - 4.20 SP - 0.34 FYM P$$

$$FK_2O = 1.99 T - 0.15 SK - 0.34 FYM K$$

$$FN = 4.75 T - 0.75 SN - 1.45 GLM N$$

$$FP_2O_5 = 2.75 T - 4.20 SP - 2.51 GLM P$$

$$FK_2O = 1.99 T - 0.15 SK - 1.31 GLM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 60 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	195	123	97	119	102	73	86	85	88
140	15	175	180	102	93	104	81	69	71	64	84
160	20	200	165	81	89	89	60	66	56	43	80
180	25	225	150	60	86	74	39	62	41	22	76
200	30	250	135	39	82	59	18	58	26	1	73
220	35	275	120	18	78	44	0	54	11	0	69
240	40	300	105	0	74	29		51	0		65
260	45	325	90		71	14		47			61

Verification: The above equations were verified on the farmers' fields of Warangal and Karimnagar districts with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1998. and 1999. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Warangal district in North Telangana Zone

Soil type : Vertisol

Crop : Rice –Pothana

Season developed : *Kharif*Yield target : Up to 60 - 70 q ha⁻¹

Note: The above equations may be tested in soils other than Clay soils in the farmers' fields with three or four targets and pick up the best one for making recommendations in North Telangana zone.

Name of the Centre : Jagtityal, Karimnagar district	Soil nitrogen range : 120 – 400 kg ha ⁻¹
Soil : Inceptisols (Sandy Loam)	Soil phosphorus range : 10 -60 kg ha ⁻¹
Crop and Variety : Rice-Pothana	Soil potassium range : 150 – 650 kg ha ⁻¹
Season developed : <i>Kharif</i> , 1993 & 1994	FYM composition :
modified in 1996 & 1997	FYM rate : 10 t ha ⁻¹
Target range : 40 q ha ⁻¹ - 50 q ha ⁻¹	Green manure composition :
	Green manure rate : 10 t ha ⁻¹

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 60 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With green manure @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	10	150	174	96	124	96	72	74	79	66	110
140	15	175	165	86	115	87	61	65	70	55	101
160	20	200	156	75	106	78	50	56	61	44	92
180	25	225	148	64	97	70	40	47	52	34	83
200	30	250	139	54	88	61	29	38	44	23	74
220	35	275	130	43	79	52	18	29	35	12	65
240	40	300	121	32	70	43	8	20	26	2	56
260	45	325	112	22	61	34	0	11	17	0	47
280	50	350	104	11	52	26					38
300	55	375	95		43	17					29
320	60	400	86		34						20
340	65	425	77		25						11

Verification: The above equations were verified on the farmers' fields of Jagtityal, Karimnagar in Karimnagar district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1998 and 1999. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Karimnagar district in Southern Telangana Zone

Soil type : Inceptisol
Crop : Rice –Pothana
Season developed : *Kharif*
Yield target : Up to 60 - 70 q ha⁻¹

Note: The above equations may be tested in soils other than Sandy loam of Inceptisol in the farmers' fields with three or four targets and pick up the best one for making recommendations in North Telangana zone.

Coimbatore (Rice)

Rice

Name of the centre	: Coimbatore	Soil phosphorus range	: 16 – 36 kg ha ⁻¹
Soil	: Alluvial (Noyyal series)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Rice – IR 50	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 60 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.39	T	-	0.52	SN	-	0.80	ON
FP₂O₅	=	2.22	T	-	3.63	SP	-	0.98	OP
FK₂O	=	2.44	T	-	0.39	SK	-	0.72	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No.	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	16	180	170	75	76
2	190	18	190	165	68	72
3	200	20	200	159	61	68
4	210	22	210	154	53	64
5	220	24	220	149	46	60
6	230	26	230	143	39	56
7	240	28	240	138	32	52
8	250	30	250	133	24	49
9	260	32	260	128	17	45
10	270	34	270	123	10	41
11	280	36	280	118	3	37

Recommendation domain

Soil type : River Alluvium- Sandy loam
Yield target : 60 q ha⁻¹

Rice**Name of the centre : Coimbatore**Soil : Alluvial
(Noyyal series)

Crop & Variety : Rice - IR 20

Season developed : Rabi

Target range : 60 q ha⁻¹Soil Nitrogen range : 180 – 270 kg ha⁻¹Soil phosphorus range : 16 – 34 kg ha⁻¹Soil potassium range : 180 – 270 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN = 4.63 T - 0.56 SN - 0.90 ON

FP₂O₅ = 1.98 T - 3.18 SP - 0.99 OPFK₂O = 2.57 T - 0.42 SK - 0.67 OK**Ready reckoner of fertilizer doses at varying soil test values for specific yield target**

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	177	68	78
2	160	10	160	172	62	74
3	170	12	170	166	55	70
4	180	14	180	160	49	66
5	190	16	190	155	43	62
6	200	18	200	149	36	57
7	210	20	210	144	30	53
8	220	22	220	138	24	49
9	230	24	230	132	17	45
10	240	26	240	127	11	41

Recommendation domain

Soil type : Red - sandy loam

Yield target : 50 q ha⁻¹

Rice

Name of the centre : Bhavanisagar
(sub centre)

Soil : Red (Irugur series)

Crop & Variety : Rice - IR 50

Season developed : Kharif

Target range : 60 q ha⁻¹

Soil Nitrogen range : 150 – 240 kg ha⁻¹

Soil phosphorus range : 8 – 26 kg ha⁻¹

Soil potassium range : 150 – 240 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN = 5.19 T - 0.89 SN - 0.98 ON

FP₂O₅ = 2.27 T - 4.50 SP - 1.09 OP

FK₂O = 3.11 T - 0.59 SK - 1.02 OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No.	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 70 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	178	100	98
2	160	10	160	169	91	93
3	170	12	170	160	82	87
4	180	14	180	151	73	81
5	190	16	190	142	64	75
6	200	18	200	133	55	69
7	210	20	210	124	46	63
8	220	22	220	115	37	57
9	230	24	230	106	28	51
10	240	26	240	97	19	45

Recommendation domain

Soil type : Red - sandy loam

Yield target : 60 q ha⁻¹

Rice

Name of the centre : Bhavanisagar
(Sub centre)

Soil : Red (Irugur series)

Crop & Variety : Rice - ASD 18

Season developed : Rabi

Target range : 60 q ha⁻¹

Soil Nitrogen range : 150 – 240 kg ha⁻¹

Soil phosphorus range : 8 – 26 kg ha⁻¹

Soil potassium range : 150 – 240 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN	=	4.88	T	-	0.68	SN	-	0.72	ON
FP ₂ O ₅	=	2.06	T	-	2.91	SP	-	2.27	OP
FK ₂ O	=	2.89	T	-	0.47	SK	-	0.59	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 70 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	191	100	103
2	160	10	160	184	94	98
3	170	12	170	177	89	94
4	180	14	180	171	83	89
5	190	16	190	164	77	84
6	200	18	200	157	71	79
7	210	20	210	150	65	75
8	220	22	220	143	56	70
9	230	24	230	137	54	65
10	240	26	240	130	48	61

Recommendation domain

Soil type : Red - sandy loam

Yield target : 50 q ha⁻¹

Rice

Name of the centre	: Aduthurai	Soil phosphorus range	: 16 – 36 kg ha ⁻¹
	(sub centre)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Soil	: Black Alluvial	FYM composition	:
	(Adanur series)	FYM rate	:
Crop & Variety	: Rice - CR 1009	Green manure composition	:
Season developed	: Kharif	Green manure rate	:
Target range	: 60 q ha ⁻¹		
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹		

Fertiliser Adjustment Equations

FN	=	2.80	T	-	0.29	SN	-	0.89	ON
FP₂O₅	=	1.35	T	-	1.28	SP	-	1.78	OP
FK₂O	=	2.50	T	-	0.42	SK	-	1.14	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	16	180	144	79	99
2	190	18	190	141	77	95
3	200	20	200	138	74	91
4	210	22	210	135	72	87
5	220	24	220	132	69	87
6	230	26	230	129	66	83
7	240	28	240	126	64	78
8	250	30	250	123	61	74
9	260	32	260	121	59	70
10	270	34	270	118	56	66
11	280	36	280	115	54	62

Recommendation domain

Soil type : River Alluvium - Clay loam
Yield target : 70 q ha⁻¹

Rice

Name of the centre	: Aduthurai	Soil phosphorus range	: 16 – 36 kg ha ⁻¹
	(Sub centre)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Soil	: Black Alluvial	FYM composition	:
	(Kalathur series)	FYM rate	:
Crop & Variety	: Rice - ADT 31	Green manure composition	:
Season developed	: Kharif	Green manure rate	:
Target range	: 60 q ha ⁻¹		
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹		

Fertiliser Adjustment Equations

FN	=	5.29	T	-	0.75	SN	-	0.89	ON
FP ₂ O ₅	=	1.65	T	-	1.76	SP	-	0.78	OP
FK ₂ O	=	2.73	T	-	0.37	SK	-	0.82	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	16	180	182	71	97
2	190	18	190	174	67	93
3	200	20	200	167	64	90
4	210	22	210	159	60	86
5	220	24	220	152	57	82
6	230	26	230	144	53	79
7	240	28	240	137	50	75
8	250	30	250	129	46	71
9	260	32	260	122	43	68
10	270	34	270	114	39	64
11	280	36	280	107	36	60

Recommendation domain

Soil type : River Alluvium - Clay loam
Yield target : 60 q ha⁻¹

Rice

Name of the centre	: Aduthurai	Soil Nitrogen range	: 180 – 280 kg ha ⁻¹
	(Sub centre)	Soil phosphorus range	: 16 – 36 kg ha ⁻¹
Soil	: Black Alluvial	Soil potassium range	: 180 – 280 kg ha ⁻¹
	(Kalathur series)	FYM composition	:
Crop & Variety	: Rice - ADT 31	FYM rate	:
Season developed	: Rabi	Green manure composition	:
Target range	: 60 q ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	5.34	T	-	0.67	SN	-	0.73	ON
FP ₂ O ₅	=	1.90	T	-	1.86	SP	-	0.70	OP
FK ₂ O	=	2.81	T	-	0.33	SK	-	0.80	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	12	180	199	84	110
2	190	14	190	193	81	106
3	200	16	200	186	77	103
4	210	18	210	179	73	100
5	220	20	220	173	69	96
6	230	22	230	166	66	93
7	240	24	240	159	62	90
8	250	26	250	152	58	86
9	260	28	260	146	55	83
10	270	30	270	139	51	80
11	280	32	280	132	47	77

Recommendation domain

Soil type : River Alluvium - Clay loam
Yield target : 60 q ha⁻¹

Rice

Name of the centre	: Killikulam	Soil Nitrogen range	: 180 – 280 kg ha ⁻¹
	(Sub centre)	Soil phosphorus range	: 12 – 32 kg ha ⁻¹
Soil	: Red (Manakkarai series)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Rice - ASD 16	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 60 q ha ⁻¹	Green manure composition	:
		Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.25	T	-	0.60	SN	-	0.79	ON
FP ₂ O ₅	=	2.71	T	-	4.39	SP	-	0.89	OP
FK ₂ O	=	3.83	T	-	0.60	SK	-	0.82	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	12	180	147	110	122
2	190	14	190	141	102	116
3	200	16	200	135	93	110
4	210	18	210	129	84	104
5	220	20	220	123	75	98
6	230	22	230	117	66	92
7	240	24	240	111	58	86
8	250	26	250	105	49	80
9	260	28	260	99	40	74
10	270	30	270	93	31	68
11	280	32	280	87	23	62

Recommendation domain

Soil type : River Alluvium - Sandy clay loam
Yield target : 60 q ha⁻¹

Rice

Name of the centre	: Killikulam	Soil Nitrogen range	: 180 – 280 kg ha ⁻¹
	(Sub centre)	Soil phosphorus range	: 12 – 32 kg ha ⁻¹
Soil	: Red (Manakkarai series)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Rice - IR 20	FYM composition	:
Season developed	: Rabi	FYM rate	:
Target range	: 60 q ha ⁻¹	Green manure composition	:
		Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.47	T	-	0.58	SN	-	0.79	ON
FP ₂ O ₅	=	2.66	T	-	3.68	SP	-	0.89	OP
FK ₂ O	=	4.08	T	-	0.65	SK	-	0.82	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 60 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	12	180	164	115	128
2	190	14	190	158	108	121
3	200	16	200	152	101	115
4	210	18	210	146	93	108
5	220	20	220	140	86	102
6	230	22	230	135	79	95
7	240	24	240	129	71	89
8	250	26	250	123	64	82
9	260	28	260	117	57	76
10	270	30	270	111	50	69
11	280	32	280	106	42	63

Recommendation domain

Soil type : River Alluvium - Sandy clay loam
Yield target : 60 q ha⁻¹

Palampur (Rice)

Name of the centre	: Palampur	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop & Variety	:	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:



Plate 10. Performance of rice crop under farmers' practice at Palampur, Himachal Pradesh



Plate 11. Performance of rice crop under state level dose (SLD) of nutrients (N-90; P₂O₅-40; K₂O-40) at Palampur, Himachal Pradesh



Plate 12. Performance of rice crop at Nutrients level targeted to get 50 q ha⁻¹ yield at Una, Himachal Pradesh

Fertilizer adjustment equations

$$F N = 5.46 T - 0.32 SN, \quad F P_2O_5 = 2.50 T - 2.67 SP, \quad F K_2O = 2.82T - 0.68 SK$$

Validation of fertilizer adjustment equations of rice on farmers' fields (average of 12 experiments) in mid hills wet temperate zone (1999-2001)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yields (kg ha ⁻¹)	Per cent deviation	B:C ratio
	N	P ₂ O ₅	K ₂ O			
Control	0	0	0	958	-	-
Farmers' practice	30	0	0	1283	-	-
State level dose	90	40	40	2468	-	7.6
Soil Test based	107	31	38	2665	-	8.5
Target (kg ha ⁻¹) based						
4000	74	41	10	3802	-5.0	26.0
5000	120	48	21	4705	-5.9	14.0
6000	182	88	46	5043	-16.0	9.6
7000	152	76	42	5110	-27.0	6.6

Fertilizer adjustment equation:

$$FN = 5.46 T - 0.32 SN, \quad F P_2O_5 = 2.50 T - 2.67 SP, \quad F K_2O = 2.82T - 0.68 SK$$

Ready reckoner for soil test based fertilizer recommendations for yield target of 40 qha⁻¹ rice (Mid hills wet temperate zone)

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	122	87	79
350	10	75	106	73	62
400	15	100	90	60	45
450	20	125	74	47	28
500	25	150	58	33	11
550	30	175	42	20	0
600	35	200	26	7	0
650	40	225	10	0	0
700	50	250	0	0	0

Fertilizer adjustment equation :

FN = 5.90 T-0.43 SN , F P₂O₅ = 3.22 T-3.29 S, F K₂O = 3.14T-0.71 SK

Ready reckoner for soil test based fertilizer recommendations for yield target of 40 q/ha rice

(Sub-montane low hills sub tropical zone)

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	107	112	90
350	10	75	86	96	72
400	15	100	64	79	55
450	20	125	43	63	37
500	25	150	21	47	19
550	30	175	0	30	1
600	35	200	0	14	0
650	40	225	0	0	0
700	50	250	0	0	0

Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for mid hills wet temperate zone

Crop: Rice			Yield Target: 40 qha ⁻¹		
Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
Low	Low	Low	154 (138-170)	80(73-87)	62(45-79)
Medium	Medium	Medium	90(58-122)	47(33-60)	20(11-28)
High	High	High	26(10-42)	14(7-20)	0
Fertilizer adjustment equation:					
FN = 5.46 T-0.32 SN, F P ₂ O ₅ = 2.50 T-2.67 SP, F K ₂ O = 2.82T-0.68 SK					

Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for maize in sub-montane low hills sub tropical zone

Crop: Maize			Yield Target: 40 qha ⁻¹		
Low	Low	Low	197(185-209)	150(145-155)	80(72-88)
Medium	Medium	Medium	143(125-161)	115(105-125)	44(24-64)
High	High	High	89(65-112)	80(65-95)	0
Fertilizer adjustment equation: FN = 5.82 T- 0.24 SN , F P ₂ O ₅ = 3.91 T-2.11SP, F K ₂ O = 2.58T-0.31 SK					

Fertilizer dose, grain yield and per cent deviation under FLD plots in mid hills wet temperate zone (1996-98)

Crop	Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	Nutrients uptake (kg ha ⁻¹)		
		N	P ₂ O ₅	K ₂ O			N	P	K
Rice	Farmers' practice	40	0	0	3140	-	61	8.9	83
	SLD	90	40	40	3350	-	66	10.5	87
	4000	0	41	57	3800	-5.0	73	12.7	95
	5000	35	67	85	4800	-4.0	87	13.5	102
	5000+FY M	35	67	85	5210	+4.2	103	15.4	108

Fertilizer dose, grain yield and per cent deviation under FLD plots in sub-montane low hills subtropical zone (1996-98)

Crop	Treatment	Fertilizer Doses (kg ha ⁻¹)			Grain Yields (kg ha ⁻¹)	Per cent deviation	Nutrients uptake (kg ha ⁻¹)		
		N	P ₂ O ₅	K ₂ O			N	P	K
Rice	Farmers' practice	40	0	0	3370	-	67	8.0	83
	SLD	90	40	40	3900	-	75	12.2	92
	4000	36	100	58	4250	+6.3	84	10.0	97
	5000	105	133	90	5290	+5.8	95	15.0	101
	5000+FYM	105	133	90	5860	+17.2	117	16.2	111

Raipur (Rice)

Crop	: Rice	Soil phosphorus range	: 3 -27
Soil type	: Alfisol	Soil potassium range	:
Variety	: IR-36	FYM composition	:
Season	: <i>Kharif</i> , 1985	FYM rate	:
Target range	: 40 q ha ⁻¹ – 60 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 5.88 Y - 0.88 SN, \quad FP_2O_5 = 107 - (11439 - 202.5Y)^{1/2} - 4.13 SP$$

$$FK_2O = \text{No K if SK} > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of improved dwarf variety of rice in Alfisol (*Dorsa*)

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) (Rice - improved dwarf var.)					
		40		50		60	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	103	37	162	58	221	86
175	6	81	24	140	46	199	74
200	9	59	12	118	34	177	62
225	12	37	9	96	21	155	49
250	15	15	9	74	9	133	37
275	18	15	9	52	9	111	28
300	21	15	9	30	9	89	9
350	24	15	9	15	9	45	9
400	27	15	9	15	9	15	9

Recommend the fertility group method for potassic fertilizer because the soil test K having > 250 kg K/ha do not respond fertilizer K₂O to the test crop in soils under study.

Rice (scented and improved semi tall)

Crop	: Rice	Soil phosphorus range	: 3 -27
Soil type	: Vertisol	Soil potassium range	:
Variety	: Indira – 9	FYM composition	:
Season	: <i>Kharif</i> , 2002	FYM rate	:
Target range	: 35 q ha ⁻¹ – 45 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$FN = 3.65 Y - (0.489 SN + 5.12 \text{ t FYM}), FP_2O_5 = 129 - (16710 - 244Y)^{1/2} - (2.89SP + 3.0 \text{ t FYM})$
 $FK_2O = \text{No K if SK} > 250 \text{ kg ha}^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of improved scented rice (Indira -9) in Vertisol (*Kanhar*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) (Rice - improved dwarf var.)					
		35		45		55	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	54	30	91	45	127	63
175	6	42	21	79	36	115	54
200	9	30	13	66	27	103	46
225	12	18	4	54	19	91	37
250	15	6	2	42	10	79	28
275	18	6	2	30	2	66	20
300	21	6	2	18	2	54	11
350	24	6	2	6	2	30	2
400	27	6	2	6	2	6	2

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of improved scented rice (Indira -9) in Vertisol (*Kanhar*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) (Scented Rice – Indira -9)					
		35		45		55	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	29	15	65	30	102	48
175	6	17	6	53	21	90	39
200	9	4	4	41	12	77	31
225	12	4	4	29	4	65	22
250	15	4	4	16	4	53	13
275	18	4	4	4	4	41	5
300	21	4	4	4	4	28	4
350	24	4	4	4	4	4	4
400	27	4	4	4	4	4	4

Rice with FYM

Crop	: Rice	Soil phosphorus range	: 3 -28
Soil type	: Inceptisol	Soil potassium range	:
Variety	: Mahamaya	FYM composition	:
Season	: <i>Kharif</i> , 1999	FYM rate	:
Target range	: 40 q ha ⁻¹ – 60 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.88 Y - 0.578 SN, \quad FP_2O_5 = 129 - (16659 - 233Y)^{1/2} - 2.24 SP$$

$$FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of rice with FYM in Inceptisol (Matasi).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Rice with 5 tons FYM (var. - Mahamaya)					
		40		50		60	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	69	37	107	52	146	71
175	6	54	30	93	45	132	64
200	9	40	23	78	38	117	57
225	12	25	16	64	31	103	50
250	15	11	10	50	25	88	44
275	18	2	3	35	18	74	37
300	21	2	3	21	11	59	30
350	24	2	3	2	4	31	23
400	28	2	3	2	3	2	15

Rice without FYM

Crop	: Rice	Soil phosphorus range	: 3 -28
Soil type	: Inceptisol	Soil potassium range	:
Variety	: Mahamaya	FYM composition	:
Season	: <i>Kharif</i> , 1999	FYM rate	:
Target range	: 40 q ha ⁻¹ – 60 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 3.93 Y - 0.489 SN, \quad FP_2O_5 = 110 - (12195 - 205Y)^{1/2} - 2.11 SP$$

$$FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of rice without FYM in Inceptisol (Matasi).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Rice without FYM (var. - Mahamaya)					
		40		50		60	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	84	40	123	60	162	94
175	6	72	34	111	53	150	87
200	9	59	28	99	47	138	81
225	12	47	21	86	41	126	75
250	15	35	15	74	34	114	68
275	18	23	9	62	28	101	62
300	21	11	2	50	22	89	56
350	24	11	2	25	15	65	49
400	28	11	2	11	7	40	41

Karnataka (Paddy-Rcie)

Crop	: Rice	Soil phosphorus range	:
SOIL	: Red lateritic	Soil potassium range	:
Season	: Kharif	FYM composition	:
Variety	: Jaya & other HYV	FYM rate	:
Season	:	Green manure composition	:
Target range	:	Green manure rate	:
Soil Nitrogen range	:		
Area of applicability	: Bangalore, Kolar and Tumkur districts.		

Target yield equation

$$F.N. = 7.26 T - 129 SN (OC \%), \quad F.P_2O_5 = 4.05 T - 2.52 SP_2O_5 (Olsen's - P_2O_5)$$

$$F.K_2O = 3.15 T - 0.29 SK_2O (NH_4 OAC - K_2O)$$

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.35	100	12	51	40	51
0.40	94	14	46	50	49
0.45	87	16	41	60	46
0.50	81	18	36	70	43
0.55	74	20	31	80	40
0.60	68	22	26	90	37
0.65	61	24	21	100	34
0.70	55	26	16	110	31
0.75	49	28	11	120	28
0.80	42			130	25
0.85	36			140	22
0.90	29			150	20
0.95	23			160	17
1.00	16			170	14

To increase or decrease the yield target of one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 7.25 kg/acre P₂O₅ = ± 4.00 kg/acre K₂O = ± 3.15 kg/acre.

Crop	: Rice	Soil phosphorus range	:
SOIL	: Red lateritic	Soil potassium range	:
Variety	: TTB-7	FYM composition	:
Season	: Kharif	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:
Area of applicable	: Bangalore, Kolar and Tumkur districts.		

Target yield equation:

F.N. = 5.99 T- 90.924 SN (OC %), F.P₂O₅ = 6.19 T- 2.11 SP₂O₅ (Bray's - P₂O₅)

F.K₂O = 3.06 T- 0.317 SK₂O (NH₄OAC - K₂O)

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Bray's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.30	21	6	37	10	21
0.35	16	8	33	15	20
0.40	12	10	28	20	18
0.45	7	12	24	25	17
		14	20	30	14
		16	16	35	13
		18	12	40	12
				45	10
				50	9
				55	7
				60	6

To increase or decrease the yield target by one q/Acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 6 kg/Acre

P₂O₅ = ± 6 kg/Acre

K₂O = ± 3 kg/Acre

Crop	: Rice	Soil phosphorus range	:
SOIL	: Red	Soil potassium range	:
Season	: Kharif	FYM composition	:
Variety	: Rasi	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:
Area of applicability	: Mandya and Mysore districts.		

Target yield equation :

$$FN = 4.703 T - 274.865 SN (OC \%) - 0.00141 OM$$

$$FP_2O_5 = 1.636 T - 0.2563 SP_2O_5 (Olsen's - P_2O_5) - 0.00077 OM$$

$$FK_2O = 2.306 T - 0.494 SK_2O (NH_4OAC - K_2O) - 0.00114 OM$$

STV O C (%)	Fertilizer nitrogen (kg/acre)	STV Bray's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.2	72.1	3	32.0	20	36.2
0.3	61.1	5	31.4	25	33.8
0.4	50.1	7	30.9	30	31.3
0.5	39.1	9	30.4	35	28.8
0.6	28.1	11	29.9	40	26.4
0.7	17.1	13	29.4	45	23.9
		15	28.9	50	21.4
		17	28.4	55	19.0
		19	27.9	60	16.5
		21	27.3	65	14.0
		23	26.8	70	11.5
		25	26.3		
		27	25.8		
		29	25.3		
		31	24.8		
		33	24.3		
		35	23.7		
		37	23.2		
		39	22.7		

Note: If one tonne FYM /acre is used then decrease N by 1.4 kg/acre, P₂O₅ by 0.8 kg/acre and K₂O by 1.1 kg/acre

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 4.7 kg/acre

P₂O₅ = ± 1.6 kg/acre

K₂O = ± 2.3 kg/acre.

Crop	: Rice	Soil phosphorus range	:
SOIL	: Red lateritic	Soil potassium range	:
Season	: Kharif	FYM composition	:
Variety	: Jaya & other HYV	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:
Area of applicability	: Bangalore, Kolar and Tumkur districts.		

Target yield equation :

$$F.N. = 7.26 T - 129 SN (OC \%), \quad F.P_2O_5 = 4.05 T - 2.52 SP_2O_5 (Olsen's - P_2O_5)$$

$$F.K_2O = 3.15 T - 0.29 SK_2O (NH_4 OAC - K_2O)$$

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.35	100	12	51	40	51
0.40	94	14	46	50	49
0.45	87	16	41	60	46
0.50	81	18	36	70	43
0.55	74	20	31	80	40
0.60	68	22	26	90	37
0.65	61	24	21	100	34
0.70	55	26	16	110	31
0.75	49	28	11	120	28
0.80	42	30	10	130	25
0.85	36	32	10	140	22
0.90	29	34	10	150	20
0.95	23	36	10	160	17
1.00	16	38	10	170	14
1.05	18	40	10	180	11

To increase or decrease the yield target of one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 7.25 kg/acre P₂O₅ = ± 4.00 kg/acre K₂O = ± 3.15 kg/acre.

Crop HYV)	: Paddy (Jaya and Other	Soil phosphorus range	:
SOIL	: Red lateritic	Soil potassium range	:
Season	: Kharif	FYM composition	:
Variety	: Indaf-8 & other HYV	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Area of applicability : Bangalore, Kolar and Tumkur districts

Target yield equation:

F.N. = $3.314 T - 0.24 SN$ (KMnO₄ - N), F.P₂O₅ = $1.85 T - 0.66 SP_2O_5$ (Bray's - P₂O₅)

STV KMnO ₄ -N (kg/acre)	Fertilizer nitrogen (kg/acre)	STV Bray's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
20	48	2.5	28	10	28
30	46	5.0	26	20	26
40	43	7.5	25	30	23
50	41	10.0	23	40	21
60	39	12.5	20	50	19
70	36	15.0	20	60	17
80	34	17.5	18	70	15
90	31	20.0	16	80	13
100	29	22.5	15	90	11
110	27	25.0	13	100	10
120	24	27.5	11		
130	22	30.0	10		

$$F.K_2O = 1.86 T - 0.21 SK_2O (NH_4OAC - K_2O)$$

Ludhiana (Paddy-Paddy)

Name of the Centre	: Ludhiana	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Basic parameters of N for FYM, green manure and inorganic fertilizer

<i>Crop</i>	<i>NR</i> <i>kg q⁻¹</i>	<i>CS</i> <i>%</i>	<i>CF (Fertilizer)</i> <i>%</i>	<i>CF (FYM)</i> <i>%</i>	<i>CF (GM)</i> <i>%</i>
Rice	1.95	49	51	36	45
Wheat	2.36	25	56	8	3

NR= nutrient requirement kg q⁻¹, CS= contribution from soil available N, CF (Fertilizer), CF (FYM), CF (GM) is recovery from applied N, FYM and GM, respectively

Basic parameters and fertilizer adjustment equations for targeted yield of rice involving use of farmyard manure (FYM) and inorganic fertilizers

Nutrient	NR (kg q ⁻¹)	CS	CF	C_FYM	Fertilizer adjustment equation
<i>Without FYM</i>					
N	1.94	0.66	0.44	-	FN=4.39 T-1.50 SN
P₂O₅	0.92	0.36	1.37	-	FP₂O₅ = 0.67 T-0.26 SP
K₂O	3.44	0.92	3.92	-	FK₂O = 0.88 T - 0.23 SK
<i>With FYM</i>					
N	1.94	0.66	0.38	0.31	FN = 5.08 T – 1.74 SN- 0.81 FYM_N
P₂O₅	0.92	0.36	0.66	0.34	FP₂O₅ = 1.39 T- 0.55 SP – 0.51 FYM_P
K₂O	3.44	0.92	2.82	3.40	FK₂O = 1.22 T- 0.32 SK- 1.20 FYM_K

SN, SP and SK indicate KMnO₄ oxidisable N, Olsen extractable P and AmOAC extractable K in soil (kg ha⁻¹); FYM_N, FYM_P and FYM_K represent the total amount of N, P and K (kg ha⁻¹), respectively added through FYM

Ready Re ckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
KmnO ₄ N	Olsens' P	Amm. Ac-K	60(q ha ⁻¹)			70 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
60	6	100	143	56	26	174	74	54
80	8	105	131	40	19	161	41	47
100	10	110	106	23	10	136	10	40
120	12	115	93	6	10	123	8	33
140	14	120	80	6	10	111	5	10
160	16	125	68	6	10	98	5	10
180	18	130	55	6	10	85	5	10
200	20	135	43	6	10	73	5	10
220	22	140	30	6	10	60	5	10
240	26	145	17	6	10	48	5	10
260	26	150	15	6	10	40	5	10

Economics of fertilizer use under IPNS for yield targets of rice at farmers' fields.

Treatment	Fertilizer (kg/ha)			Grain yield (kg/ha)	Increase over farmer's practice	
	N	P ₂ O ₅	K ₂ O		Benefit (Rs/ha)	B/C (Rs/Re)
Farmers Practice	150	32.8	1.8	5798	-	-
STRD	117	7.1	10.0	5990	3295	4.71
Target 70 q ha⁻¹	128	12.2	21.0	6204	4415	2.19
IPNS 70 q ha⁻¹	101	3.2	8.5	6197	4010	2.10

Basic parameters and fertilizer adjustment equations for targeted yield of rice involving use of pressmud and inorganic fertilizers

Nutrient	NR (kg q ⁻¹)	CS	CF	C_PM	Fertilizer adjustment equation
<i>Without Press mud</i>					
N	1.921	0.512	0.657	-	FN=2.924 T-0.78 SN
P ₂ O ₅	0.905	0.474	0.616	-	FP ₂ O ₅ = 1.469 T-0.77 SP
K ₂ O	3.02	0.807	2.080	-	FK ₂ O = 1.452 T - 0.39 SK

With Press mud

N	1.921	0.512	0.812	0.498	FN = 3.31 T – 0.863 SN- 1.025 PM_N
P ₂ O ₅	0.905	0.474	-	-	-
K ₂ O	3.02	0.807	2.508	1.157	FK ₂ O = 1.207 T – 0.322 SK- 0.46 PM_K

SN, SP and SK indicate KMnO₄ oxidisable N, Olsen extractable P and AmOAC extractable K in soil (kg ha⁻¹); PM_N and PM_K represent the total amount of N and K (kg ha⁻¹), respectively added through pressmud

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Fertilizer nutrient required (kg ha ⁻¹) for yield target of 60		Fertilizer nutrient required (kg ha ⁻¹) for yield target of 70 (q ha ⁻¹)	
Kmn O ₄ N	N	Kmn O ₄ N	N
40	154	40	192
60	135	60	173
80	116	80	154
100	97	100	135
120	77	120	116
140	58	140	96
160	39	160	77
180	20	180	58
200	1	200	39
220	1	220	20
240	1	240	10

Fertilizer nitrogen required along with green manuring with 52-day old '*dhaincha*'(*Sesbania*) to achieve yield targets of 60 and 70 q ha⁻¹ of paddy yield at different soiltest values

Fertilizer nutrient required (kg ha ⁻¹) for yield target of 60		Fertilizer nutrient required (kg ha ⁻¹) for yield target of 70 (q ha ⁻¹)	
Kmn O ₄ N	N	Kmn O ₄ N	N
40	145	40	183
60	126	60	164
80	107	80	145
100	88	100	126
120	68	120	107
140	49	140	87
160	30	160	68
180	11	180	49
200	0	200	30

New Delhi (Rice)

Name of the Centre	: New Delhi	Soil phosphorus range	:
Soil	: Typic hapusttept (Alluvial)	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equations for targeted yields of crops in NCR of Delhi (Without FYM)

$$FN = 4.93 T - 0.47 SN, FP_2O_5 = 4.48 T - 7.82 SP, FK_2O = 2.31 T - 0.21 SK$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Rice

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	200	120	95	250	120	120
125	13	125	190	120	90	235	120	115
150	15	150	175	105	85	225	120	105
175	18	175	165	85	80	215	120	100
200	20	200	155	70	75	200	115	95
225	23	225	140	50	70	190	95	90
250	25	250	130	30	65	180	75	85
275	28	275	120	10	60	165	55	80
300	30	300	105	10	55	155	35	75
325	33	325	95	10	50	145	15	70
350	36	350	85	10	45	130	15	65
375	38	375	70	10	35	120	15	60

Palampur (Rice)

Name of the Centre	: Palampur	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$F N = 5.46 T - 0.32 SN$$

$$F P_2O_5 = 2.50 T - 2.67 SP$$

$$F K_2O = 2.82T - 0.68 SK$$

$$F N = 5.90 T - 0.43 SN$$

$$F P_2O_5 = 3.22 T - 3.29 SP$$

$$F K_2O = 3.14T - 0.71 SK$$

Ready reckoner for soil test based fertilizer recommendations for yield target of 40 qha⁻¹ rice (Mid hills wet temperate zone)

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	122	87	79
350	10	75	106	73	62
400	15	100	90	60	45
450	20	125	74	47	28
500	25	150	58	33	11
550	30	175	42	20	0
600	35	200	26	7	0
650	40	225	10	0	0
700	50	250	0	0	0
Fertilizer adjustment equation: FN = 5.46 T-0.32 SN, F P ₂ O ₅ = 2.50 T-2.67 SP, F K ₂ O = 2.82T-0.68 SK					

Ready recknors for rice, maize and wheat in low hills sub-montane sub tropical zone are given in tables 29-31

Ready reckoner for soil test based fertilizer recommendations for yield arget of 40 q/ha rice (Sub-montane low hills sub tropical zone)

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	107	112	90
350	10	75	86	96	72
400	15	100	64	79	55
450	20	125	43	63	37
500	25	150	21	47	19
550	30	175	0	30	1

600	35	200	0	14	0
650	40	225	0	0	0
700	50	250	0	0	0
Fertilizer adjustment equation : $FN = 5.90 T - 0.43 SN$, $FP_2O_5 = 3.22 T - 3.29 S$, $FK_2O = 3.14T - 0.71 SK$					

Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for mid hills wet temperate zone

Crop: Rice			Yield Target: 40 qha ⁻¹		
Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
Low	Low	Low	154 (138-170)	80(73-87)	62(45-79)
Medium	Medium	Medium	90(58-122)	47(33-60)	20(11-28)
High	High	High	26(10-42)	14(7-20)	0
Fertilizer adjustment equation: $FN = 5.46 T - 0.32 SN$, $FP_2O_5 = 2.50 T - 2.67 SP$, $FK_2O = 2.82T - 0.68 SK$					

Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for rice in sub-montane low hills sub tropical zone

Crop: Rice			Yield Target: 40 qha ⁻¹		
Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
Low	Low	Low	172(150-190)	104(96-112)	72(55-90)
Medium	Medium	Medium	64(21-107)	64(48-79)	28(19-37)
High	High	High	0	25(17-33)	0
Fertilizer adjustment equation: $FN = 5.90 T - 0.43 SN$, $FP_2O_5 = 3.22 T - 3.29 S$, $FK_2O = 3.14T - 0.71 SK$					

Maharashtra (Paddy-Rice)

Crop	: Upland Paddy (<i>Rabi</i>)	Soil phosphorus range	: 6 - 16 kg ha ⁻¹
Variety	: R-24	Soil potassium range	: 200 -700 kg ha ⁻¹
Soil	: Typic Haplustepts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Districts	: Kolhapur, Sangli, Satara	Green manure composition	:
Target range	: 30 q ha ⁻¹ - 40 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100 - 200 kg ha ⁻¹		

Targeted Yield Equations

$$FN = 5.52 T - 0.54 SN, \quad FP_2O_5 = 2.19 T - 0.83 SP, \quad FK_2O = 2.37 T - 0.05 SK$$

Fertilizer prescription for targeted yields of upland paddy for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			30 q ha ⁻¹ target			40 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	112	61	61	167	82	84
120	8	300	101	59	56	156	81	79
140	10	400	90	57	51	145	79	74
160	12	500	80	55	46	134	77	69
180	14	600	68	54	41	123	76	64
200	16	700	57	52	36	112	74	59

Crop	: Transplanted paddy	Soil phosphorus range	: 10 - 30 kg ha ⁻¹
Variety	: Indrayani	Soil potassium range	: 200 -400 kg ha ⁻¹
Soil	: Typic Ustorthents	FYM composition	:
Situation	: Irrigated	FYM rate	:
Districts	: Kolhapur, Sangli, Satara	Green manure composition	:
Target range	: 40 q ha ⁻¹ - 45 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100 - 300 kg ha ⁻¹		
Districts	: Nasik, Pune, Nandurbar, Gadchiroli, Kolhapur		

Targeted Yield Equations

$$FN = 5.20 T - 0.34 SN, \quad FP_2O_5 = 9.40 T - 13.66 SP, \quad FK_2O = 2.73 T - 0.16 SK$$

Fertilizer prescription for targeted yields of transplanted paddy for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			40 q ha ⁻¹ target			45 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	200	174	239	77	200	286	91
150	15	250	157	171	69	183	218	83
200	20	300	140	103	61	166	150	75
250	25	350	123	35	53	149	82	67
300	30	400	106	25*	45	132	25*	59

* Minimum dose of P₂O₅

Low land paddy (IPNS)

Experimental details : NARP, Igatpuri RBD 3/6, Av. N 265, Av. P 25.2,
Av. K 460 kg ha⁻¹

Fertilizer prescription equations

$$FN = 5.20 T - 0.34 SN$$

$$FP_2O_5 = 9.40 T - 13.66SP$$

$$FK_2O = 2.73 T - 0.16 SK$$

Treatment details

T₁ : Control

T₂ : Fertilizers for 40 q ha⁻¹ target

T₃ : Fertilizers for 40 q ha⁻¹ target + 5 t FYM ha⁻¹

T₄ : Fertilizers for 40 q ha⁻¹ target + 10 t FYM ha⁻¹

T₅ : Fertilizers for 40 q ha⁻¹ target + 5 t FYM ha⁻¹ + biofertilizer

T₆ : 10 t FYM ha⁻¹

Yield targeting in rice (Indrayani) on IPNS base pearl-millet

Treatment	Yield (q ha ⁻¹)	Total nutrient uptake, (kg ha ⁻¹)			Initial soil test value (kg ha ⁻¹)		
		N	P	K	N	P	K
T₁	18.4	41.1	20.7	51.8	180	20.6	415
T₂	38.0	82.2	39.8	105.0	182	21.3	420
T₃	42.3	91.2	43.8	115.3	185	21.8	410
T₄	55.2	114.0	54.5	142.5	188	22.0	415
T₅	43.6	93.0	45.3	116.7	183	22.2	420
T₆	24.7	54.8	27.5	69.3	186	21.5	410
SE ±	0.38	0.82	0.40	0.89			
CD 5 %	1.17	2.49	3.0	2.7			

Crop	: Transplanted paddy	Soil phosphorus range	:
Variety	: Indrayani	Soil potassium range	:
Soil	: Typic Ustorthents	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:
Districts	: Nasik, Pune, Nandurbar, Gadchiroli, Kolhapur		

Targeted Yield Equations

$$FN = 5.20 T - 0.34 SN, \quad FP_2O_5 = 9.40 T - 13.66 SP, \quad FK_2O = 2.73 T - 0.16 SK$$

Fertilizer prescription for targeted yields of transplanted paddy for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			40 q ha ⁻¹ target			45 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	10	200	174	239	77	200	286	91
150	15	250	157	171	69	183	218	83
200	20	300	140	103	61	166	150	75
250	25	350	123	35	53	149	82	67
300	30	400	106	25*	45	132	25*	59

* Minimum dose of P₂O₅

Pusa (Paddy-Paddy)

Name of the Centre	: Pusa	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Calculation procedure of fertilizer doses for different yield targets

The following illustration is given for paddy grown in calcareous soils to Pusa (Samastipur) in Bihar.

Crop : Paddy

Soil Test Values : Alk. $\text{KMnO}_4 - \text{N} = 200 \text{ kg N/ha}$
 Olsen's $\text{P} = 26.3 \text{ kg P}_2\text{O}_5/\text{ha}$
 Ammonium $\text{OAc} - \text{K} = 116 \text{ kg K}_2\text{O/ha}$

Yield target chosen : 40 q/ha

Targetted yield equations for the region: $\text{FN} = 6.82 \text{ T} - 0.53 \text{ SN} - 0.77 \text{ CN}$
 $\text{FP}_2\text{O}_5 = 3.60\text{T} - 2.16 \text{ SP}_2\text{O}_5 - 1.05 \text{ CP}_2\text{O}_5$
 $\text{FK}_2\text{O} = 3.42 \text{ T} - 0.39 \text{ SK}_2\text{O} - 0.36 \text{ CK}_2\text{O}$

Crop: Paddy Soil: Young Alluvium Calcareous Soil

Targetted Yield Equations

$\text{FN} = 5.60 \text{ T} - 0.40 \text{ SN}, \text{ FP}_2\text{O}_5 = 3.30 \text{ T} - 2.48 \text{ SP}_2\text{O}_5, \text{ FK}_2\text{O} = 3.31 \text{ T} - 0.65 \text{ SK}_2\text{O}$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	120	89	60	176	122	93
130	6	70	116	84	54	172	117	87
140	8	80	112	79	47	168	112	80
150	10	90	108	74	41	164	107	74
160	12	100	104	69	34	160	102	67
170	14	110	100	64	28	156	97	61
180	16	120	96	59	21	152	92	54
190	18	130	92	54	15	148	87	48
200	20	140	88	49	10	144	82	41
210	22	150	84	44	10	140	77	35
220	24	160	80	39	10	136	72	28
230	26	170	76	35	10	132	68	22
240	28	180	72	30	10	128	63	15
250	30	190	68	25	10	124	58	10
260	32	200	64	20	10	120	53	10
270	34	210	60	15	10	116	48	10
280	36	220	56	10	10	112	43	10
290	38	230	52	10	10	108	38	10
300	40	240	48	10	10	104	33	10
310	42	250	44	10	10	100	28	10
320	44	260	40	10	10	96	23	10
330	46	270	36	10	10	92	18	10
340	48	280	32	10	10	88	13	10
350	50	290	30	10	10	84	10	10
360	52	300	30	10	10	80	10	10
370	54	310	30	10	10	76	10	10
380	56	320	30	10	10	72	10	10
390	58	330	30	10	10	68	10	10
400	60	340	30	10	10	64	10	10

Crop: Paddy

Soil: Young Alluvium Calcareous Soil

Targetted Yield Equations

$$\begin{aligned} \text{FN} &= 7.00 \text{ T} - 0.44 \text{ SN}, \quad \text{FP}_2\text{O}_5 = 3.90 \text{ T} - 1.87 \text{ SP}_2\text{O}_5, \quad \text{FK}_2\text{O} = 5.30 \text{ T} - 1.48 \text{ SK}_2\text{O} \\ \text{F Zn} &= 0.29 \text{ T} - 4.72 \text{ S Zn} \end{aligned}$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)				Fertilizer Nutrients Required (kg/ha) for Yield Target of							
				30 q/ha				40 q/ha			
N	P ₂ O ₅	K ₂ O	Zn (ppm)	N	P ₂ O ₅	K ₂ O	Zn	N	P ₂ O ₅	K ₂ O	Zn
120	4	60	0.4	157	110	70	7	227	149	123	9.7
130	6	70	0.5	153	106	55	6	223	145	108	9.2
140	8	80	0.6	148	102	41	6	218	141	94	8.8
150	10	90	0.7	144	98	26	5	214	137	79	8.3
160	12	100	0.8	140	95	11	5	210	134	64	7.8
170	14	110	0.9	135	91	10	4	205	130	49	7.4
180	16	120	1	131	87	10	4	201	126	34	6.9
190	18	130	1.1	126	83	10	4	196	122	20	6.4
200	20	140	1.2	122	80	10	3	192	119	10	5.9
210	22	150	1.3	118	76	10	3	188	115	10	5.5
220	24	160	1.4	113	72	10	2	183	111	10	5.0
230	26	170	1.5	109	68	10	2	179	107	10	4.5
240	28	180	1.6	104	65	10	1	174	104	10	4.0
250	30	190	1.7	100	61	10	1	170	100	10	3.6
260	32	200	1.8	96	57	10	0	166	96	10	3.1
270	34	210	1.9	91	53	10	0	161	92	10	2.6
280	36	220	2	87	50	10	0	157	89	10	2.2
290	38	230	2.1	82	46	10	0	152	85	10	1.7
300	40	240	2.2	78	42	10	0	148	81	10	1.2
310	42	250	2.3	74	38	10	0	144	77	10	0.7
320	44	260	2.4	69	35	10	0	139	74	10	0.3
330	46	270	2.5	65	31	10	0	135	70	10	0
340	48	280	2.6	60	27	10	0	130	66	10	0
350	50	290	2.7	56	24	10	0	126	63	10	0
360	52	300	2.8	52	20	10	0	122	59	10	0
370	54	310	2.9	47	16	10	0	117	55	10	0
380	56	320	3	43	12	10	0	113	51	10	0
390	58	330	3.1	38	10	10	0	108	48	10	0
400	60	340	3.2	34	10	10	0	104	44	10	0

Targetted Yield Equations

$$FN = 5.73 T - 0.40 SN - 0.58CN, \quad FP_2O_5 = 2.50 T - 1.90 SP_2O_5 - 0.72 CP_2O_5$$

$$FK_2O = 2.44 T - 0.33 SK_2O - 0.47CK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Without Biogas slurry

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	124	67	53	181	92	78
130	6	70	120	64	50	177	89	75
140	8	80	116	60	47	173	85	71
150	10	90	112	56	44	169	81	68
160	12	100	108	52	40	165	77	65
170	14	110	104	48	37	161	73	61
180	16	120	100	45	34	157	70	58
190	18	130	96	41	30	153	66	55
200	20	140	92	37	27	149	62	51
210	22	150	88	33	24	145	58	48
220	24	160	84	29	20	141	54	45
230	26	170	80	26	17	137	51	42
240	28	180	76	22	14	133	47	38
250	30	190	72	18	11	129	43	35
260	32	200	68	14	10	125	39	32
270	34	210	64	10	10	121	35	28
280	36	220	60	10	10	117	32	25
290	38	230	56	10	10	113	28	22
300	40	240	52	10	10	109	24	18
310	42	250	48	10	10	105	20	15
320	44	260	44	10	10	101	16	12
330	46	270	40	10	10	97	13	10
340	48	280	36	10	10	93	10	10
350	50	290	32	10	10	89	10	10
360	52	300	30	10	10	85	10	10
370	54	310	24	10	10	81	10	10
380	56	320	30	10	10	77	10	10
390	58	330	30	10	10	73	10	10
400	60	340	30	10	10	69	10	10
<i>Reduction in Fertilizer recommendation with the application of biogas slurry (N -0.93, P₂O₅- 0.45 & K₂O- 0.55 %)@</i>								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	5	11	16	22	27	32	43	54
P ₂ O ₅	3	6	10	13	16	19	26	32
K ₂ O	3	5	8	10	13	16	21	26

Targetted Yield Equations

$$FN = 6.46 T - 0.56 SN - 0.72CN, \quad FP_2O_5 = 3.27 T - 1.78 SP_2O_5 - 0.59 CP_2O_5$$

$$FK_2O = 2.94 T - 0.45 SK_2O - 1.01CK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Without Poultry manure

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	127	91	61	191	124	91
130	6	70	121	87	57	186	120	86
140	8	80	115	84	52	180	117	82
150	10	90	110	80	48	174	113	77
160	12	100	104	77	43	169	109	73
170	14	110	99	73	39	163	106	68
180	16	120	93	70	34	158	102	64
190	18	130	87	66	30	152	99	59
200	20	140	82	63	25	146	95	55
210	22	150	76	59	21	141	92	50
220	24	160	71	55	16	135	88	46
230	26	170	65	52	12	130	85	41
240	28	180	59	48	10	124	81	37
250	30	190	54	45	10	118	77	32
260	32	200	48	41	10	113	74	28
270	34	210	43	38	10	107	70	23
280	36	220	37	34	10	102	67	19
290	38	230	31	30	10	96	63	14
300	40	240	30	27	10	90	60	10
310	42	250	30	23	10	85	56	10
320	44	260	30	20	10	79	52	10
330	46	270	30	16	10	74	49	10
340	48	280	30	13	10	68	45	10
350	50	290	30	10	10	62	42	10
360	52	300	30	10	10	57	38	10
370	54	310	30	10	10	51	35	10
380	56	320	30	10	10	46	31	10
390	58	330	30	10	10	40	28	10
400	60	340	30	10	10	34	24	10
<i>Reduction in Fertilizer recommendation with the application of poultry man. (N -1.47, P2O5- 1.93 & K2O- 1.15 %)@</i>								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	11	21	32	42	53	64	85	106
P ₂ O ₅	11	23	34	46	57	68	91	114
K ₂ O	12	23	35	46	58	70	93	116

Targetted Yield Equations

$$FN = 4.22 T - 0.25 SN - 0.74CN, \quad FP_2O_5 = 2.27 T - 1.87 SP_2O_5 - 1.62 CP_2O_5$$

$$FK_2O = 3.43 T - 0.78 SK_2O - 1.50CK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Without Rap seed Oil Cake

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	97	61	56	139	83	90
130	6	70	94	57	48	136	80	83
140	8	80	92	53	41	134	76	75
150	10	90	89	49	33	131	72	67
160	12	100	87	46	25	129	68	59
170	14	110	84	42	17	126	65	51
180	16	120	82	38	10	124	61	44
190	18	130	79	34	10	121	57	36
200	20	140	77	31	10	119	53	28
210	22	150	74	27	10	116	50	20
220	24	160	72	23	10	114	46	12
230	26	170	69	19	10	111	42	10
240	28	180	67	16	10	109	38	10
250	30	190	64	12	10	106	35	10
260	32	200	62	10	10	104	31	10
270	34	210	59	10	10	101	27	10
280	36	220	57	10	10	99	23	10
290	38	230	54	10	10	96	20	10
300	40	240	52	10	10	94	16	10
310	42	250	49	10	10	91	12	10
320	44	260	47	10	10	89	10	10
330	46	270	44	10	10	86	10	10
340	48	280	42	10	10	84	10	10
350	50	290	39	10	10	81	10	10
360	52	300	37	10	10	79	10	10
370	54	310	34	10	10	76	10	10
380	56	320	32	10	10	74	10	10
390	58	330	29	10	10	71	10	10
400	60	340	27	10	10	69	10	10
Reduction in Fertilizer recommendation with the application of oil cakes (N -5.20, P₂O₅- 1.82 & K₂O- 1.20 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	38	77	115	154	192	231	308	385
P ₂ O ₅	29	59	88	118	147	177	236	295
K ₂ O	18	36	54	72	90	108	144	180

Recent Alluvium Non Calcareous Non Saline Soil

WITH ONLY INORGANIC FERTILIZERS (N, P & K)

Crop: Paddy Soil: Recent Alluvium Non Calcareous Non Saline Soil

Targetted Yield Equations

$$FN = 4.91 T - 0.31 SN, \quad FP_2O_5 = 2.74 T - 2.54 SP_2O_5$$

$$FK_2O = 2.28 T - 0.39 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	110	72	45	159	99	68
130	6	70	107	67	41	156	94	64
140	8	80	104	62	37	153	89	60
150	10	90	101	57	33	150	84	56
160	12	100	98	52	29	147	79	52
170	14	110	95	47	26	144	74	48
180	16	120	92	42	22	141	69	44
190	18	130	88	36	18	138	64	41
200	20	140	85	31	14	134	59	37
210	22	150	82	26	10	131	54	33
220	24	160	79	21	10	128	49	29
230	26	170	76	16	10	125	44	25
240	28	180	73	11	10	122	38	21
250	30	190	70	10	10	119	33	17
260	32	200	67	10	10	116	28	13
270	34	210	64	10	10	113	23	10
280	36	220	61	10	10	110	18	10
290	38	230	57	10	10	107	13	10
300	40	240	54	10	10	103	10	10
310	42	250	51	10	10	100	10	10
320	44	260	48	10	10	97	10	10
330	46	270	45	10	10	94	10	10
340	48	280	42	10	10	91	10	10
350	50	290	39	10	10	88	10	10
360	52	300	36	10	10	85	10	10
370	54	310	33	10	10	82	10	10
380	56	320	30	10	10	79	10	10
390	58	330	30	10	10	76	10	10
400	60	340	30	10	10	72	10	10

Old Alluvium Light Textured Soil

WITH ONLY INORGANIC FERTILIZERS (N, P & K)

Crop: Paddy

Soil: Old Alluvium Light Textured Soil

Targetted Yield Equations

$$FN = 4.54 T - 0.39 SN, \quad FP_2O_5 = 2.73 T - 2.92 SP_2O_5, \quad FK_2O = 1.85 T - 0.24 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	89	70	41	135	98	60
130	6	70	86	64	39	131	92	57
140	8	80	82	59	36	127	86	55
150	10	90	78	53	34	123	80	52
160	12	100	74	47	32	119	74	50
170	14	110	70	41	29	115	68	48
180	16	120	66	35	27	111	62	45
190	18	130	62	29	24	108	57	43
200	20	140	58	24	22	104	51	40
210	22	150	54	18	20	100	45	38
220	24	160	50	12	17	96	39	36
230	26	170	47	10	15	92	33	33
240	28	180	43	10	12	88	27	31
250	30	190	39	10	10	84	22	28
260	32	200	35	10	10	80	16	26
270	34	210	31	10	10	76	10	24
280	36	220	30	10	10	72	10	21
290	38	230	30	10	10	69	10	19
300	40	240	30	10	10	65	10	16
310	42	250	30	10	10	61	10	14
320	44	260	30	10	10	57	10	12
330	46	270	30	10	10	53	10	10
340	48	280	30	10	10	49	10	10
350	50	290	30	10	10	45	10	10
360	52	300	30	10	10	41	10	10
370	54	310	30	10	10	37	10	10
380	56	320	30	10	10	33	10	10
390	58	330	30	10	10	30	10	10
400	60	340	30	10	10	30	10	10

Old Alluvium Heavy Textured Soil

WITH ONLY INORGANIC FERTILIZERS (N, P & K)

Crop: Paddy

Soil: Old Alluvium Heavy Textured Soil

Targetted Yield Equations

$$FN = 4.40 T - 0.54 SN, \quad FP_2O_5 = 1.95 T - 2.09 SP_2O_5, \quad FK_2O = 1.92 T - 0.39 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			40 q/ha			50 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	111	70	53	155	89	73
130	6	70	106	65	50	150	85	69
140	8	80	100	61	46	144	81	65
150	10	90	95	57	42	139	77	61
160	12	100	90	53	38	134	72	57
170	14	110	84	49	34	128	68	53
180	16	120	79	45	30	123	64	49
190	18	130	73	40	26	117	60	45
200	20	140	68	36	22	112	56	41
210	22	150	63	32	18	107	52	38
220	24	160	57	28	14	101	47	34
230	26	170	52	24	11	96	43	30
240	28	180	46	19	10	90	39	26
250	30	190	41	15	10	85	35	22
260	32	200	36	11	10	80	31	18
270	34	210	30	10	10	74	26	14
280	36	220	30	10	10	69	22	10
290	38	230	30	10	10	63	18	10
300	40	240	30	10	10	58	14	10
310	42	250	30	10	10	53	10	10
320	44	260	30	10	10	47	10	10
330	46	270	30	10	10	42	10	10
340	48	280	30	10	10	36	10	10
350	50	290	30	10	10	31	10	10
360	52	300	30	10	10	30	10	10
370	54	310	30	10	10	30	10	10
380	56	320	30	10	10	30	10	10
390	58	330	30	10	10	30	10	10
400	60	340	30	10	10	30	10	10

Red Loam Soils of Jharkhand

WITH ONLY INORGANIC FERTILIZERS (N, P & K)

Crop: Paddy

Soil: Red Loam Soils of Jharkhand

Targetted Yield Equations

$$FN = 6.14 T - 0.55 SN, \quad FP_2O_5 = 2.83 T - 2.16 SP_2O_5, \quad FK_2O = 3.73 T - 0.70 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			25 q/ha			30 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	88	62	51	118	76	70
130	6	70	82	58	44	113	72	63
140	8	80	77	53	37	107	68	56
150	10	90	71	49	30	102	63	49
160	12	100	66	45	23	96	59	42
170	14	110	60	41	16	91	55	35
180	16	120	55	36	10	85	50	28
190	18	130	49	32	10	80	46	21
200	20	140	44	28	10	74	42	14
210	22	150	38	23	10	69	37	10
220	24	160	33	19	10	63	33	10
230	26	170	30	15	10	58	29	10
240	28	180	30	10	10	52	24	10
250	30	190	30	10	10	47	20	10
260	32	200	30	10	10	41	16	10
270	34	210	30	10	10	36	11	10
280	36	220	30	10	10	30	10	10
290	38	230	30	10	10	30	10	10
300	40	240	30	10	10	30	10	10
310	42	250	30	10	10	30	10	10
320	44	260	30	10	10	30	10	10
330	46	270	30	10	10	30	10	10
340	48	280	30	10	10	30	10	10
350	50	290	30	10	10	30	10	10
360	52	300	30	10	10	30	10	10
370	54	310	30	10	10	30	10	10
380	56	320	30	10	10	30	10	10
390	58	330	30	10	10	30	10	10
400	60	340	30	10	10	30	10	10

Kalyani (Rice)

Name of the Centre	: Kalyani	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Rice (cv. IET- 4094)	FYM composition	:
Season developed	: Kharif, 2004	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations:

$$FN = 3.60 T - 0.25 SN, \quad FP_2O_5 = 2.29 T - .82 SP, \quad FK_2O = 2.61 T - 0.19 SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 100, 120, 140
	P₂O₅	0, 40, 60
	K₂O	0, 40, 60
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	296 - 346
	Olsen-P	21- 41
	NH₄OAc-K	132 - 435
Yield (kg.ha⁻¹)	Control plot	2000 - 2200
	Treated plot	5520 - 7200

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha⁻¹)			Fertilizer nutrient required (kg.ha⁻¹)					
			Targeted yield 3.5 t.ha⁻¹			Targeted yield 4.0 t.ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
250	5	100	111	84	87	129	98	90
275	10	150	102	84	87	120	98	90
300	15	200	93	84	87	111	98	90
325	20	250	84	84	87	102	94	90
350	25	300	76	80	87	94	89	100
375	30	350	67	75	77	85	85	90

* A minor modification was made in the ready-reckoner.

Name of the Centre	: Kalyani	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Boro rice (cv. IET-4786)	FYM composition	:
Season developed	: Rabi 2006	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Targeted yield equation:

FN = 2.75 T – 0.63 STVN -0.035M, FP = 0.48 T – 0.54 STVP -0.07M, FK = 1.24 T – 0.62 STVK - 0.24M

Fertilizer levels (kg.ha⁻¹)	N	120, 150, 170
	P₂O₅	50, 60, 80
	K₂O	60, 80, 100
	FYM (t ha⁻¹)	2.5, 5.0
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	232- 293
	Olsen-P	22 - 32
	NH₄OAc-K	118 - 238
Yield (kg.ha⁻¹)	Control plot	3083-2583
	Treated plot	5300-3250

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha⁻¹)			Fertilizer nutrient required (kg.ha⁻¹)					
			Targeted yield 5.0 t.ha⁻¹			Targeted yield 5.5 t.ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
250	5	100	122	83	92	141	96	103
275	10	150	112	83	92	132	96	103
300	15	200	103	83	92	118	96	103
325	20	250	96	83	92	110	89	103
350	25	300	83	78	92	98	86	92
375	30	350	74	68	86	89	79	89

Targeted yield equations used for the verification trials are given below:

Kharif rice (cv. IET-4097)

FN = 15.34 T- 1.62 SN, FP₂O₅ = 2.97 T- 3.62 SP, FK₂O = 2.52 T- 0.28 SK

Verification trials for kharif Rice (mean of 7 trials)

Treatment	Grain yield (q.ha ⁻¹)	Straw yield (q.ha ⁻¹)
T ₁ - Farmers' practice	40.2	62.4
T ₂ - Govt. recommended dose	36.4	56.8
T ₃ - Soil test based fertilizer dose for targeted yield of 3.5 t ha ⁻¹	35.2	53.7
T ₄ - Soil test based fertilizer dose for Targeted yield of 4.0 t ha ⁻¹ .	40.9	64.8

Barrackpore

Rice (cv Khitish), 2005

Targeted Yield Equations

FN = 7.51 T – 0.37 SN – 0.23 ON

FP₂O₅ = 1.90 T – 0.33 SP – 0.29 OP

FK₂O = 2.63 T – 0.21 SK – 0.05 OK

Rice-Jute sequence (1982-83)

Targeted Yield Equations

FN = 13.76 T - 1.94 SN

FP₂O₅ = 4.90 T - 1.69 SP

FK₂O = 5.87 T - 0.79 SK

Rice-Jute sequence (1987-88)

Targeted Yield Equations

FN = 2.44 T – 0.10 SN

F P₂O₅ = 4.54 T – 2.48 SP

F K₂O = 6.37 T – 0.36 SK

Rice-Jute sequence (1988-89)

Targeted Yield Equations

FN = 5.13 T - 0.19 SN

F P₂O₅ = 4.00 T - 2.33 SP

F K₂O = 5.95 T - 0.33 SK

Rice-Jute sequence (1988 - 89).

Targeted Yield Equations

FN = 5.13 T - 0.19 SN

FP₂O₅ = 4.00 T - 2.33 SP

FK₂O = 5.95 T - 0.33 SK

i) Rice (cv. Ratna), 1974.

ix) Jute (cv. JRO 524), 1993 in Rice-Jute sequence (1992 - 93).

Targeted Yield Equations

FN = 6.56 T - 0.42 SN

FP₂O₅ = 4.18 T - 2.94 SP

FK₂O = 6.00 T - 0.48 SK

ii) Rice (cv. Jaya), 1975.

Targeted Yield Equations

$$FN = 3.28 T - 0.18 SN$$

$$FP_2O_5 = 4.80 T - 5.02 SP$$

$$FK_2O = 2.83 T - 0.54 SK$$

iii) Rice (cv. Pankaj), 1983 in Rice–Jute sequence (1983-84)**Targeted Yield Equations**

$$FN = 3.94 T - 0.47 SN$$

$$FP_2O_5 = 3.91 T - 2.94 SP$$

$$F K_2O = 2.49 T - 0.22 SK$$

v) Rice (cv. CR 1014), 1988 in Rice–Jute sequence (1988–89)**Targeted Yield Equations**

$$FN = 5.50 T - 0.30 SN$$

$$FP_2O_5 = 4.64 T - 4.24 SP$$

$$FK_2O = 3.12 Y - 0.24 SK$$

vii) Rice (cv. CR 1094), 1990**Targeted Yield Equations**

$$FN = 6.15T - 0.58 SN$$

$$F P_2O_5 = 4.26 T - 5.96 SP$$

$$F K_2O = 4.00T - 0.61 SK$$

ix) Rice (cv. Ratna), 1997 in Rice-Mustard sequence 1997 (1997-98)**Targeted Yield Equations**

$$FN = 5.33 T - 0.34 SN$$

$$FP_2O_5 = 4.06 T - 5.87 SP$$

$$F K_2O = 4.58 T - 0.42 SK$$

Targeted Yield Equations

$$FN = 4.80 T - 0.54 SN$$

$$FP_2O_5 = 7.74 T - 11.02 SP$$

$$FK_2O = 2.83 T - 0.38 SK$$

iv) rice (cv. CR 1014), 1987 in rice-jute sequence (1987-88)**Targeted Yield Equations**

$$FN = 4.32 T - 0.48 SN$$

$$FP_2O_5 = 3.39 T - 8.45 SP$$

$$FK_2O = 6.10 T - 1.21 SK$$

vi) Rice (cv. CR 1014), 1989**Targeted Yield Equations**

$$FN = 5.82 T - 0.41 SN$$

$$F P_2O_5 = 5.46T - 5.79 SP$$

$$F K_2O = 3.72 T - 0.44 SK$$

viii) Rice (cv. CR 1014), 1992 in Rice - Jute sequence (1992-93)**Targeted Yield Equations**

$$FN = 4.58T - 0.47 SN$$

$$FP_2O_5 = 3.39 T - 4.55 SP$$

$$FK_2O = 2.50 T - 0.32 SK$$

Hisar(Paddy-Paddy)

Fertilizer nitrogen required in the presence of residual green manure applied to preceding rice for wheat grain yield targets of 45 and 55 q/ha at different soil test values

Name of the Centre	: Hisar	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Paddy	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Table 11. Economics of target yield approach vis-à-vis farmers' practice for rice in frontline demonstrations

<i>Approach</i>	<i>Fertilizer N-P-K (kg ha⁻¹)</i>	<i>Yield (q ha⁻¹)</i>	<i>B/C (Rs/Re)</i>	<i>Net benefit (Rs/ha)</i>
FP	130-40-0	61.0	-	-
STRD	150-7-0	64.7	77	1347
70 q ha⁻¹	151-11-12	63.8	96	2386
80 q ha⁻¹	179-15-29	69.5	48	2821

Basic data of nutrient requirement (NR), kg/q, per cent contribution from soil (CS), per cent contribution from fertilizer (CF) and soil test based fertilizer adjustment equations for targeted yield of crops

Crop (Variety)	<u>Targeted Yield Equations*</u>	Response yardsticks (kg/kg)
1	5	6
Paddy (PR 106)	FN=3.70T-1.10 SN FP ₂ O ₅ =1.35T-2.66SP	15.0

Name of the Centre	: Hisar	Soil phosphorus range	:
Soil	: Sierozem (Inceptisols/Entisols)	Soil potassium range	:
Crop and variety	: Paddy (PR 106)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Targeted Yield Equations :

$$FN = 3.70T - 1.10 SN, \quad FP_2O_5 = 1.35T - 2.66 SP$$

Ready reckoner of soil test based fertilizer recommendations for paddy (PR 106) grain yield of 65, 70 and 75 q/ha

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	65	70	75		65	70	75
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	154	171	190	4	64	78	91
90	142	160	179	6	58	72	85
100	131	149	168	8	53	67	80
120	109	127	146	10	48	62	75
140	87	105	124	12	42	56	69
160	65	83	102	14	37	51	64
180	43	61	80	16	32	46	59
200	21	39	58	20	21	35	48
220	14	17	36	25	8	22	35
240	14	14	14	30	8	9	22

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 60 and 70 q/ha were achieved with $\pm 6.0\%$ deviations.

Applicability: These fertilizer adjustment equations will hold good throughout Haryana for high yielding varieties of dwarf paddy

Results of IPNS based follow up experiments (15) on targeted yield of paddy

Treatment	Yield (kg/ha)	Response yard stick (kg/kg)	Benefit / cost ratio (Rs/Re)	Per cent deviation
Control	2100-3500	-	-	-
F.P.	4035-5416	9.7-15.7	4.31-8.25	-
G.R.	5877-7355	16.1-21.7	5.15-11.01	-
TY-70	6500-7325	18.8-27.0	9.27-12.05	-7.1 to +4.6
TY-75	7053-7777	19.0-25.2	9.82-11.69	-6.0 to +3.7
TY-70 FYM	6516-7404	18.1-26.5	5.56-8.40	-6.9 to +5.4
TY-75 FYM	6975-7899	19.4-25.7	6.04-10.21	-7.0 to +5.3

Soil test values of the experimental fields before sowing of paddy in kharif 1999

Site No.	Soil test values (kg/ha)		
	N	P	K
1	112	15	340
2	105	8	360
3	105	17	280
4	119	12	300

Paddy yield in different treatments during kharif 1999 to 2001

Sr. No.	Treatment	Paddy yield (kg/ha)			
		Site-1	Site-2	Site-3	Site-4
Kharif 1999					
1.	F.P.	4174	3707	4762	3947
2.	TY-70	6683	7275	6883	6673
3.	TY-70 (15t FYM)	6641	7182	6749	6539
4.	TY-70 (7.5t FYM)	6565	7136	6915	6682
Kharif 2000					
1.	F.P.	3950	3540	4290	4050
2.	TY-70	6750	7050	7290	6790
3.	TY-70 (15t FYM)	6690	6890	7020	6600
4.	TY-70 (7.5t FYM)	6670	6990	6850	6620
Kharif 2001					
1.	F.P.	3850	4250	4590	4050
2.	TY-70	6850	6950	7500	6720
3.	TY-70 (15t FYM)	6700	6680	7450	6640
4.	TY-70 (7.5t FYM)	6900	6660	7390	6850

Results of demonstrations on soil test based fertilizer recommendations for yield targets of paddy (32 demonstrations)

Treatment	Paddy yield (kg/ha)		Per cent deviation
	Range	Mean	
GR	6000-7380	6730	-
TY-60	5700-6440	6260	-5.0 to +7.3
TY-70	6560-7420	7100	-6.3 to +6.0
TY-80	7320-8120	7640	-8.5 to -1.5

Upland Paddy (Without IPNS)

Maharashtra (Upland paddy)

Crop	: Upland Paddy (<i>Rabi</i>)	Soil Nitrogen range	: 100 – 200 kg ha ⁻¹
Variety	: R-24	Soil phosphorus range	: 6 – 16 kg ha ⁻¹
Soil	: Typic Haplustepts	Soil potassium range	: 200 – 700 kg ha ⁻¹
Situation	: Irrigated	FYM composition	:
Districts	: Kolhapur, Sangli, Satara	FYM rate	:
Season developed	: Rabi	Green manure composition	:
Target range	: 30 q ha ⁻¹ – 40 q ha ⁻¹	Green manure rate	:

Targeted Yield Equations

$$FN = 5.52 T - 0.54 SN, \quad FP_2O_5 = 2.19 T - 0.83 SP, \quad FK_2O = 2.37 T - 0.05 SK$$

Fertilizer prescription for targeted yields of upland paddy for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			30 q ha ⁻¹ target			40 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	112	61	61	167	82	84
120	8	300	101	59	56	156	81	79
140	10	400	90	57	51	145	79	74
160	12	500	80	55	46	134	77	69
180	14	600	68	54	41	123	76	64
200	16	700	57	52	36	112	74	59

Jharkhand

Crop : Paddy

A. Soil Type : Laterite Soil

Equations Valid for : All Districts of Jharkhand State having Laterite Soil

Targetted Yield Equations (Jharkhand State)

$$FN = 6.14 T - 0.55 SN, FP_2O = 2.83 T - 2.16 SP_2O_5, FK_2O = 3.73 T - 0.70 SK_2O$$

Pantanagar (Paddy)

Fertilizer adjustment equations of STCR experiments for different crops under IPNS

$$F N (N \text{ kg/ha}) = 5.72 \times YT (q/ha) - 1.01 SN - 0.95 FYM-N$$

$$F P (P \text{ kg/ha}) = 0.93 \times YT (q/ha) - 0.72 SP - 0.23 FYM-P$$

$$F K (K \text{ kg/ha}) = 1.15 \times YT (q/ha) - 0.20 SP - 0.30 FYM-K$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
KmnO ₄ N	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	103.8	162.1	34.2
125	13	125	94.6	148.6	29.1
150	15	150	85.3	139.6	23.9
175	18	175	76.1	126.0	18.8
200	20	200	66.8	117.0	13.6
225	23	225	57.6	103.5	8.5
250	25	250	48.3	194.5	3.3
275	28	275	39.1	80.9	2.0
300	30	300	29.8	71.9	2.0
325	33	325	20.6	58.4	2.0
350	35	350	11.3	49.4	2.0
375	38	375	2.1	35.8	2.0
400	40	400	2.0	26.8	2.0

Economics of verification trial for Paddy (PD-4)

Treatments	Fertilizer dose N-P-K-FYM (kg ha ⁻¹)	Actual mean Yield (t ha ⁻¹)	Additional yield (t ha ⁻¹)	Value of additional yield (Rs.)	Cost of fertilizer (Rs.)	Net benefit (Rs.)	B/C ratio	Response ratio	Yield deviation (%)
Farmer's Practice (T₁)	150-20-20	4813	-	-	-	-	-	-	-
GRD (T₂)	150-60-40	5583	770	6163	2968.20	3194.50	1.1	3.1	-
Target 50 t ha⁻¹ (T₃)	39-19-25	4947	134	1069	940.80	128.50	0.1	1.6	-1.1
Target 55 t ha⁻¹ (T₄)	61-30-32	5473	660	5283	1423.10	3859.50	2.7	5.4	-0.5

Rate N 10.5, P₂O₅ 18.5 and K₂O 7.08 Rs kg⁻¹. Paddy grain Rs 800 q⁻¹

Madhya Pradesh (Rice)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 4.25 T - 0.45 SN$$

$$FP_2O_5 = 3.55 T - 4.89 SP$$

$$FK_2O = 2.1 T - 0.18 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)	
	35	40		35	40		35	40
100	104	125	5	100	118	200	38	48
150	81	102	10	75	95	250	29	39
200	89	80	15	51	69	300	20	30
250	36	60	20	26	44	350	11	21
300	14	35	25	-	20	400	-	12

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur, Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.

Rice

Bhubneswer (Rice)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Rice (Lalat)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 8.4 T - 1.4 SN, \quad FP_2O_5 = 5.0 T - 3.1 SP, \quad FK_2O = 6.6 T - 1.5 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	40 (q ha ⁻¹)			45 (q ha ⁻¹)			50 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	30	80	196	107	144	238	132	177	280	157	186
120	35	100	168	92	114	210	114	147	252	141	156
140	40	120	140	76	84	182	101	117	224	126	126
160	45	140	112	60	54	154	85	87	196	110	96
180	50	160	84	45	14	126	70	57	168	95	66
200	55	180	56	30	10	98	54	10	140	79	36
220	60	200	28	14	10	70	39	10	112	64	10
230	65	220	14	10	10	56	23	10	98	48	10
240	70	250	10	10	10	42	10	10	84	33	10
250	80	300	10	10	10	28	10	10	70	10	10

(NB : when the calculated fertilizer requirement values are almost zero, a minimum dose, say 20 kg ha⁻¹ for N and 10 kg ha⁻¹ each for P and K are added to the calculated values to bring the dose to a reasonable one).

Wheat

Karnataka (Wheat)

Crop	: Karnataka	Soil Nitrogen range	:
Variety	: Wheat (Keerthi)	Soil phosphorus range	:
Soil	: Black Clayey	Soil potassium range	:
Situation	:	FYM composition	:
Season developed	: Rabi	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
		Green manure rate	:

Applicability : Tungabhadra Command Area of Bellary and Raichur districts.

Target yield equations :

F.N. = 6.61 T- 28.29 SN (OC%), F.P₂O₅ = 5.2 T- 1.28 SP₂O₅ (Olsen's - P₂O₅)

F.K₂O = 4.54 T- 0.06 SK₂O NH₄OAC - K₂O)

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.1	77	1	61	250	40
0.2	74	3	59	300	37
0.3	71	5	56	350	34
0.4	68	7	53	400	31
0.5	65	9	51	450	28
0.6	62	11	48	500	25
0.7	60	13	46	550	22
0.8	57	15	43	600	19
0.9	54	17	41	650	16
1.00	51	19	38	700	13
1.10	48	21	36	750	10
1.20	45	23	33		
1.30	43	25	30		

To increase or decrease the yield target by one q/acre The variations to be made in the fertilizer recommendations are as follows:

N = ± 6.5 kg/acre P₂O₅ = ± 5.25 kg/acre K₂O = ± 4.5 kg/acre

Ludhiana (Wheat)

Crop	: Ludhiana	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations for targeted yield of wheat involving residual effect of farmyard manure (FYM) in the presence of added inorganic fertilizers

Fertilizer adjustment equation	
<i>Without Residual FYM</i>	<i>With Residual FYM</i>
FN= 4.827 T-0.65 SN	FN = 5.35 T – 0.72 SN- 0.28 FYM_N
FP ₂ O ₅ = 2.07 T-0.82 SP	
FK ₂ O = 0.93 T – 0.11 SK	

SN, SP and SK indicate KMnO₄ oxidisable N, Olsen extractable P and AmOAC extractable K in soil (kg ha⁻¹); FYM_N represents the total amount of N (kg ha⁻¹) added through FYM

Basic parameters and fertilizer adjustment equations for targeted yield of wheat involving residual effect of press mud in the presence of added inorganic fertilizers

Fertilizer adjustment equation	
<i>Without Residual FYM</i>	<i>With Residual FYM</i>
FN=3.98 T-0.55 SN	FN = 3.41 T – 0.47 SN- 0.28 PM_N
FP ₂ O ₅ = 2.00 T-0.92 SP	FP ₂ O ₅ =2.13 T- 0.73 SP – 0.35 PM_P
FK ₂ O = 2.02 T – 0.23 SK	FK ₂ O = 1.80 T- 0.30 SK- 0.22 PM_K

SN, SP and SK indicate KMnO₄ oxidisable N, Olsen extractable P and AmOAC extractable K in soil (kg ha⁻¹); PM_N, PM_P and PM_K represent the total amount of N, P & K (kg ha⁻¹), respectively added through pressmud

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of		
Kmn O ₄ N	Olsens' P	Amm. Ac-K	45 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O
75	10	10	162	89	61
100	13	20	153	80	47
125	16	30	144	71	33
150	19	40	134	62	19
175	22	50	125	53	5
200	25	60	116	44	5
225	28	70	106	35	5
250	31	80	97	26	5
275	34	100	88	17	5
300	37	110	78	8	5
325	40	120	69	5	5
350	43	130	59	5	5
375	44	140	50	5	5

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Fertilizer nutrient required (kg ha ⁻¹) for yield target of		Fertilizer nutrient required (kg ha ⁻¹) for yield target of	
Kmn O ₄ N	Olsens' P	55 (q ha ⁻¹)	
		N	P ₂ O ₅
80	10	203	115
120	15	188	100
160	20	173	85
200	25	158	70
240	30	143	55
280	35	128	40
320	40	113	25
360	45	98	11
400	50	83	0
440	55	68	0

Economics of fertilizer use for yield targets of wheat at farmers' fields

Treatment	Fertilizer kg/ha			Grain yield (kg/ha)	Increase over farmer's practice	
	N	P ₂ O ₅	K ₂ O		Benefit (Rs/ha)	B/C (Rs/Re)
Farmers Practice	149	66.4	3.8	4470	-	-
STRD	128	44.4	14.8	4716	3321	8.8
Target 45 q ha ⁻¹	141	48.7	0.9	4728	3728	6.7
Target 55 q ha ⁻¹	179	66.1	1.5	5160	5375	4.8

Fertilizer nitrogen required in the presence of residual FYM applied to preceding rice for wheat grain yield targets of 45 and 55 q ha⁻¹ at different soil test values

Fertilizer nutrient required (kg ha ⁻¹) for yield target of 45		Fertilizer nutrient required (kg ha ⁻¹) for yield target of 55 (q ha ⁻¹)	
Kmn O ₄ N	N	Kmn O ₄ N	N
80	145	80	188
120	127	120	170
160	109	160	152
200	91	200	134
240	73	240	116
280	55	280	98
320	37	320	80
360	19	360	62
400	1	400	44
440	1	440	26

Hisar (Wheat)

Crop	: Hisar	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Optimum nutrient dose, optimum yield and response yardstick of different crops at average soil test values of N and P

Crop (Variety)	Optimum nutrient dose (kg/ha)		Optimum yield (kg/ha)	Response yardstick (kg/kg)	R ² value
	N	P ₂ O ₅			
Wheat (WH-283)	141	76	5165	12.0	0.97
Wheat (WH-542)	161	69	5210	12.8	0.93
Wheat (PBW-343)	163	71	5013	10.8	0.90

Crop (Variety)	Targeted yield equations*	Response yardsticks (kg/kg)
1	5	6
Wheat (HD 2329)	FN=5.29 T-1.14 SN FP ₂ O ₅ =2.34 T-3.36 SP	9.9
Wheat (WH 542)	FN=5.65 T-1.34 SN FP ₂ O ₅ =1.91T-2.19SP	12.8

Targeted yield equations :

FN =5.22T-1.04SN-0.12 FYM (N), FP₂O₅ = 2.38T-4.06 SP – 0.14 FYM (P₂O₅)

Ready reckoner of soil test based fertilizer recommendations for 45, 50 and 55 q/ha grain yield of wheat (WH 711)

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	45	50	55		45	50	55
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertilizer P ₂ O ₅ , kg/ha)		
80	152	178	204	4	91	103	115
90	141	167	193	6	83	95	107
100	131	157	183	8	75	87	98
110	121	147	173	10	66	78	90
120	110	136	162	12	58	70	82
140	89	115	142	14	50	62	74
160	69	95	121	16	42	54	66
180	48	74	100	20	26	38	50
200	27	53	79	24	10	22	33
220	6	32	58	28	2	6	17
240	6	12	38	32	2	2	2

*SN and SP are soil available N and P (kg/ha), respectively; T = Yield target (q/ha)

FYM(N) and FYM(P₂O₅) are N and P₂O₅ (kg/ha), respectively in applied FYM

Note : The dose of fertilizer N and P₂O₅ be reduced by 1.25 and 1.00 kg/ha, respectively, from above fertilizer doses for each ton of applied FYM/compost.

Crop	: Hisar	Soil Nitrogen range	:
Variety	: Wheat (WH 542)	Soil phosphorus range	:
Soil	: Sierozem	Soil potassium range	:
	(Inceptisols/Entisols)	FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targeted yield equations used:

$$FN = 5.65T - 1.34 SN, \quad FP_2O_5 = 1.91T - 2.19 SP$$

Ready reckoner of soil test based fertilizer recommendations for wheat (WH 542) grain yield of 45, 50 and 55 q/ha

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	45	50	55		45	50	55
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	147	175	204	4	77	87	96
90	133	161	190	6	73	82	92
100	120	148	177	8	68	78	87
120	93	121	150	10	64	74	83

140	66	97	123	12	60	69	79
160	39	67	96	14	55	65	74
180	14	41	70	16	51	60	80
200	14	14	42	20	42	52	61
220	14	14	15	25	31	41	50
240	14	14	14	30	20	30	39

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 45 and 50 q/ha were achieved with -5.0 to +4.4% deviations.

Applicability: These fertilizer adjustment equations will hold good throughout Haryana for high yielding varieties of wheat

Crop	: Ludhiana	Soil Nitrogen range	:
Variety	: Durum wheat (WH 896)	Soil phosphorus range	:
Soil	: Sierozem	Soil potassium range	:
	(Inceptisols/Entisols)	FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targeted yield equations used:

$$FN = 6.08T - 1.19 SN, \quad FP_2O_5 = 2.58T - 3.68 SP$$

Ready reckoner of soil test based fertilizer recommendations for durum wheat (WH 896) grain yield of 35, 40 and 45 q/ha

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	35	40	45		35	40	45
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	118	148	178	4	76	89	101
90	106	136	167	6	68	81	94
100	94	124	155	8	61	74	87
120	70	100	131	10	53	66	79
140	46	77	107	12	46	59	72
160	22	53	83	14	39	52	64
180	6	29	59	16	31	44	57
200	6	6	36	20	17	30	43
220	6	6	12	25	6	11	24
240	6	6	6	30	6	6	6

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 35, 40 and 45q/ha were achieved with $\pm 5.5\%$ deviations.

Applicability: These fertilizer adjustment equations will hold good throughout Haryana for high yielding varieties of durum wheat

Crop (Variety)	Targeted yield equation*
Wheat (WH 711)	FN = 5.22T-1.04SN-0.12 FYM (N) F P ₂ O ₅ =2.38T-4.06SP-0.14 FYM (P ₂ O ₅)
Wheat (PBW 343)	FN = 5.55T-0.95SN-0.16 FYM (N) F P ₂ O ₅ =2.07T-3.04SP-0.15 FYM (P ₂ O ₅)
Wheat (UP2338)	FN = 4.89T-0.92SN-0.13 FYM (N) F P ₂ O ₅ =2.72T-3.96SP-0.19 FYM (P ₂ O ₅)

Ready reckoner of soil test based fertilizer recommendations for 40, 45 and 50 q/ha grain yield of durum wheat (WH 912)

Targeted yield equations : FN = 5.57T-1.04SN-0.15 FYM (N)*
FP₂O₅ = 2.12T-2.68 SP – 0.16 FYM (P₂O₅)

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	40	45	50		40	45	50
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertilizer P ₂ O ₅ , kg/ha)		
80	140	168	196	4	74	85	96
90	129	157	185	6	69	79	90
100	119	147	175	8	63	74	85
110	108	136	164	10	58	69	79
120	98	126	154	12	53	63	74
140	77	105	133	14	47	58	68
160	56	84	112	16	42	53	63
180	36	64	92	20	31	42	52
200	15	43	71	24	21	31	42
220	15	22	50	28	10	20	31
240	15	15	29	32	10	10	20

*SN and SP are soil available N and P (kg/ha), respectively; T = Yield target (q/ha)

FYM(N) and FYM(P₂O₅) are N and P₂O₅ (kg/ha), respectively in applied FYM

Note : The dose of fertilizer N and P₂O₅ be reduced by 1.50 and 1.25 kg/ha, respectively, from above fertilizer doses for each ton of applied FYM/compost.

Maharashtra (Wheat)

Crop	: Maharashtra	Soil Nitrogen range	:
Variety	: Wheat (HD-2189)	Soil phosphorus range	:
Soil	: Vertic Haplustepts	Soil potassium range	:
Situation	: Irrigated	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Districts	: Ahmednagar, Pune, Jalgaon, Nasik, Aurangabad, Parbhani, Jalna, Akola, Buldhana, Wardha, Yawatmal, Satara, Sangli, Kolhapur, Dhule, Nandurbar.		

Targeted Yield Equations

$$FN = 7.54 T - 0.74 SN, \quad FP_2O_5 = 1.90 T - 2.88 SP, \quad FK_2O = 2.49 T - 0.22 SK$$

Fertilizer prescription for targeted yields of wheat for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			40 q ha ⁻¹ target			50 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	250	237	59	45	303	78	69
120	8	275	222	53	40	288	72	64
140	10	300	207	47	34	273	66	58
160	12	325	193	41	29	259	60	53
180	14	350	178	36	23	244	55	47
200	16	375	163	30	18	229	49	42
220	18	400	149	25*	25*	214	43	36
240	20	425	133	25*	25*	199	37	31
260	22	450	118	25*	25*	185	32	25
280	24	475	103	25*	25*	170	26	20
300	26	500	80	25*	25*	155	20	15

Fertilizer prescription equations for soybean – wheat cropping system with and without FYM

Soybean	
Chemical fertilizer only	Chemical fertilizer + FYM
FN = 6.86 T – 0.68 SN	FN = 3.97 T – 0.39 SN – 0.09 FYM
FP ₂ O ₅ = 6.17 T – 4.46 SP	FP ₂ O ₅ = 4.14 T – 2.95 SP – 1.5 FYM
FK ₂ O = 3.96 T – 0.13 SK	FK ₂ O = 3.47 T – 0.11 SK – 0.27 FYM
Wheat	
Chemical fertilizer only	Chemical fertilizer + FYM
FN = 4.63 T – 0.35 SN	FN = 4.24 T – 0.32 N – 2.08 FYM
FP ₂ O ₅ = 2.38 T – 2.46 SP	FP ₂ O ₅ = 1.72 T – 1.78 SP – 1.93 FYM
FK ₂ O = 2.85 T – 0.14 SK	FK ₂ O = 2.12 T – 0.10 SK – 0.21 FYM

Yield Targeting in wheat with IPNS, PDCO (Av. of 2 trials)

Madhya Pradesh (Soybean)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 5.19 T - 0.48 SN$$

$$FP_2O_5 = 5.2 T - 4.1 SP$$

$$FK_2O = 3.9 T - 0.22 SK$$

SP =
Soil – P
(kg ha⁻¹)

FP₂O₅ = Fert. P
(kg ha⁻¹)

T =Yield Target
(q ha⁻¹)

SK= Soil –
K
(kg ha⁻¹)

FK₂O =Fert. K
(kg ha⁻¹)

T=Yield Target (q ha⁻¹)

	20	25		20	25
5	83	109	200	34	53
10	63	89	250	23	42
15	42	68	300	12	31

20	22	48	350	20
25	-	27	400	9

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.Chindwara .

New Delhi (Wheat)

Name of the Centre	: New Delhi	Soil phosphorus range	:
Soil	: Typic hapusttept (Alluvial)	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equatins for targeted yield of crps in NCR of Delhi	
With FYM	Without FYM
$FN = 3.85 T - 0.41 SN - 1.64 FYM,$ $FP_2O_5 = 2.78 T - 4.12 SP - 1.72 FYM$ $FK_2O = 2.04 T - 0.29 SK - 0.88 FYM$	$FN = 5.31 T - 0.51 SN,$ $FP_2O_5 = 3.45 T - 5.55 SP,$ $FK_2O = 2.75 T - 0.32 SK$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Wheat FYM 10t ha⁻¹

Initial soil tests (kg ha⁻¹)			Nutrient added (kg ha⁻¹) for an yield target of 40 q ha⁻¹			Nutrient added (kg ha⁻¹) for an yield target of 40 q ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
100	10	100	135	80	65	175	110	85
125	13	125	125	70	55	165	100	75
150	15	150	115	60	50	155	90	70
175	18	175	105	50	40	145	80	65
200	20	200	95	40	35	135	65	55
225	23	225	85	30	30	120	55	50
250	25	250	75	20	20	110	45	40
275	28	275	65	10*	15	100	35	35
300	30	300	55	10*	10*	90	25	25
325	33	325	45	10*	10*	80	15	20
350	36	350	35	10*	10*	70	10*	10*
375	38	375	20	10*	10*	60	10*	10*

*maintainace dose

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Wheat

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	215	115	105	250	120	120
125	13	125	200	100	100	250	120	120
150	15	150	190	90	90	245	120	120
175	18	175	175	75	80	230	110	110
200	20	200	165	60	75	215	95	100
225	23	225	150	50	65	205	85	95
250	25	250	140	35	60	190	70	85
275	28	275	125	20	50	180	55	80
300	30	300	110	10	40	165	40	70
325	33	325	100	10	35	155	25	60
350	36	350	85	10	25	140	15	55
375	38	375	75	10	20	130	15	45

Results of frontline demonstrations conducted at farmers' fields in NCR Delhi

Fertilizer nutrient dose (kg ha ⁻¹)			Treat-ment	Yield Obtain ed (q ha ⁻¹)	Extra yield (q ha ⁻¹)	Cost of extra yield (Rs.ha ⁻¹)	Cost of fertilize r (Rs.ha ⁻¹)	Response ratio kg grain kg ⁻¹ nutrient	Net profit (Rs. ha ⁻¹)
N	P ₂ O ₅	K ₂ O							
Wheat (<i>Kundan</i>) Year : 1997-98									
0	0	0	C	19.2	-				
114	34	55	T ₅₀	49.0	29.8	23840	2542	14.7	21298
120	60	40	Gen	47.5	28.3	22640	2860	12.8	19780
80	57	0	FP	41.2	22.0	17600	1895	15.9	15705
Wheat (<i>HD-2285</i>) Year :1997-98									
0	0	0	C	18.5	-				
131	56	67	T ₅₀	52.2	33.7	26960	3213	13.3	23747
120	60	40	Gen	46.0	27.5	22000	2860	12.5	19140
80	57	0	FP	38.5	20.0	16000	1895	14.6	14105
Wheat (<i>HD-2643</i>) Year : 1998-99									
0	0	0	C	22.0	-				
131	22	56	T ₅₀	52.7	30.7	24560	2593	14.7	21967
120	60	40	Gen	47.5	25.5	20400	2860	11.6	17540
80	57	0	FP	38.6	16.6	13280	1895	12.1	11385

Wheat (HD-2643) Year : 1998-99									
0	0	0	C	18.2	-				
107	76	64	T ₅₀	49.6	31.4	25120	3171	12.7	21949
120	60	40	Gen	44.3	26.1	20880	2860	11.9	18020
80	57	0	FP	36.0	17.8	14240	1895	13.0	12345
Wheat (HD-2380) Year : 1999-00									
0	0	0	C	21.2	-				
129	17	67	T ₅₀	54.2	33.0	26400	2602	15.5	23798
120	60	40	Gen	49.6	28.4	22720	2860	11.7	19860
80	57	0	FP	38.5	17.3	13840	1895	12.6	11945
Wheat (HD-2380) Year : 1999-00									
0	0	0	C	18.0	-				
109	77	51	T ₅₀	48.8	30.8	24640	3082	13.0	21558
120	60	40	Gen	44.0	26.0	20800	2860	11.8	17940
80	57	0	FP	34.2	16.2	12960	1895	11.8	11065
Wheat (HD-2687) Year : 2000-01									
0	0	0	C	18.0	-				
134	22	87	T ₅₀	53.5	35.5	28400	2942	15.9	25458
120	60	40	Gen	48.0	30.0	24000	2860	13.6	21140
80	57	0	FP	39.0	21.0	16800	1895	15.3	14905
Wheat (HD-2687) Year : 2002-03									
0	0	0	C	18.6	-				
138	34	0	T ₅₀	52.0	33.4	26720	2304	19.9	24416
120	60	40	Gen	49.2	30.6	24480	2860	13.9	21620
80	57	0	FP	41.3	22.7	18160	1895	16.6	16265
Wheat (HD-2687) Year : 2002-03									
0	0	0	C	20.2	-				
123	70	0	T ₅₀	53.8	33.6	26880	2649	17.4	24231
120	60	40	Gen	50.6	30.4	24320	2860	13.8	21460
80	57	0	FP	40.6	20.4	16320	1895	14.9	14425
Farmer : Shri Ranbir Singh Village : Dhulsiras									
Wheat (HD-2687) Year : 2003-04									
0	0	0	C	20.8	-				
145	10	74	T ₅₀	53.4	32.6	26080	2775	14.2	23305
120	60	40	Gen	46.3	25.5	20400	2860	11.6	17540
80	57	0	FP	38.3	17.5	14000	1895	12.8	12105
Farmer : Shri Suraj Bhan Village : Dhulsiras									
Wheat (HD-2687) Year : 2003-04									
0	0	0	C	17.2	-				
140	82	14	T ₅₀	51.0	33.8	27040	3190	14.3	23850
120	60	40	Gen	44.2	27.0	21600	2860	12.3	18740
80	57	0	FP	36.1	18.9	15120	1895	13.3	13225

Farmer: Shri Teeka Ram;					Village : Shikarpur				
Wheat (HD-2733)					Year : 2004-05				
0	0	0	C	16.0					
145	22	27	T₅₀	48.7	32.7	22890	2985	13.4	19905
120	60	40	Gen	44.2	28.2	19740	2860	12.8	16880
80	57	0	FP	37.4	21.4	14980	1895	15.6	13085
Farmer: Shri Shrikishan					Village : Chhawala				
Wheat (PBH-343)					Year : 2005-06				
0	0	0	16.0						
142	16	72	T₅₀	47.6	31.6	22120	2806	14.2	19314
120	60	40	Gen	43.2	27.2	19040	2860	12.8	16180
80	57	0	FP	34.1	18.1	12670	1895	13.2	10775

Palampur (Wheat)

Crop : Palampur

Variety :

Soil :

Situation :

Districts :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :



Plate 21. Wheat crop at L₁ level of fertility gradient (N-300, P₂O₅-600 and K₂O-300 kg/ha⁻¹)

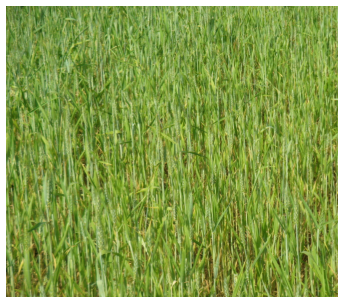


Plate 20. Wheat crop at L_{1/2} level of fertility gradient (N-150, P₂O₅-300 and K₂O-150 kg/ha⁻¹)



Plate 20. Wheat crop at L_{1/2} level of fertility gradient (N-150, P₂O₅-300 and K₂O-150 kg/ha⁻¹)

Fertilizer adjustment equation:

$$FN = 3.26 T - 0.20SN, \quad FP_2O_5 = 5.47 T - 4.72 SP, \quad FK_2O = 3.28T - 0.48 SK$$

Ready reckoner for soil test based fertilizer recommendations for yield target of 40 qha⁻¹ wheat (Mid hills sub humid zone)

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	70	195	107
350	10	75	60	172	95
400	15	100	50	148	83
450	20	125	40	124	71
500	25	150	30	101	59
550	30	175	20	77	47
600	35	200	10	54	35
650	40	225	0	30	23
700	50	250	0	0	11

Fertilizer adjustment equations

F N = 5.88 T - 0.23SN - 0.93ON, F P₂O₅ = 4.87 T - 1.22 SP - 0.81OP, F K₂O = 3.66 T - 0.49 SK - 0.51OK

IPNS based fertilizer doses at different soil test values for important crops

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Crop: Wheat			Yield Target: 40 qha ⁻¹		
300	10	120	80	134	66
400	15	170	55	132	58
500	20	220	30	130	51
<i>If FYM with 10, 0.50, 0.25 and 0.50 % moisture, N, P₂O₅ and K₂O is applied at the rate of 12.5 t ha⁻¹.</i>					

Validation of fertilizer adjustment equations of wheat on farmers' fields (average of 46 experiments) in mid hills wet temperate zone (1985-86 to 2000-01)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	B:C ratio
	N	P ₂ O ₅	K ₂ O			
Control	0	0	0	1330	-	-
Farmers' practice	30	0	0	1559	-	-
State level dose	120	90	30	2621	-	3.2
Soil Test based	115	72	34	2586	-	4.1
Target (kg ha ⁻¹) based						
2500	36	51	10	2516	+0.1	9.2
3500	67	89	26	3499	-0.1	6.1
4000	91	121	36	3831	-4.2	5.6
5000	161	153	62	4481	-10.4	4.6

Pusa (Wheat)

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$$FN = 5.95 T - 0.43 SN, \quad FP_2O_5 = 3.03 T - 1.34SP_2O_5, \quad FK_2O = 3.16 T - 0.73 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	127	86	51	186	116	83
130	6	70	123	83	44	182	113	75
140	8	80	118	80	36	178	110	68
150	10	90	114	78	29	174	108	61
160	12	100	110	75	22	169	105	53
170	14	110	105	72	15	165	102	46
180	16	120	101	69	10	161	100	39
190	18	130	97	67	10	156	97	32
200	20	140	93	64	10	152	94	24
210	22	150	88	61	10	148	92	17
220	24	160	84	59	10	143	89	10
230	26	170	80	56	10	139	86	10
240	28	180	75	53	10	135	84	10
250	30	190	71	51	10	131	81	10
260	32	200	67	48	10	126	78	10
270	34	210	62	45	10	122	76	10
280	36	220	58	43	10	118	73	10
290	38	230	54	40	10	113	70	10
300	40	240	50	37	10	109	68	10
310	42	250	45	35	10	105	65	10
320	44	260	41	32	10	100	62	10
330	46	270	37	29	10	96	60	10
340	48	280	32	27	10	92	57	10
350	50	290	30	24	10	88	54	10
360	52	300	30	21	10	83	52	10
370	54	310	30	19	10	79	49	10
380	56	320	30	16	10	75	46	10
390	58	330	30	13	10	70	43	10
400	60	340	30	11	10	66	41	10

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

FN = 6.05 T – 0.30 SN, FP₂O₅ = 4.27 T – 3.39 SP₂O₅,

FK₂O = 10.02 T – 3.30 SK₂O, FZn = 0.38 T – 7.14 SZn

*g/q of grain production

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)				Fertilizer Nutrients Required (kg/ha) for Yield Target of							
				30 q/ha				40 q/ha			
N	P ₂ O ₅	K ₂ O	Zn (ppm)	N	P ₂ O ₅	K ₂ O	Zn	N	P ₂ O ₅	K ₂ O	Zn
120	4	60	0.4	146	115	103	9	206	157	203	12.3
130	6	70	0.5	143	108	70	8	203	150	170	11.6
140	8	80	0.6	140	101	37	7	200	144	137	10.9
150	10	90	0.7	137	94	10	6	197	137	104	10.2
160	12	100	0.8	134	87	10	6	194	130	71	9.5
170	14	110	0.9	131	81	10	5	191	123	38	8.8
180	16	120	1	128	74	10	4	188	117	10	8.1
190	18	130	1.1	125	67	10	4	185	110	10	7.3
200	20	140	1.2	122	60	10	3	182	103	10	6.6
210	22	150	1.3	119	54	10	2	179	96	10	5.9
220	24	160	1.4	116	47	10	1	176	89	10	5.2
230	26	170	1.5	113	40	10	1	173	83	10	4.5
240	28	180	1.6	110	33	10	0	170	76	10	3.8
250	30	190	1.7	107	26	10	0	167	69	10	3.1
260	32	200	1.8	104	20	10	0	164	62	10	2.3
270	34	210	1.9	101	13	10	0	161	56	10	1.6
280	36	220	2	98	10	10	0	158	49	10	0.9
290	38	230	2.1	95	10	10	0	155	42	10	0.2
300	40	240	2.2	92	10	10	0	152	35	10	0
310	42	250	2.3	89	10	10	0	149	28	10	0
320	44	260	2.4	86	10	10	0	146	22	10	0
330	46	270	2.5	83	10	10	0	143	15	10	0
340	48	280	2.6	80	10	10	0	140	10	10	0
350	50	290	2.7	77	10	10	0	137	10	10	0
360	52	300	2.8	74	10	10	0	134	10	10	0
370	54	310	2.9	71	10	10	0	131	10	10	0
380	56	320	3	68	10	10	0	128	10	10	0
390	58	330	3.1	65	10	10	0	125	10	10	0
400	60	340	3.2	62	10	10	0	122	10	10	0

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$FN = 6.67 T - 0.43 SN - 0.52CN$, $FP_2O_5 = 3.84 T - 3.43 SP_2O_5 - 0.85 CP_2O_5$ $FK_2O = 3.54 T - 0.74 SK_2O - 0.27CK_2O$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without compost

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	149	101	62	215	140	97
130	6	70	144	95	54	211	133	90
140	8	80	140	88	47	207	126	82
150	10	90	136	81	40	202	119	75
160	12	100	131	74	32	198	112	68
170	14	110	127	67	25	194	106	60
180	16	120	123	60	17	189	99	53
190	18	130	118	53	10	185	92	45
200	20	140	114	47	10	181	85	38
210	22	150	110	40	10	177	78	31
220	24	160	106	33	10	172	71	23
230	26	170	101	26	10	168	64	16
240	28	180	97	19	10	164	58	10
250	30	190	93	12	10	159	51	10
260	32	200	88	10	10	155	44	10
270	34	210	84	10	10	151	37	10
280	36	220	80	10	10	146	30	10
290	38	230	75	10	10	142	23	10
300	40	240	71	10	10	138	16	10
310	42	250	67	10	10	134	10	10
320	44	260	63	10	10	129	10	10
330	46	270	58	10	10	125	10	10
340	48	280	54	10	10	121	10	10
350	50	290	50	10	10	116	10	10
360	52	300	45	10	10	112	10	10
370	54	310	41	10	10	108	10	10
380	56	320	37	10	10	103	10	10
390	58	330	32	10	10	99	10	10
400	60	340	30	10	10	95	10	10
Reduction in Fertilizer recommendation with the application of compost (N -0.55, P₂O₅- 0.25 & K₂O- 0.67 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	3	6	9	11	14	17	23	29
P ₂ O ₅	2	4	6	9	11	13	17	21
K ₂ O	2	4	5	7	9	11	14	18

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$FN = 5.08 T - 0.29 SN - 0.63CN$, $FP_2O_5 = 2.81 T - 1.50 SP_2O_5 - 0.79 CP_2O_5$ $FK_2O = 3.41 T - 0.52 SK_2O - 0.67CK_2O$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without Biogas slurry

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	118	78	71	168	106	105
130	6	70	115	75	66	166	103	100
140	8	80	112	72	61	163	100	95
150	10	90	109	69	56	160	97	90
160	12	100	106	66	50	157	94	84
170	14	110	103	63	45	154	91	79
180	16	120	100	60	40	151	88	74
190	18	130	97	57	35	148	85	69
200	20	140	94	54	30	145	82	64
210	22	150	92	51	24	142	79	58
220	24	160	89	48	19	139	76	53
230	26	170	86	45	14	137	73	48
240	28	180	83	42	10	134	70	43
250	30	190	80	39	10	131	67	38
260	32	200	77	36	10	128	64	32
270	34	210	74	33	10	125	61	27
280	36	220	71	30	10	122	58	22
290	38	230	68	27	10	119	55	17
300	40	240	65	24	10	116	52	12
310	42	250	63	21	10	113	49	10
320	44	260	60	18	10	110	46	10
330	46	270	57	15	10	108	43	10
340	48	280	54	12	10	105	40	10
350	50	290	51	10	10	102	37	10
360	52	300	48	10	10	99	34	10
370	54	310	45	10	10	96	31	10
380	56	320	42	10	10	93	28	10
390	58	330	39	10	10	90	25	10
400	60	340	36	10	10	87	22	10
Reduction in Fertilizer recommendation with the application of biogas slurry (N -0.93, P2O5- 0.45 & K2O- 0.55 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	6	12	18	24	30	36	48	60
P ₂ O ₅	4	7	11	14	18	21	28	36
K ₂ O	4	7	11	15	18	22	29	37

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$$FN = 5.85 T - 0.40 SN - 0.46CN, \quad FP_2O_5 = 3.72 T - 2.02 SP_2O_5 - 0.44 CP_2O_5$$

$$FK_2O = 3.96 T - 0.56 SK_2O - 0.82CK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without Poultry manure

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	128	104	85	186	141	125
130	6	70	124	99	80	182	137	119
140	8	80	120	95	74	178	133	114
150	10	90	116	91	68	174	129	108
160	12	100	112	87	63	170	125	102
170	14	110	108	83	57	166	121	97
180	16	120	104	79	52	162	116	91
190	18	130	100	75	46	158	112	86
200	20	140	96	71	40	154	108	80
210	22	150	92	67	35	150	104	74
220	24	160	88	63	29	146	100	69
230	26	170	84	59	24	142	96	63
240	28	180	80	55	18	138	92	58
250	30	190	76	51	12	134	88	52
260	32	200	72	47	10	130	84	46
270	34	210	68	43	10	126	80	41
280	36	220	64	39	10	122	76	35
290	38	230	60	35	10	118	72	30
300	40	240	56	31	10	114	68	24
310	42	250	52	27	10	110	64	18
320	44	260	48	23	10	106	60	13
330	46	270	44	19	10	102	56	10
340	48	280	40	15	10	98	52	10
350	50	290	36	11	10	94	48	10
360	52	300	32	10	10	90	44	10
370	54	310	30	10	10	86	40	10
380	56	320	30	10	10	82	36	10
390	58	330	30	10	10	78	32	10
400	60	340	30	10	10	74	28	10
Reduction in Fertilizer recommendation with the application of poultry man. (N -1.47, P2O5- 1.93 & K2O- 1.15 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	7	15	22	30	37	45	60	75
P ₂ O ₅	5	11	16	21	26	32	42	53
K ₂ O	6	11	17	23	29	34	46	57

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

FN = 5.12 T – 0.36 SN - 0.74CN, FP₂O₅ = 3.42 T – 4.24 SP₂O₅-1.76 CP₂O₅

FK₂O = 2.50 T – 0.69 SK₂O - 2.02 CK₂O

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without Rap seed Oil Cake

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	110	86	34	162	120	59
130	6	70	107	77	27	158	111	52
140	8	80	103	69	20	154	103	45
150	10	90	100	60	13	151	94	38
160	12	100	96	52	10	147	86	31
170	14	110	92	43	10	144	77	24
180	16	120	89	35	10	140	69	17
190	18	130	85	26	10	136	60	10
200	20	140	82	18	10	133	52	10
210	22	150	78	10	10	129	44	10
220	24	160	74	10	10	126	35	10
230	26	170	71	10	10	122	27	10
240	28	180	67	10	10	118	18	10
250	30	190	64	10	10	115	10	10
260	32	200	60	10	10	111	10	10
270	34	210	56	10	10	108	10	10
280	36	220	53	10	10	104	10	10
290	38	230	49	10	10	100	10	10
300	40	240	46	10	10	97	10	10
310	42	250	42	10	10	93	10	10
320	44	260	38	10	10	90	10	10
330	46	270	35	10	10	86	10	10
340	48	280	31	10	10	82	10	10
350	50	290	30	10	10	79	10	10
360	52	300	30	10	10	75	10	10
370	54	310	30	10	10	72	10	10
380	56	320	30	10	10	68	10	10
390	58	330	30	10	10	64	10	10
400	60	340	30	10	10	61	10	10
Reduction in Fertilizer recommendation with the application of oil cakes (N -5.20, P2O5- 1.82 & K2O- 1.20 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	38	77	115	154	192	231	308	385
P ₂ O ₅	32	64	96	128	160	192	256	320
K ₂ O	24	48	73	97	121	145	194	242

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Recent Alluvium Non -	Soil potassium range	:
Calcareous Non Saline Soil		FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targetted Yield Equations

$$FN = 5.05 T - 0.40 SN, \quad FP_2O_5 = 3.0 T - 2.11 SP_2O_5, \quad FK_2O = 2.10 T - 0.15 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	104	82	54	154	112	75
130	6	70	100	77	53	150	107	74
140	8	80	96	73	51	146	103	72
150	10	90	92	69	50	142	99	71
160	12	100	88	65	48	138	95	69
170	14	110	84	60	47	134	90	68
180	16	120	80	56	45	130	86	66
190	18	130	76	52	44	126	82	65
200	20	140	72	48	42	122	78	63
210	22	150	68	44	41	118	74	62
220	24	160	64	39	39	114	69	60
230	26	170	60	35	38	110	65	59
240	28	180	56	31	36	106	61	57
250	30	190	52	27	35	102	57	56
260	32	200	48	22	33	98	52	54
270	34	210	44	18	32	94	48	53
280	36	220	40	14	30	90	44	51
290	38	230	36	10	29	86	40	50
300	40	240	32	10	27	82	36	48
310	42	250	30	10	26	78	31	47
320	44	260	30	10	24	74	27	45
330	46	270	30	10	23	70	23	44
340	48	280	30	10	21	66	19	42
350	50	290	30	10	20	62	15	41
360	52	300	30	10	18	58	10	39
370	54	310	30	10	17	54	10	38
380	56	320	30	10	15	50	10	36
390	58	330	30	10	14	46	10	35
400	60	340	30	10	12	42	10	33

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Old Alluvium Light	Soil potassium range	:
Textured Soil		FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targetted Yield Equations

$$FN = 5.20 T - 0.36 SN, \quad FP_2O_5 = 2.93 T - 2.15 SP_2O_5, \quad FK_2O = 2.25 T - 0.25 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	113	79	53	165	109	75
130	6	70	109	75	50	161	104	73
140	8	80	106	71	48	158	100	70
150	10	90	102	66	45	154	96	68
160	12	100	98	62	43	150	91	65
170	14	110	95	58	40	147	87	63
180	16	120	91	54	38	143	83	60
190	18	130	88	49	35	140	79	58
200	20	140	84	45	33	136	74	55
210	22	150	80	41	30	132	70	53
220	24	160	77	36	28	129	66	50
230	26	170	73	32	25	125	61	48
240	28	180	70	28	23	122	57	45
250	30	190	66	23	20	118	53	43
260	32	200	62	19	18	114	48	40
270	34	210	59	15	15	111	44	38
280	36	220	55	11	13	107	40	35
290	38	230	52	10	10	104	36	33
300	40	240	48	10	10	100	31	30
310	42	250	44	10	10	96	27	28
320	44	260	41	10	10	93	23	25
330	46	270	37	10	10	89	18	23
340	48	280	34	10	10	86	14	20
350	50	290	30	10	10	82	10	18
360	52	300	30	10	10	78	10	15
370	54	310	30	10	10	75	10	13
380	56	320	30	10	10	71	10	10
390	58	330	30	10	10	68	10	10
400	60	340	30	10	10	64	10	10

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Old Alluvium Light	Soil potassium range	:
Textured Soil		FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targetted Yield Equations

$FN = 4.92 T - 0.22 SN - 0.51CN$, $FP_2O_5 = 2.62 T - 1.18 SP_2O_5 - 0.77 CP_2O_5$, $FK_2O = 3.63 T - 0.65 SK_2O - 0.60CK_2O$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without compost

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	121	74	70	170	100	106
130	6	70	119	72	63	168	98	100
140	8	80	117	69	57	166	95	93
150	10	90	115	67	50	164	93	87
160	12	100	112	64	44	162	91	80
170	14	110	110	62	37	159	88	74
180	16	120	108	60	31	157	86	67
190	18	130	106	57	24	155	84	61
200	20	140	104	55	18	153	81	54
210	22	150	101	53	11	151	79	48
220	24	160	99	50	10	148	76	41
230	26	170	97	48	10	146	74	35
240	28	180	95	46	10	144	72	28
250	30	190	93	43	10	142	69	22
260	32	200	90	41	10	140	67	15
270	34	210	88	38	10	137	65	10
280	36	220	86	36	10	135	62	10
290	38	230	84	34	10	133	60	10
300	40	240	82	31	10	131	58	10
310	42	250	79	29	10	129	55	10
320	44	260	77	27	10	126	53	10
330	46	270	75	24	10	124	51	10
340	48	280	73	22	10	122	48	10
350	50	290	71	20	10	120	46	10
360	52	300	68	17	10	118	43	10
370	54	310	66	15	10	115	41	10
380	56	320	64	13	10	113	39	10
390	58	330	62	10	10	111	36	10
400	60	340	60	10	10	109	34	10
<i>Reduction in Fertilizer recommendation with the application of compost (N -1.04, P2O5- 0.23 & K2O- 0.60 %)@</i>								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	5	11	16	21	27	32	42	53
P ₂ O ₅	2	4	5	7	9	11	14	18

K ₂ O	4	8	12	16	20	24	32	40
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Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Old Alluvium Light	Soil potassium range	:
Textured Soil		FYM composition	:
Situation	:	FYM rate	:
Districts	:	Green manure composition	:
Season developed	:	Green manure rate	:
Target range	: q ha ⁻¹		

Targetted Yield Equations

$$FN = 4.06 T - 0.23 SN, \quad FP_2O_5 = 2.03 T - 1.46 SP_2O_5, \quad FK_2O = 1.69 T - 0.16 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	94	55	41	156	75	58
130	6	70	92	52	40	154	72	56
140	8	80	90	49	38	152	70	55
150	10	90	87	46	36	150	67	53
160	12	100	85	43	35	147	64	52
170	14	110	83	40	33	145	61	50
180	16	120	80	38	32	143	58	48
190	18	130	78	35	30	140	55	47
200	20	140	76	32	28	138	52	45
210	22	150	74	29	27	136	49	44
220	24	160	71	26	25	133	46	42
230	26	170	69	23	24	131	43	40
240	28	180	67	20	22	129	40	39
250	30	190	64	17	20	127	37	37
260	32	200	62	14	19	124	34	36
270	34	210	60	11	17	122	32	34
280	36	220	57	10	16	120	29	32
290	38	230	55	10	14	117	26	31
300	40	240	53	10	12	115	23	29
310	42	250	51	10	11	113	20	28
320	44	260	48	10	10	110	17	26
330	46	270	46	10	10	108	14	24
340	48	280	44	10	10	106	11	23
350	50	290	41	10	10	104	10	21
360	52	300	39	10	10	101	10	20
370	54	310	37	10	10	99	10	18
380	56	320	34	10	10	97	10	16
390	58	330	32	10	10	94	10	15
400	60	340	30	10	10	92	10	13

Crop	: Pusa	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	: Alluvium heavy tested soil	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$$FN = 4.06 T - 0.23 SN, \quad FP_2O_5 = 2.03 T - 1.46 SP_2O_5, \quad FK_2O = 1.69 T - 0.16 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			20 q/ha			30 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	54	52	31	102	82	51
130	6	70	50	49	29	98	78	49
140	8	80	46	46	27	95	75	48
150	10	90	43	43	26	91	72	46
160	12	100	39	39	24	88	69	44
170	14	110	36	36	23	84	65	43
180	16	120	32	33	21	80	62	41
190	18	130	30	29	19	77	59	40
200	20	140	30	26	18	73	56	38
210	22	150	30	23	16	70	52	36
220	24	160	30	20	15	66	49	35
230	26	170	30	16	13	62	46	33
240	28	180	30	13	11	59	43	32
250	30	190	30	10	10	55	39	30
260	32	200	30	10	10	52	36	28
270	34	210	30	10	10	48	33	27
280	36	220	30	10	10	44	30	25
290	38	230	30	10	10	41	26	24
300	40	240	30	10	10	37	23	22
310	42	250	30	10	10	34	20	20
320	44	260	30	10	10	30	16	19
330	46	270	30	10	10	30	13	17
340	48	280	30	10	10	30	10	16
350	50	290	30	10	10	30	10	14
360	52	300	30	10	10	30	10	12
370	54	310	30	10	10	30	10	11
380	56	320	30	10	10	30	10	10
390	58	330	30	10	10	30	10	10
400	60	340	30	10	10	30	10	10

Raipur (Wheat)

Crop	: Raipur	Soil Nitrogen range	:
Variety	: Wheat (Swati)	Soil phosphorus range	:
Soil	: Vertisol Situation :	Soil potassium range	:
Districts	:	FYM composition	:
Season developed	: Rabi, 1986-87	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
		Green manure rate	:

Fertilizer adjustment equations

FN = 7.69 Y – 0.34 SN, $FP_2O_5 = 7.89 Y - 12.99 SP$, $FK_2O = No\ K\ if\ SK > 250\ kg\ ha^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of wheat (Sujata) in Vertisol (Kanhra).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) wheat (var. - Swati)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	64	79	103	118	141	158
175	6	56	40	94	79	133	119
200	9	47	2	86	40	124	80
225	12	39	2	77	2	116	41
250	15	30	2	69	2	107	2
275	18	22	2	60	2	99	2
300	21	13	2	52	2	90	2
350	24	5	2	35	2	73	2
400	28	5	2	18	2	56	2

Crop	: Raipur	Soil Nitrogen range	:
Variety	: Wheat (Swati)	Soil phosphorus range	:
Soil	: Inceptisol	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	: <i>Rabi</i> , 1990-91	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$FN = 6.99 Y - 0.41 SN$, $FP_2O_5 = 115 - (13114 - 460.8Y)^{1/2} - 3.45 SP$
 $FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of wheat (Swati) in Inceptisol (Matasi).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) wheat (var. - Swati)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	43	26	78	42	113	65
175	6	33	16	68	32	103	54
200	9	23	5	58	22	93	44
225	12	13	5	48	11	83	34
250	15	3	5	37	5	72	23
275	18	3	5	27	5	62	13
300	21	3	5	17	5	52	5
350	24	3	5	0	5	31	5
400	28	3	5	0	5	11	5

Crop	: Raipur	Soil Nitrogen range	:
Variety	: Wheat (Sujata)	Soil phosphorus range	:
Soil	: Vertisol	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	: <i>Rabi</i> , 2003-04	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$FN = 6.51 Y - (0.285 SN + 3.73 \text{ t FYM}), FP_2O_5 = 189 - (35721 - 1111Y)^{1/2} - (2.78SP + 6.25 \text{ t FYM})$
 $FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of wheat (Sujata) in Vertisol (Kanhra).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) wheat (var. - Sujata)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	55	43	87	64	120	92
175	6	48	34	80	56	113	83
200	9	41	26	73	48	106	75
225	12	34	18	66	39	99	66
250	15	26	9	59	31	92	58
275	18	19	6	52	23	84	50
300	21	12	6	45	14	77	41
350	24	7	6	31	6	63	33
400	28	7	6	16	6	49	22

Wheat

Village	Auri,	Block	Patan,
Distt.	Durg (CG)	Name of farmer	Govind Chandrakar
Soil Type	Vertisol	Crop/variety	wheat (Sujata)
Soil Test Value	SN = 236, SP = 16 & SK = 553 kg ha ⁻¹		
Targeted yield equations used (Date of sowing - 12-12.2003)			
FN	=	7.69Y-0.34 SN	
F P ₂ O ₅	=	7.87 Y – 12.99 SP	
F K ₂ O	=	No fertilizer K if SK is more than 250 kg ha ⁻¹	

Grain yield of wheat, yield response, and net return as Rs. per Re spent on fertilizer in relation to soil test based fertilizer recommendation and other adopted fertilizer doses

S. No.	Treatment	Fertilizer dose N:P ₂ O ₅ :K ₂ O	Grain yield obtained q ha ⁻¹	Yield response kg kg ⁻¹ fertilizer use	Net return Rs Re ⁻¹ spent on fertilizer
1.	Control	0:00:00	9.14	-	-
2.	FPD	60:40:00	16.11	4.97	3.95
3.	GRD	80:50:30	18.44	4.56	3.59
4.	YT of 20 q ha ⁻¹	112:00:00	19.25	7.24	6.18
5	YT of 25 q ha ⁻¹	150:28:00	23.58	6.99	5.14

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of wheat (Sujata) in Vertisol (Kanhra).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) wheat (var. - Sujata)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	36	11	69	33	101	60
175	6	29	3	62	25	94	52
200	9	22	3	55	17	87	44
225	12	15	3	47	8	80	35
250	15	8	3	40	3	73	27
275	18	5	3	33	3	66	19
300	21	5	3	26	3	59	10
350	24	5	3	12	3	44	3
400	28	5	3	5	3	30	3

Kalyani (Wheat)

Crop	: Kalyani	Soil Nitrogen range	:
Variety	: Wheat (cv. UP-262)	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	: Rabi, 2002-2003	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations:

$$FN = 12.88 T - 0.80 SN, \quad FP_2O_5 = 2.15 T - 0.23 SP, \quad FK_2O = 4.65 T - 0.29 SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 80, 100, 120
	P₂O₅	0, 40, 50
	K₂O	0, 40, 50
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	239 - 310
	Olsen-P	7 - 28
	NH₄OAc-K	72 - 225
Yield (kg.ha⁻¹)	Control plot	1464 - 2042
	Treated plot	2459 - 2773

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha⁻¹)			Fertilizer nutrient required (kg.ha⁻¹)					
			Targeted yield 2.5 t ha⁻¹			Targeted yield 3.0 t ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
250	5	100	122	53	58	126	63	82
275	10	150	102	51	58	126	62	82
300	15	200	82	50	58	126	61	82
325	20	250	62	49	44	126	60	67
350	25	300	62	48	29	106	59	53
375	30	350	42	47	15	86	58	38

* A minor modification was made in the ready-reckoner.

Crop	: Kalyani	Soil Nitrogen range	:
Variety	: Wheat (cv. PBW - 343)	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	: Rabi, 2003-'04	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations:

$$FN = 3.03 T - .18 SN, FP_2O_5 = 1.35T - 0.23SP, \quad FK_2O = 2.15 T - 0.29 SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 80, 100, 120
	P₂O₅	0, 40, 50
	K₂O	0, 40, 50
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	283 – 387
	Olsen-P	25 - 40
	NH₄OAc-K	71- 180
Yield (kg.ha⁻¹)	Control plot	550 - 580
	Treated plot	1947 - 2200

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha⁻¹)			Fertilizer nutrient required (kg.ha⁻¹)					
			Targeted yield 4.5 t.ha⁻¹			Targeted yield 5.0 t.ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
250	5	100	122	73	89	137	80	100
275	10	150	117	72	75	132	79	86
300	15	200	113	71	60	128	78	71
325	20	250	108	70	46	123	76	57
350	25	300	104	69	31	119	75	42
375	30	350	99	67	17	114	74	28

* A minor modification was made in the ready-reckoner.

Targeted yield equations used for the verification trials are given below:

Wheat (cv. UP-262)

$$FN = 12.88 T - 0.80 SN, \quad FP_2O_5 = 2.15 T - 0.23 SP, \quad FK_2O = 4.65 T - 0.29 SK$$

Verification trials for Wheat (mean of 6 trials)

Treatment	Grain yield (kg.ha ⁻¹)	Straw yield (kg.ha ⁻¹)
T ₁ - Farmers' practice	2507	5123
T ₂ - Govt. recommended dose	2500	5233
T ₃ - Soil test based fertilizer dose for targeted yield of 2.5 t ha ⁻¹	2533	5000
T ₄ - Soil test based fertilizer dose for Targeted yield of 3.0 t ha ⁻¹ .	3061	5667

Comparative economics of different fertilizer schedules under verification trials for wheat, rape and kharif rice

Profit (Rs.ha ⁻¹) over T ₁			
Treatment adopted	Wheat	Rape	Kharif rice
Farmers' practice (T ₁)	-	-	-
Govt. recommended dose (T ₂)	- 69 to + 148	+ 413 to 1210	- 193 to + 360
Soil test based fertilizer dose targeting 2.5/1.0/3.5 t ha ⁻¹ yield (T ₃)	+ 1260 to 1870	+ 1341 to 2134	+ 291 to 570
Soil test based fertilizer dose targeting 3.0/1.2/4.0 t ha ⁻¹ yield (T ₄)	+ 4543 to 5216	+ 3083 to 3670	+ 983 to 1132

Berrackpore

Wheat sequence (1983 - 84)

Targeted Yield Equations

$$\text{FN} = 9.83 \text{ T} - 0.76 \text{ SN}$$

$$\text{FP}_2\text{O}_5 = 3.17 \text{ T} - 4.69 \text{ SP}$$

$$\text{FK}_2\text{O} = 5.19 \text{ T} - 0.45 \text{ SK}$$

ii) Wheat (cv. UP 262), 1983-84 in jute-wheat sequence

Targeted Yield

$$\text{FN} = 9.35 \text{ T} - 0.33 \text{ SN}$$

$$\text{FP}_2\text{O}_5 = 7.95 \text{ T} - 4.48 \text{ SP}$$

$$\text{F K}_2\text{O} = 5.04 \text{ T} - 0.36 \text{ SK}$$

Reddy reckoner request

wheat (cv. Sonalika), 1974.

Targeted Yield Equations

$$\text{FN} = 3.97 \text{ T} - 0.15 \text{ SN}$$

$$\text{FP}_2\text{O}_5 = 7.87 \text{ T} - 5.41 \text{ SP}$$

$$\text{FK}_2\text{O} = 3.24 \text{ T} - 0.17 \text{ SK}$$

iii) Wheat (cv. UP 262), 1984-85 in jute-wheat sequence

Targeted Yield Equations

$$\text{FN} = 6.32 \text{ T} - 0.45 \text{ SN}$$

$$\text{FP}_2\text{O}_5 = 5.64 \text{ T} - 0.83 \text{ SP}$$

$$\text{F K}_2\text{O} = 3.90 \text{ T} - 0.40 \text{ SK}$$

Pantanagar (Wheat)

Crop	: Pantnagar	Soil Nitrogen range	:
Variety	:	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Situation	:	FYM composition	:
Districts	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations for different yield target.	
Wheat (Var. HD 2687) With FYM	Wheat Var. (UP 2382) With FYM
FN = 7.96T-0.96 SN-1.04FYM-N	F N (N kg/ha) = 6.25 x YT (q/ha) – 0.67SN-0.371FYM-N
FP = 1.25T-0.80 SP-0.17 FYM-P	F P (P kg/ha) = 0.91 x YT (q/ha) – 0.27SP-0.173FYM-P
FK = 1.99T-0.29 SK-0.44 FYM-K	F K (K kg/ha) = 1.38x YT (q/ha) – 0.16SP-0.079FYM-K

Fertilizer adjustment equations of STCR experiments for different crops under IPNS	
Wheat (Var. HD-2285) Without FYM	Wheat (Var. Raj 3077) Without FYM
FN (N, kg/ha) = 2.69 x YT – 227.49	F N (N, kg/ha) = 3.15 x YT (q/ha) – 45.04
F P (P₂O₅, kg/ha) = 2.88 x YT (q/ha) – 0.56	F P (P₂O₅, kg/ha) = 2.05 x YT (q/ha) – 0.50
F K (K₂O kg/ha) = 2.23 x YT (q/ha) – 0.05	F K (K₂O kg/ha) = 1.77 x YT (q/ha) – 0.06

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
KmnO ₄ N	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	198.4	119.8	66.4
125	13	125	179.6	115.4	43.3
150	15	150	160.8	112.5	20.2
175	18	175	142.0	108.1	10.0
200	20	200	143.2	105.2	10.0
225	23	225	104.4	100.8	10.0
250	25	250	85.6	97.9	10.0
275	28	275	66.8	93.5	10.0
300	30	300	48.0	90.6	10.0
325	33	325	29.2	86.2	10.0
350	35	350	10.4	83.3	10.0
375	38	375	10.0	78.9	10.0
400	40	400	10.0	76.0	10.0

Economics of verification trial for Wheat (UP 2382)

Treatments	Fertilizer dose N-P-K-FYM (kg ha ⁻¹)	Actual mean Yield (t ha ⁻¹)	Additional yield (t ha ⁻¹)	Value of additional yield (Rs.)	Cost of fertilizer (Rs.)	Net benefit (Rs.)	B/C ratio	Response ratio	Yield deviation (%)
Farmer's Practice (T₁)	120 - 40 - 20	3337	-	-	-	-	-	-	-
GRD (T₂)	150 - 60 - 40	4610	1273	12730	2685	10045.00	3.7	5.1	-
Target 40 q ha⁻¹ (T₃)	115 - 19 - 26	3887	550	5497	1562.70	3934.00	2.5	3.4	-2.8
Target 45 q ha⁻¹ (T₄)	146 - 24 - 33	4450	1113	11130	1972.25	9157.80	4.6	5.5	-1.1
Target 40 q ha⁻¹ +20 t FYM/ha (T₅)	104 - 16 - 23	3977	640	6397	1380.35	5016.30	3.6	4.5	-0.6
Target 45 q ha⁻¹ +20 t FYM/ha (T₆)	135 - 20 - 30	4540	1203	12030	1797	10233.00	5.7	6.5	+0.9

Rate N 10.5, P₂O₅ 18.5 and K₂O 7.08 Rs kg⁻¹. Wheat grain Rs. 1000 q⁻¹

Madhya Pradesh (Wheat)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 4.40 T - 0.40 SN \quad FP_2O_5 = 4.00 T - 4.58 SP \quad FK_2O = 2.53 T - 0.16 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)	
	35	40		35	40		35	40
100	114	136	5	111	131	200	57	69
150	94	116	10	83	103	250	49	61
200	74	96	15	54	74	300	41	53
250	54	76	20	25	45	350	33	45
300	34	56	25	-	17	400	25	37

Applicability :Medium black and Deep black soils ;Soil Testing Laboratories : Bhopal, Dhar, Jabalpur,Indore, Khandwa, Khargone, Mandsaur,Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.

Maize

Andhra Pradesh (MAIZE – Kharif)

Name of the Centre	: Jagtial	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Chalka soils	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Maize-DHM-105	FYM composition	:
Season developed	: <i>Kharif</i> , 1995	FYM rate	:
Target range	: 40 q ha ⁻¹ – 50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.19 T - 0.40 SN, \quad FP_2O_5 = 1.50 T - 1.55 SP, \quad FK_2O = 1.49 T - 0.16 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	40 (q ha ⁻¹)			50 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	108	45	36	150	60	51
175	15	200	98	37	28	140	52	43
200	20	250	88	29	20	130	44	35
225	25	300	78	21	12	120	36	27
250	30	350	68	14	4	110	29	19
275	35	400	58	6	--	90	21	11
300	40	450	48	0	--	80	13	3

Verification: **The above results are yet to be verified on the farmers' fields.**

Applicability

Soil Testing Laboratories : Karimnagar, Warangal, Nizamabad and Sanga Reddy

Soil type : Chalka soils
Crop : Maize
Season developed : *Kharif*
Yield target : Upto 50 q ha⁻¹

Note : **The above equations may be verified in black soils with three or four targets and pickup the best one for making recommendations.**

MAIZE - *Rabi*

Name of the Centre	: Rajendranagar	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Chalka soils	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Maize-DHM-101	FYM composition	:
Season developed	: <i>Rabi</i> , 1981-82 & 1982-83 (pooled data)	FYM rate	:
Target range	: 40 q ha ⁻¹ – 50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.00 T - 0.49 SN, \quad FP_2O_5 = 2.15 T - 2.58 SP, \quad FK_2O = 2.58 T - 0.30 SK$$

Reddy Reckoner Request

Verification: **The above equations are yet to be verified on the farmers' fields.**

Applicability

Soil Testing Laboratories **:Rajendranagar, Jadcherla and Sanga Reddy**

Soil type **:Chalka soils**

Crop **:Maize**

Season developed **:*Rabi***

Yield target **:Upto 60 q ha⁻¹**

Note : **The above equations may be verified in black soils with three or four targets and pickup the best one for making recommendations.**

Karnataka

Crop Hybrid	: Maize (Deccan and Other HYV)	Target range :
SOIL	: Red lateritic	Soil phosphorus range :
Season	: Kharif	Soil potassium range :
Variety	: Deccan Hybrid	FYM composition :
Area of Applicability	: Bangalore, Kolar and Tumkur districts.	FYM rate :
Soil Nitrogen range	:	Green manure composition :
		Green manure rate :

Target yield equation :

$$F.N. = 3.41 T - 0.08 SN. (KMnO_4 - N)$$

$$F.P_2O_5 = 1.94 T - 0.41 SP_2O_5 (Bray's - P_2O_5)$$

$$F.K_2O = 2.28 T - 0.072 SK_2O (N H_4OAC - K_2O)$$

STV $KMnO_4-N$ (kg/acre)	Fertilizer nitrogen (kg/acre)	STV Bray's P_2O_5 (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K_2O (kg/acre)	Fertilizer potash (kg/acre)
20	67	2	38	40	43
40	65	5	37	60	41
60	63	10	35	80	40
80	62	15	33	100	38
100	60	20	31	120	37
120	59	25	29	140	36
140	57	30	27	160	34
160	55	35	25	180	33
180	54	40	22	200	31
200	52	45	20	220	30
220	51	50	18	240	28
240	49	55	16	260	27

To increase or decrease the yield target by one q/acre. The variations to be made in the fertilizer recommendations are as follows:

$$N = \pm 3.5 \text{ kg/acre}$$

$$P_2O_5 = \pm 2.0 \text{ kg/acre}$$

$$K_2O = \pm 2.25 \text{ kg/acre}$$

Coimbatore (Without IPNS)

Maize

Name of the centre : Coimbatore

Soil : Mixed black
(Perianaickenpalayam series)

Crop & Variety : Maize - CO 1

Season developed : Kharif

Target range : 50 q ha⁻¹

Soil Nitrogen range : 180 – 270 kg ha⁻¹

Soil phosphorus range : 8 - 26

Soil potassium range : 300 – 480

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN = 4.60 T - 0.55 SN

FP₂O₅ = 2.25 T - 1.80 SP

FK₂O = 5.16 T - 0.49 SK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	300	131	98	111
2	190	10	320	125	95	101
3	200	12	340	120	91	91
4	210	14	360	114	88	82
5	220	16	380	109	84	72
6	230	18	400	103	81	62
7	240	20	420	98	77	52
8	250	22	440	92	73	43
9	260	24	460	87	70	33
10	270	26	480	81	66	23

Recommendation domain

Soil type : Black Clay Loam

Yield target : 50 q ha⁻¹

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 - 26
Soil	: Mixed black (Perianaickenpalayam series)	Soil potassium range	: 300 – 480
Crop & Variety	: Maize - CO 1	FYM composition	:
Season developed	: Rabi	FYM rate	:
Target range	: 50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 270 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	5.29	T	-	0.38	SN	-	0.78	ON
FP ₂ O ₅	=	2.08	T	-	1.29	SP	-	0.89	OP
FK ₂ O	=	5.20	T	-	0.45	SK	-	0.78	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	300	196	94	125
2	190	10	320	192	91	116
3	200	12	340	189	89	107
4	210	14	360	285	86	98
5	220	16	380	181	83	89
6	230	18	400	177	81	80
7	240	20	420	173	78	71
8	250	22	440	170	76	62
9	260	24	460	166	73	53
10	270	26	480	162	70	44

Recommendation domain

Soil type : Black Clay Loam
Yield target : 50 q ha⁻¹

Hisar

Soil type	: Sierozem	Soil phosphorus range	:
	(Inceptisols/Entisols)	Soil potassium range	:
Crop (Variety)	: Maize (Vijay composite)	FYM composition	:
Crop & Variety	: Maize - CO 1	FYM rate	:
Season developed	: Rabi	Green manure composition	:
Target range	: 40 q ha ⁻¹ - 50 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Targeted yield equations used:

$$FN = 4.93T - 1.03 SN, FP_2O_5 = 1.95T - 3.54 SP$$

Ready reckoner of soil test based fertilizer recommendations for maize (Vijay composite)
grain yield of 40, 45 and 50 q/ha

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	40	45	50		40	45	50
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertilizer P ₂ O ₅ , kg/ha)		
80	115	139	164	4	63	73	83
90	104	129	154	6	56	66	76
100	94	119	144	8	49	59	69
120	73	98	123	10	42	52	62
140	52	77	102	12	35	45	55
160	32	57	82	14	28	38	48
180	12	36	61	16	21	31	41
200	12	16	41	20	6	16	26
220	12	12	20	25	6	6	9

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 40, 45 and 50 q/ha were achieved within -6.6 to +1.7% deviations.

Applicability: These fertilizer adjustment equations will hold good for high yielding varieties of maize through out Haryana.

Palampur

Ready reckoner for soil test based fertilizer recommendations for yield target of 40 q/ha maize (Mid hills sub humid zone)

Fertilizer adjustment equation:

$$FN = 3.48 T - 0.20SN, \quad F P_2O_5 = 2.3 T - 2.09 SP, \quad F K_2O = 2.16T - 0.48 SK$$

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	79	82	62
350	10	75	69	71	50
400	15	100	59	61	38
450	20	125	49	50	26
500	25	150	39	40	14
550	30	175	29	29	2
600	35	200	19	19	0
650	40	225	9	8	0
700	50	250	0	0	0

Fertilizer adjustment equations

$$F N = 5.88 T - 0.23SN - 0.93ON, \quad F P_2O_5 = 4.87 T - 1.22 SP - 0.81OP$$

$$F K_2O = 3.66 T - 0.49 SK - 0.51OK$$

IPNS based fertilizer doses at different soil test values for important crops

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Crop: Maize			Yield Target: 40 q ha ⁻¹		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	10	120	114	160	59
400	15	170	91	154	34
500	20	220	68	148	10
<i>If FYM @12.5 t ha⁻¹ containing 10, 0.50, 0.25 and 0.50 % moisture, N, P₂O₅ and K₂O, respectively is applied .</i>					

Ready reckoner for soil test based fertilizer recommendations for specific yield target of 40 q ha⁻¹ maize (Sub-montane low hills sub tropical zone)

Fertilizer adjustment equation:

$$FN = 5.82T - 0.24 SN, \quad F P_2O_5 = 3.91 T - 2.11SP, \quad F K_2O = 2.58T - 0.31 SK$$

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Alkaline KMnO ₄ -N	Olsen's -P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
300	5	50	161	146	88
350	10	75	149	135	80
400	15	100	137	125	72
450	20	125	125	114	64
500	25	150	113	104	57
550	30	175	101	93	49
600	35	200	89	83	41
650	40	225	77	72	33

700	50	250	65	51	26
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Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for maize in sub-montane low hills sub tropical zone

Fertilizer adjustment equation:

$$FN = 5.82 T - 0.24 SN, \quad F P_2O_5 = 3.91 T - 2.11 SP, \quad F K_2O = 2.58T - 0.31 SK$$

Crop: Maize			Yield Target: 40 qha ⁻¹		
Low	Low	Low	197(185-209)	150(145-155)	80(72-88)
Medium	Medium	Medium	143(125-161)	115(105-125)	44(24-64)
High	High	High	89(65-112)	80(65-95)	0

Fertilizer dose, grain yield and per cent deviation under FLD plots in sub-montane low hills subtropical zone (1996-98)

Crop	Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	Nutrients uptake (kg ha ⁻¹)		
		N	P ₂ O ₅	K ₂ O			N	P	K
Maize	Farmers' practice	40	0	0	2010	-	57	8.2	21
	SLD	90	45	30	2390	-	61	9.7	28
	3000	70	73	59	2800	-6.7	66	10.2	32
	4000	127	117	81	3760	-6.0	89	11.0	36
	4000+ FYM	127	117	81	4330	+8.3	73	12.0	39

Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes for mid hills wet temperate zone

Fertilizer adjustment equation:

$$FN = 5.28 T - 0.16 SN, \quad F P_2O_5 = 4.56 T - 4.75 SP, \quad F K_2O = 1.92T - 0.09 SK$$

Crop: Maize			Yield Target: 40 qha ⁻¹	
Low	Low	179(171-187)	147(135-158)	70(68-72)
Medium	Medium	147(131-163)	87(63-111)	60(54-65)
High	High	111(99-123)	28(16-40)	41(32-50)

**Ready reckoner for soil test based fertilizer recommendations vis-à-vis fertility classes
for mid hills wet temperate zone**

Fertilizer adjustment equation

FN = 3.48 T- 0.20SN, F P₂O₅ = 2.3 T-2.09 SP, F K₂O = 2.16T-0.48 SK

Crop: Maize			Yield Target: 40 qha ⁻¹	
Low	Low	179(171-187)	147(135-158)	70(68-72)
Medium	Medium	147(131-163)	87(63-111)	60(54-65)
High	High	111(99-123)	28(16-40)	41(32-50)

Fertilizer dose, grain yield and per cent deviation under FLD plots in mid hills wet temperate zone (1996-98)

Crop	Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	Nutrients uptake (kg ha ⁻¹)		
		N	P ₂ O ₅	K ₂ O			N	P	K
Maize	Farmers' practice	40	0	0	2010	-	57	8.2	21
	SLD	90	45	30	2390	-	61	9.7	28
	3000	70	73	59	2800	-6.7	66	10.2	32
	4000	127	117	81	3760	-6.0	89	11.0	36
	4000+ FYM	127	117	81	4330	+8.3	73	12.0	39

Pusa

Crop	: Kharif Maize	Soil phosphorus range	: 4 kg ha ⁻¹ 50 kg ha ⁻¹
Soil	: Young Alluvium Calcareous Soil	Soil potassium range	: 60 kg ha ⁻¹ 290 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 30 q ha ⁻¹ - 40 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 120 kg ha ⁻¹ 350 kg ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$$FN = 4.71 T - 0.43 SN, \quad FP_2O_5 = 2.59 T - 2.13 SP_2O_5, \quad FK_2O = 1.96 T - 0.29 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			30 q/ha			40 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	90	69	41	137	95	61
130	6	70	85	65	39	133	91	58
140	8	80	81	61	36	128	87	55
150	10	90	77	56	33	124	82	52
160	12	100	73	52	30	120	78	49
170	14	110	68	48	27	115	74	47
180	16	120	64	44	24	111	70	44
190	18	130	60	39	21	107	65	41
200	20	140	55	35	18	102	61	38
210	22	150	51	31	15	98	57	35
220	24	160	47	27	12	94	52	32
230	26	170	42	22	10	90	48	29
240	28	180	38	18	10	85	44	26
250	30	190	34	14	10	81	40	23
260	32	200	30	10	10	77	35	20
270	34	210	30	10	10	72	31	18
280	36	220	30	10	10	68	27	15
290	38	230	30	10	10	64	23	12
300	40	240	30	10	10	59	18	10
310	42	250	30	10	10	55	14	10
320	44	260	30	10	10	51	10	10
330	46	270	30	10	10	47	10	10
340	48	280	30	10	10	42	10	10
350	50	290	30	10	10	38	10	10

Crop	: Rabi Maize	Soil phosphorus range	: 4 kg ha ⁻¹ 60 kg ha ⁻¹
Soil	: Young Alluvium Calcareous Soil	Soil potassium range	: 60 kg ha ⁻¹ 340 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 50 q ha ⁻¹ - 60 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 120 kg ha ⁻¹ 400 kg ha ⁻¹	Green manure rate	:

Targetted Yield Equations

$$FN = 3.55 T - 0.31 SN, \quad FP_2O_5 = 2.10 T - 3.57 SP_2O_5, \quad FK_2O = 1.50 T - 0.41 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			50 q/ha			60 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	140	91	80	176	112	65
130	6	70	137	84	76	173	105	61
140	8	80	134	76	72	170	97	57
150	10	90	131	69	68	167	90	53
160	12	100	128	62	64	163	83	49
170	14	110	125	55	60	160	76	45
180	16	120	122	48	56	157	69	41
190	18	130	119	41	52	154	62	37
200	20	140	116	34	48	151	55	33
210	22	150	112	26	44	148	47	29
220	24	160	109	19	39	145	40	24
230	26	170	106	12	35	142	33	20
240	28	180	103	10	31	139	26	16
250	30	190	100	10	27	136	19	12
260	32	200	97	10	23	132	12	10
270	34	210	94	10	19	129	10	10
280	36	220	91	10	15	126	10	10
290	38	230	88	10	11	123	10	10
300	40	240	85	10	10	120	10	10
310	42	250	81	10	10	117	10	10
320	44	260	78	10	10	114	10	10
330	46	270	75	10	10	111	10	10
340	48	280	72	10	10	108	10	10
350	50	290	69	10	10	105	10	10
360	52	300	66	10	10	101	10	10
370	54	310	63	10	10	98	10	10
380	56	320	60	10	10	95	10	10
390	58	330	57	10	10	92	10	10
400	60	340	54	10	10	89	10	10

Crop	: Rabi Maize	Soil phosphorus range	: 4 kg ha ⁻¹ 60 kg ha ⁻¹
Soil	: Young Alluvium	Soil potassium range	: 60 kg ha ⁻¹ 340 kg ha ⁻¹
	Calcareous Soil	FYM composition	:
Soil	: Typic Haplusterts	FYM rate	:
Situation	: Irrigated	Green manure composition	:
Target range	: 50 q ha ⁻¹ - 70 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 120 kg ha ⁻¹ 400 kg ha ⁻¹		

Targetted Yield Equations

$$FN = 3.51 T - 0.23 SN - 0.72CN, \quad FP_2O_5 = 2.50 T - 2.19 SP_2O_5 - 1.44 CP_2O_5$$

$$FK_2O = 2.17 T - 0.52 SK_2O - 2.10CK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values Without Rap seed Oil Cake

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			50 q/ha			70 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	148	116	77	218	166	121
130	6	70	146	112	72	216	162	116
140	8	80	143	107	67	214	157	110
150	10	90	141	103	62	211	153	105
160	12	100	139	99	57	209	149	100
170	14	110	136	94	51	207	144	95
180	16	120	134	90	46	204	140	90
190	18	130	132	86	41	202	136	84
200	20	140	130	81	36	200	131	79
210	22	150	127	77	31	197	127	74
220	24	160	125	72	25	195	122	69
230	26	170	123	68	20	193	118	64
240	28	180	120	64	15	191	114	58
250	30	190	118	59	10	188	109	53
260	32	200	116	55	10	186	105	48
270	34	210	113	51	10	184	101	43
280	36	220	111	46	10	181	96	38
290	38	230	109	42	10	179	92	32
300	40	240	107	37	10	177	87	27
310	42	250	104	33	10	174	83	22
320	44	260	102	29	10	172	79	17
330	46	270	100	24	10	170	74	12
340	48	280	97	20	10	168	70	10
350	50	290	95	16	10	165	66	10
360	52	300	93	11	10	163	61	10
370	54	310	90	10	10	161	57	10
380	56	320	88	10	10	158	52	10
390	58	330	86	10	10	156	48	10
400	60	340	84	10	10	154	44	10
Reduction in Fertilizer recommendation with the application of oil cakes (N -5.20, P2O5- 1.82 & K2O- 1.20 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	37	75	112	150	187	225	300	374

P ₂ O ₅	26	52	79	105	131	157	210	262
K ₂ O	25	50	76	101	126	151	202	252

Crop	: Kharif Maize	Soil phosphorus range	: 4 kg ha ⁻¹ 60 kg ha ⁻¹
Soil	: Red Loam Soils of Jharkhand	Soil potassium range	: 60 kg ha ⁻¹ 340 kg ha ⁻¹
Situation	: Irrigated	FYM composition	:
Target range	: 50 q ha ⁻¹ - 70 q ha ⁻¹	FYM rate	:
Soil Nitrogen range	: 120 kg ha ⁻¹ 400 kg ha ⁻¹	Green manure composition	:
		Green manure rate	:

Targetted Yield Equations

$$FN = 3.70 T - 0.21 SN, \quad FP_2O_5 = 2.14 T - 1.38 SP_2O_5, \quad FK_2O = 2.46 T - 0.24 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			20 q/ha			30 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	49	37	35	86	59	59
130	6	70	47	35	32	84	56	57
140	8	80	45	32	30	82	53	55
150	10	90	43	29	28	80	50	52
160	12	100	40	26	25	77	48	50
170	14	110	38	23	23	75	45	47
180	16	120	36	21	20	73	42	45
190	18	130	34	18	18	71	39	43
200	20	140	32	15	16	69	37	40
210	22	150	30	12	13	67	34	38
220	24	160	30	10	11	65	31	35
230	26	170	30	10	10	63	28	33
240	28	180	30	10	10	61	26	31
250	30	190	30	10	10	59	23	28
260	32	200	30	10	10	56	20	26
270	34	210	30	10	10	54	17	23
280	36	220	30	10	10	52	15	21
290	38	230	30	10	10	50	12	19
300	40	240	30	10	10	48	10	16
310	42	250	30	10	10	46	10	14
320	44	260	30	10	10	44	10	11
330	46	270	30	10	10	42	10	10
340	48	280	30	10	10	40	10	10
350	50	290	30	10	10	38	10	10
360	52	300	30	10	10	35	10	10
370	54	310	30	10	10	33	10	10
380	56	320	30	10	10	31	10	10
390	58	330	30	10	10	30	10	10
400	60	340	30	10	10	30	10	10

Raipur

Crop	: Maize	Soil phosphorus range	: 3 kg ha ⁻¹ 28 kg ha ¹
Soil type	: Vertisol	Soil potassium range	: 60 kg ha ⁻¹ 340 kg ha ¹
variety	: Pro-agro 4640	FYM composition	:
Season	: <i>Kharif</i> , 2001	FYM rate	:
Target range	: 50 q ha ⁻¹ - 70 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 kg ha ⁻¹ 400 kg ha ⁻¹	Green manure rate	:

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of maize (hybrid) in Vertisol (Kanhra).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield targets (qha ⁻¹) maize (Hybrid)			
		50		60	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	129	105	168	149
175	6	117	65	157	109
200	9	106	24	145	68
225	12	94	7*	134	28
250	15	82	7*	122	7*
275	18	71	7*	110	7*
300	21	59	7*	99	7*
350	24	36	7*	75	7*
400	28	13	7*	52	7*

* maintenance dose

Applicability :

Ludhiana (Maize)

Crop	: Maize	Soil potassium range	: 100-240kg ha ¹
Soil type	: Vertisol	FYM composition	:
variety	: Pro-agro 4640	FYM rate	:
Season	: <i>Kharif</i> , 2001	Green manure composition	:
Target range	: 40 -50 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 120-260 kg ha ⁻¹		
Soil phosphorus range	: 12-26 kg ha ¹		

Target yield equations used to compute fertilizer dose for wheat and maize

Wheat

$$FN = 4.23 T - 0.37 SN$$

$$FP_2O_5 = 2.63 T - 2.98 SP$$

$$FK_2O = 1.66 T - 1.4 SK$$

Maize

$$FN = 6.51 T - 1.11 SN$$

$$FP_2O_5 = 2.95 T - 6.72 SP$$

$$FK_2O = 1.89 T - 0.32 SK$$

Where T is yield target in q ha⁻¹ and SN, SP and SK represent KMnO₄-oxidisableN, NaHCO₃-extractable P and neutral normal AmOAc extractable K (kg ha⁻¹). FN, FP₂O₅ and FK₂O represent the fertilizer dose for the respective nutrient (kg ha⁻¹).

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of maize

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	40(q ha ⁻¹)			50 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	12	100	127	37	44	192	67	63
140	14	120	105	24	37	170	53	56
160	16	140	83	10	31	148	40	50
180	18	160	61	10	24	126	27	43
200	20	180	38	10	18	104	13	37
220	22	200	16	10	12	81	12	31
240	24	220	0	10	5	59	12	24
260	26	240	0	10	5	37	12	18

Appicability :

Pantanagar (Maize)

Fertilizer adjustment equations for different yield target	
Maize Fodder (Var. Ganga 2) Without FYM	Maize Fodder (Var. Ganga 2) Without FYM
F N (N, kg/ha) = 9.1 x YT (q/ha) – 309.17	F N (N, kg/ha) = 0.82 x YT (q/ha) – 52.24
F P (P₂O₅, kg/ha) = 6.94 x YT (q/ha) – 0.76	F P (P₂O₅, kg/ha) = 0.76 x YT (q/ha) – 1.58
F K (K₂O kg/ha) = 6.16 x YT (q/ha) – 0.18	F K (K₂O kg/ha) = 0.45 x YT (q/ha) – 0.13
Maize (Var. Pragati) With FYM	
FN = 12.56T- 1.03N-0.32FYM-N	
FP = 4.65T- 3.6SP-1.56FYM-P	
FK = 5.94T- 0.59SK-0.93FYM-K	

Reddy Reckoner Request

New Delhi (Maize)

Crop	: Maize	Soil phosphorus range	:
Variety	:	Soil potassium range	:
Soil	: Typic Haplustept	FYM composition	:
(Alluvial)		FYM rate	:
Situation	:	Green manure composition	:
Target range	: qha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equations for targeted yield of crops in NCR of Delhi	
With FYM	Without FYM
FN = 5.02 T – 0.35 SN – 1.82 FYM, FP ₂ O ₅ = 3.93 T – 3.62 SP – 2.29 FYM FK ₂ O = 2.25 T – 0.17 SK - 1.00 FYM	FN = 6.61 T – 0.52 SN, FP ₂ O ₅ = 4.77 T – 5.13 SP, FK ₂ O = 2.75 T – 0.24 SK

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Maize FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	95	60	40	150	100	65
125	13	125	90	50	35	140	90	60
150	15	150	80	40	30	130	80	55
175	18	175	7	30	30	120	70	50
200	20	200	60	25	25	115	60	45
225	23	225	55	15	20	105	55	40
250	25	250	45	10	15	95	45	35
275	28	275	35	10	10	85	35	35
300	30	300	25	10	10	80	25	30
325	33	325	20	10	10	70	15	25
350	36	350	15	10	10	60	10	20
375	38	375	10	10	10	50	10	15

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Maize FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	145	90	145	210	120	85
125	13	125	135	80	135	200	120	80
150	15	150	120	65	120	185	115	75
175	18	175	110	55	110	175	100	70
200	20	200	95	40	95	160	90	60
225	23	225	80	30	80	145	75	55
250	25	250	70	15	70	135	65	50
275	28	275	55	10	55	120	50	45
300	30	300	40	10	40	110	35	40
325	33	325	30	10	30	95	25	30
350	36	350	15		15	80	10	25
375	38	375	10		10	70	10	20

Maharashtra (Maize)

Crop	: Fodder Maize	Soil phosphorus range	: 6 kg ha ⁻¹ 16 kg ha ⁻¹
	(Summer)	Soil potassium range	: 200 kg ha ⁻¹ 700 kg ha ⁻¹
Variety	: African tall	FYM composition	:
Soil	: Typic Haplusterts	FYM rate	:
Situation	: Irrigated	Green manure composition	:
Target range	: 40 q ha ⁻¹ - 50 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100 kg ha ⁻¹ 200 kg ha ⁻¹		
Districts	: Kolhapur, Satara, Sangli, Pune, Ahmednagar, Nasik, Solapur		

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 4.0 \ T - 0.22 \ SN \quad FP_2O_5 = 2.38 \ T - 1.4 \ SP \quad FK_2O = 2.07 \ T - 0.08 \ SK$$

Madhya Pradesh (Maize)

Name of the Centre	: Madhya Pradesh	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and Variety	:	FYM composition	:
Situation	:	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Targeted Yield Equations

$$FN = 6.49 \ T - 0.56 \ SN, \quad FP_2O_5 = 1.51 \ T - 0.73 \ SP, \quad FK_2O = 2.45 \ T - 0.13 \ SK$$

SN =	FN = Fert. N		SP =	FP₂O₅ = Fert. P		SK=	FK₂O =Fert. K	
Soil – N	(kg ha⁻¹)		Soil – P	(kg ha⁻¹)		Soil – K	(kg ha⁻¹)	
(kg ha⁻¹)	-----		(kg ha⁻¹)	-----		(kg ha⁻¹)	-----	
	T =Yield Target			T =Yield Target			T=Yield Target	
	(q ha⁻¹)			(q ha⁻¹)			(q ha⁻¹)	
	35	40		35	40		35	40
100	118	138	5	76	88	200	56	67
150	107	127	10	69	81	250	52	63
200	96	116	15	62	74	300	48	59
250	85	105	20	55	67	350	44	55

300	74	94	25	48	60	400	40	51
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Applicability : Shallow and Medium black black soils : Soil Testing Laboratories : Bhopal, Dhar, Jhabua, Indore, Khandwa, Khargone, Mandsaur,, Sehore, Ujjain. Chindwara.

Fertilizer prescription for targeted yields of fodder maize for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			40 t ha ⁻¹ target			50 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	203.6	56.02	72	268.5	71.12	96.5
120	8	300	192.4	54.56	59	257.3	69.66	83.5
140	10	400	181.2	53.1	46	246.1	68.2	70.5
160	12	500	170.0	51.64	33	234.9	66.74	57.5
180	14	600	158.8	50.18	20	223.7	65.28	44.5
200	16	700	147.6	48.72	25*	215.5	63.82	31.5

* Minimum dose of K₂O

Barley

Hisar (Barley)

Crop	: Barley	Soil phosphorus range	:
Variety	: BH393	Soil potassium range	:
Soil	: Entials\ incept sols	FYM composition	:
Situation	: Irrigated	FYM rate	: 15 t ha
Target range	: 35-45 qha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 80-200 qha ⁻¹	Green manure rate	:

Ready Reckoner of soil test based fertilizer recommendations for 35, 40 and 45 q/ha grain yield of (BH 393)

Targeted yield equations :

$$FN = 4.88T - 0.98SN - 0.15 FYM (N)^*, \quad FP_2O_5 = 2.35T - 3.80 SP - 0.16 FYM (P_2O_5)$$

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	35	40	45		35	40	45
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertilizer P ₂ O ₅ , kg/ha)		
80	92	117	142	4	67	79	91
90	82	107	132	6	60	71	83
100	73	97	122	8	52	64	76
110	63	87	112	10	44	56	68
120	53	77	101	12	36	48	60
140	34	58	82	14	29	41	53
160	14	38	63	16	21	33	45

180	14	19	43	20	6	18	30
200	14	14	24	24	3	3	15

***SN and SP are soil available N and P (kg/ha), respectively; T = Yield target (q/ha)**

FYM(N) and FYM(P₂O₅) are N and P₂O₅ (kg/ha), respectively in applied FYM

Note : The dose of fertilizer N and P₂O₅ be reduced by 1.50 and 1.25 kg/ha, respectively, from above fertilizer doses for each ton of applied FYM/compost.

Pantanagar (Barley)

Barley, Var. : Azad

Fertilizer adjustment equation for yield targets (kg/ha)

$$FN \text{ (N kg/ha)} = 5.00 \times YT - 111.16 \times$$

$$FP \text{ (P kg/ha)} = 2.45 \times YT - 2.31$$

$$FK \text{ (K kg/ha)} = 4.96 \times YT - 0.82$$

Requst reddy reckoner

New Delhi(Barley)

Crop	: Barley	Soil phosphorus range	: 10-40 kg ha ⁻¹
Variety	: BH393	Soil potassium range	: 100-400 kg ha ⁻¹
Soil	: incept sols (haplustepts)	FYM composition	:
Situation	:	FYM rate	:
Target range	: 40-50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100-400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations for targeted yields of crops in NCR of Delhi (Without FYM)

$$FN = 3.69 T - 0.64 SN, \quad FP_2O_5 = 2.93 T - 5.24 SP, \quad FK_2O = 2.22 T - 0.31 SK$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Barley

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	85	65	60
125	13	125	70	50	50
150	15	150	50	40	40
175	18	175	35	25	35
200	20	200	20	10	25
225	23	225	10	10	20
250	25	250	10	10	10
275	28	275	10	10	10
300	30	300	10	10	10
325	33	325	10	10	10
350	36	350	10	10	10
375	38	375	10	10	10
400	40	400	10	10	10

Ready reckoners on soil test based fertilizer recommendations for specific yield targets
(45 qha⁻¹) of Barley

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 45 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	100	80	70
125	13	125	85	65	60
150	15	150	70	55	55
175	18	175	55	40	45
200	20	200	40	25	40
225	23	225	20	15	30
250	25	250	10	10	20
275	28	275	10	10	15
300	30	300	10	10	10
325	33	325			10
350	36	350			10
375	38	375			
400	40	400			

Ready reckoners on soil test based fertilizer recommendations for specific yield targets
(50 qha⁻¹) of Barley

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	120	95	80
125	13	125	105	80	70
150	15	150	90	70	65
175	18	175	75	55	55
200	20	200	55	40	50
225	23	225	40	30	40
250	25	250	25	15	35
275	28	275	10	10	25
300	30	300	10	10	20
325	33	325	10	10	10
350	36	350			10
375	38	375			10
400	40	400			

Pearlmillet

Maharashtra (Pearlmillet (IPNS))

Crop	: Pearlimillet	Soil phosphorus range	:
Variety	:	Soil potassium range	:
Soil	:	FYM composition	:
Situation	:	FYM rate	:
Target range	: qha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Experimental details : PGI farm, MPKV., Rahuri, RBD 4/6, 45cm x15 cm, 4.5 x 3.9m²

Soil depth 45 cm, pH 8.1, EC 0.26 dSm⁻¹, OC 0.45 %

Fertilizer prescription equations

FN = 3.31 T - 0.38 SN, FP₂O₅ = 3.38 T - 4.11 SP, FK₂O = 1.65 T - 0.06 SK

Reddy Reckoner Request

Treatment details

T₁ : Control

T₂ : Fertilizers for 30q ha⁻¹ target

T₃ : Fertilizers for 30 q ha⁻¹ target + 5 t FYM ha⁻¹

T₄ : Fertilizers for 30 q ha⁻¹ target + 10 t FYM ha⁻¹

T₅ : Fertilizers for 30 q ha⁻¹ target + 5 t FYM ha⁻¹ + biofertilizer

T₆ : 10 t FYM ha⁻¹

The inorganic and organic sources of nutrients significantly influenced the grain yield of pearlmillet. The highest yield of 29.6 q ha⁻¹ was achieved in 30 q ha⁻¹ target + 5 t FYM ha⁻¹ + bio fertilizer treatment followed by STCR 30 q ha⁻¹ target + 10 t FYM ha⁻¹. Application of FYM alone gave lower yields compared to integrated use of FYM, fertilizers and biofertilizers.

Yield targeting in pearl-millet

Treatment	Yield (q ha ⁻¹)	Total nutrient uptake, (kg ha ⁻¹)			Initial soil test value (kg ha ⁻¹)		
		N	P	K	N	P	K
T₁	16.7	31	4.9	66	157	9.7	448
T₂ (40:62:23)	20.0	39	6.7	87	159	8.6	450

T₃	24.4	51	10.1	99	164	9.1	4654
T₄	27.6	62	11.6	122	167	8.7	470
T₅	29.6	73	12.9	137	160	8.1	440
T₆	17.3	44	8.5	96	161	8.1	451
SE ±	1.4	2.45	0.48	5.04			
CD 5 %	4.1	7.40	1.44	15.2			

Pearlmillet (IPNS)

Experimental details : **ARF, B Division Solapur RBD 4/6, 45cm x15 cm, 3.6 x 4.8m²**

**pH 7.9, EC 0.26 dSm⁻¹, Av.N 147, Av. P 10.3, Av.K 251kg ha⁻¹,
sowing date 13/7/1999, harvesting date 5/10/1999.**

Fertilizer prescription equations

FN = 3.31 T - 0.38 SN, FP₂O₅ = 3.38 T - 4.11 SP, FK₂O = 1.65 T - 0.06 SK

Reddy Reckoner Request

Treatment details

T₁ : Control

T₂ : Fertilizers for 30 q ha⁻¹ target

T₃ : Fertilizers for 30 q ha⁻¹ target + 5 t FYM ha⁻¹

T₄ : Fertilizers for 30 q ha⁻¹ target + 10 t FYM ha⁻¹

T₅ : Fertilizers for 30 q ha⁻¹ target + 5 t FYM ha⁻¹ + biofertilizer

T₆ : 10 t FYM ha⁻¹

The inorganic and organic sources nutrients significantly influenced the grain yield of pearlmillet. The highest yield of 27.2 q ha⁻¹ was achieved in 30 q ha⁻¹ target + 10 t FYM ha⁻¹ treatment followed by STCR 30 q ha⁻¹ target + 5 t FYM ha⁻¹. Application of FYM alone gave lower yields but the combined use of inorganic fertilizers with FYM and bio-fertilizer had beneficial effect in increasing the crop yield.

New Delhi (Pearlimillet -Bajra)

Crop	: Pearlimillet-Bajra	Soil phosphorus range	: 10-40 kg ha ⁻¹
Variety	: BH393	Soil potassium range	: 100-400 kg ha ⁻¹
Soil	: incept sols (haplustepts)	FYM composition	:
Situation	:	FYM rate	:
Target range	: 40-50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100-400 kg ha ⁻¹	Green manure rate	:

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equatins for targeted yield of crps in NCR of Delhi	
With FYM	Without FYM
$FN = 5.35 T - 0.29 SN - 2.23 FYM, FP_2O_5$ $= 4.72 T - 3.29 SP - 2.48 FYM$ $FK_2O = 2.88 T - 0.17 SK - 1.35 FYM$	$FN = 6.97 T - 0.38 SN,$ $FP_2O_5 = 5.73 T - 4.81 SP,$ $FK_2O = 3.92 T - 0.28 SK$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Pearlimillet FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	80	60	40	110	80	55
125	13	125	75	50	35	100	75	40
150	15	150	70	45	30	95	65	45
175	18	175	60	35	30	85	60	45
200	20	200	55	30	25	80	50	40
225	23	225	45	20	20	70	45	35
250	25	250	40	10	15	65	40	30
275	28	275	30	10	10	55	35	25
300	30	300	25	10	10	45	30	25
325	33	325	15	10	10	40	25	20
350	36	350	10	10	10	30	20	15
375	38	375	10	10	10	25	15	10

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Pearl millet FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	135	95	70	170	120	90
125	13	125	125	85	65	160	110	80
150	15	150	115	70	55	150	100	75
175	18	175	110	60	50	140	90	70
200	20	200	100	45	40	135	75	60
225	23	225	90	35	35	125	65	55
250	25	250	80	25	30	115	50	50
275	28	275	70	10	20	105	40	40
300	30	300	60	10	15	95	30	35
325	33	325	50	10	10	85	15	25
350	36	350	40	10	10	75	10	20
375	38	375	30	10	10	65	10	15

Hisar (Bajra)

Ready reckoner of soil test based fertilizer recommendations for 20, 25 and 30q/ha grain yield of hybrid bajra (HHB 94)

Targeted yield equations:

$$FN = 10.00T - 1.43 SN - 0.13 FYM (N), FP_2O_5 = 3.75T - 4.46SP - 0.15FYM (P_2O_5)$$

SN* (kg/ha)	FN Fertilizer N, kg/ha			SP* (kg/ha)	FP ₂ O ₅ (Fertilizer P ₂ O ₅ kg/ha)		
	20	25	30		20	25	30
	Targeted yield, q/ha				Targeted yield, q/ha		
80	85	135	185	4	57	76	95
90	71	121	171	6	48	67	86
100	57	107	157	8	39	58	77
110	43	93	143	10	30	49	68
120	28	78	128	12	21	40	59
140	14	50	100	14	12	31	50
160	14	21	71	16	4	22	41
180	14	14	43	20	4	5	23
200	14	14	14	24	4	5	5

SN and SP are soil available N and P (kg/ha), respectively; T = Yield target (q/ha) FYM(N) and FYM(P₂O₅) are N and P₂O₅ (kg/ha), respectively in applied FYM

Note : The dose of fertilzier N and P₂O₅ be reduced by abotu 1.25 kg and 1.00 kg/ha, respectively, from above fertilzier doses for each ton of applied FYM/compost.

Madhya Pradesh (Jowar)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 6.48 T - 0.38 SN \quad FP_2O_5 = 3.99 T - 2.29 SP \quad FK_2O = 3.51 T - 0.16 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹)	SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹)	SK = Soil – K (kg ha ⁻¹)	FK ₂ O = Fert. K (kg ha ⁻¹)
	T =Yield Target (q ha ⁻¹)		T =Yield Target (q ha ⁻¹)		T=Yield Target (q ha ⁻¹)
	30 35		30 35		30 35
100	156 189	5	108 128	200	73 91
150	137 170	10	97 117	250	65 83
200	118 151	15	86 106	300	57 75
250	99 132	20	74 94	350	49 67
300	80 113	25	63 83	400	41 59

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Indore, Khandwa, Khargone, Mandasaur,, Narsinghpur, Sagar, Sehore, Ujjain, Chindawara

Bajra

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 10.9 T - 0.78 SN \quad FP_2O_5 = 5.22 T - 4.0 SP \quad FK_2O = 4.13 T - 0.35 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹)	SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹)	SK = Soil – K (kg ha ⁻¹)	FK ₂ O = Fert. K (kg ha ⁻¹)
	T =Yield Target (q ha ⁻¹)		T =Yield Target (q ha ⁻¹)		T=Yield Target (q ha ⁻¹)
	25 30		25 30		25 30
100	194 249	5	110 137	200	33 54

150	155	210	10	90	117	250	16	36
200	116	171	15	70	97	300	-	20
250	77	132	20	50	77	350	-	-
300	38	93	25	30	57	400	-	-

Applicability : Alluvial and mixed red and black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain

Sorghum

Andhra Pradesh (Sorghum)

Name of the Centre	: Palem, Mahabubnagar district	Soil phosphorus range	: 5 – 50 kg ha ⁻¹
Soil	: Alfisol (Sandy Loam)	Soil potassium range	: 1250 – 350 kg ha ⁻¹
Crop and Variety	: Rainfed Jowar – CHS-9	FYM composition	:
Season developed	: <i>Kharif</i> , 2001 & 2002	FYM rate	:
Target range	: 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 280 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

FN = 7.29 T – 0.82 SN- 0.38 FYM N,

FP₂O₅ = 4.30 T – 1.53 SP- 0.19 FYM P,

FK₂O = 5.10 T – 0.39 SK- 0.17 FYM K

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 25 q ha ⁻¹					
Kmn O ₄ -N	Olsen-P	Amm Aoc- K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	125	100	100	79	70	88	67
120	10	150	84	92	69	53	81	57
140	15	175	67	85	59	37	73	47
160	20	200	51	77	50	21	66	38
180	25	225	35	69	40	4	58	28
200	30	250	18	62	30	0	50	18
220	35	275	12	54	20		43	8
240	40	300	12*	46	11		35	0
260	45	325	12*	39	1		27	
280	50	350	12*	31	0		20	

* maintenance of dose

Verification: The above equations were verified on the farmers' fields of Palem, Mahabubnagar district with yield targets of 20 and 25 q ha⁻¹ during *kharif*, 2002 and 2003. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : **Mahabubnagar, Ranga Reddy and Kurnool districts in Southern Telangana Zone**

Soil type : **Alfisol**

Crop : **Rainfed Jowar (High yielding varieties)**

Season developed : ***Kharif* (Rainfed)**

Yield target : **Up to 20- 25 q ha⁻¹**

Note: The above equations may be tested in soils other than Sandy loam of Alfisol in the farmers' fields with three or four targets and pick up the best one for making recommendations in Southern Telangana zone.

Coimbatore (Sorghum)

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 -26
Soil	: Red (Irugur series)	Soil potassium range	: 150 – 240
Crop & Variety	: Sorghum - CSH 5	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 240 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.86	T	-	0.53	SN	-	0.98	ON
FP ₂ O ₅	=	1.63	T	-	0.87	SP	-	0.90	OP
FK ₂ O	=	4.56	T	-	0.59	SK	-	0.76	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	164	75	140
2	160	10	160	158	73	134
3	170	12	170	153	71	128
4	180	14	180	148	69	122
5	190	16	190	142	68	116
6	200	18	200	137	66	110
7	210	20	210	132	64	104
8	220	22	220	126	62	98
9	230	24	230	121	61	92
10	240	26	240	116	59	86

Recommendation domain

Soil type : Red Sandy Loam
Yield target : 50 q ha⁻¹

Sorghum

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 -28
Soil	: Mixed black (Perianaickenalayam series)	Soil potassium range	: 300 – 500
Crop & Variety	: Sorghum - CO 24	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 50 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	6.06	T	-	0.81	SN	-	0.53	ON
FP ₂ O ₅	=	2.06	T	-	3.14	SP	-	0.72	OP
FK ₂ O	=	5.03	T	-	0.47	SK	-	0.66	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 50 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	300	157	78	111
2	190	10	320	149	72	101
3	200	12	340	141	65	92
4	210	14	360	133	59	82
5	220	16	380	125	53	73
6	230	18	400	117	46	64
7	240	20	420	109	40	54
8	250	22	440	101	34	45
9	260	24	460	92	28	35
10	270	26	480	84	21	26
11	280	28	500	76	15	17

Recommendation domain

Soil type : Black Clay Loam
Yield target : 50 q ha⁻¹

Hisar

Name of the centre	: Hisar	Soil phosphorus range	:
Soil	: Sierozem	Soil potassium range	:
(Inceptisols/Entisols)		FYM composition	:
Crop & Variety	: Sorghum (HC 171)	FYM rate	:
Season developed	: Kharif	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

sorghum (HC 171) green fodder yield of 400, 500 and 600 q/ha

Targeted yield equations used:

$$FN = 0.46T - 1.27 SN, \quad FP_2O_5 = 0.16T - 3.59 SP$$

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	40	50	60		40	50	60
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	82	128	174	4	50	66	82
90	70	116	162	6	42	58	74
100	57	103	149	8	35	51	67
120	32	78	124	10	28	44	60
140	6	52	98	12	21	37	53
160	6	27	73	14	14	30	46
180	6	6	47	16	6	22	38
200	6	6	22	20	6	8	24

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 400, 500 and 600 q/ha were achieved with $\pm 6.0\%$ deviations.

Applicability: These fertilizer adjustment equations will hold good throughout Haryana for high yielding varieties of sorghum for green fodder.

Maharashtra (IPNS Based)

Name of the centre	: Maharashtra	Soil phosphorus range	: 6-14 kg ha ⁻¹
Soil	: Vertic Ustropepts	Soil potassium range	: 200-700 kg ha ⁻¹
Crop & Variety	: Sorghum (CSH-9)	FYM composition	:
Season developed	: Kharif	FYM rate	:
Situation	: Rainfed	Green manure composition	:
Target range	: 40-45 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100-200 kg ha ⁻¹		
Districts	: Jalgaon, Dhule, Nandurbar, Satara, Kolhapur, Snagli, Akola, Parbhani, Buldhana, Aurangabad, Wardha, Yeotmal, Pune		

Targeted Yield Equations

FN = 4.58 T – 0.96 SN, FP₂O₅ = 2.21 T – 6.94 SP, FK₂O = 3.34 T – 0.22 SK

Rates : N 7.20, P₂O₅ 18.00, K₂O 7.15 Rs kg⁻¹, Grain Rs. 500 q⁻¹

Fertilizer prescription for targeted yields of *Kharif* sorghum for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			40 q ha ⁻¹ target			45 q ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	87	47	90	110	58	106
120	8	300	68	33	68	91	44	84
140	10	400	49	19	46	72	30	62
160	12	500	30	25*	24	52	16	40
180	14	600	10	25*	25*	33	25*	18
200	> 14	700	25*	25*	25*	14	25*	25*

* Minimum dose of N, P₂O₅ and K₂O

Without IPNS**Name of the centre : Maharashtra**

Soil : Typic Haplusterts

Crop & Variety : Sorghum (CSH-8R)

Season developed : Kharif

Situation : Irrigated

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Districts : Jalgaon, Akola, Aurangabad, Jalna, Osmanabad, Parbhani, Latur, Ahmednagar, Buldhana, Solapur, Yeotmal, Satara, Sangli.

Targeted Yield Equations

$$FN = 4.7 T - 0.77 SN, \quad FP_2O_5 = 2.00 T - 4.29 SP, \quad FK_2O = 3.35 T - 0.33 SK$$

Rates : N 7.20, P₂O₅ 18.00, K₂O 7.00 Rs kg⁻¹, Grain Rs. 800 q⁻¹

Fertilizer prescription for targeted yields of *rabi* Sorghum for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			50 q ha ⁻¹ target			60 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	158	74	102	205	94	135
120	8	250	143	66	85	190	86	119
140	10	300	127	57	69	174	77	102
160	12	350	112	49	52	159	69	86
180	14	400	96	40	36	143	60	69
200	16	450	81	31	19	128	51	53
220	18	500	66	23	25*	113	43	36
240	20	> 500	50	14	25*	97	34	25*

- Minimum dose of K₂O

Finger Millet

Maharashtra (Without IPNS)

Crop	: Finger millet (<i>Nagli</i>)	Soil phosphorus range	: 6 – 16 kg ha ⁻¹
Variety	: Nagli RAU-8	Soil potassium range	: 200 – 700 kg ha ⁻¹
Soil	: Typic Haplustepts	FYM composition	:
Situation	: Rainfed	FYM rate	:
Target range	: 12 q ha ⁻¹ - 18 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 200 kg ha ⁻¹	Green manure rate	:
Districts	: Nasik, Nandurbar, Kolhapur, Pune, Gadchiroli, Bhandara		

Targeted Yield Equations

$$\text{FN} = 4.42 \text{ T} - 0.225 \text{ SN}, \text{ FP}_2\text{O}_5 = 2.97 \text{ T} - 1.32 \text{ SP}, \text{ FK}_2\text{O} = 1.21 \text{ T} - 0.024 \text{ SK}$$

Fertilizer prescription for targeted yields of finger millet for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			12 q ha ⁻¹ target			18 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	30	28	10	57	45	17
120	8	300	26	25	25*	52	43	15
140	10	400	21	22	25*	48	40	25*
160	12	500	17	20	25*	43	37	25*
180	14	600	25*	17	25*	39	35	25*
200	16	700	25*	14	25*	34	32	25*

* Minimum dose of N and K₂O

Ragi

Coimbatore (Ragi) IPNS Based

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 - 28
Soil	: Mixed black (P.N.Palayam series)	Soil potassium range	: 300 – 500
Crop & Variety	: Ragi - CO 11	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 40 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.35	T	-	0.37	SN	-	0.98	ON
FP ₂ O ₅	=	1.18	T	-	1.03	SP	-	0.80	OP
FK ₂ O	=	2.68	T	-	0.14	SK	-	0.40	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 40 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	300	107	39	65
2	190	10	320	104	37	62
3	200	12	340	100	35	60
4	210	14	360	96	33	57
5	220	16	380	93	31	54
6	230	18	400	89	29	51
7	240	20	420	85	27	48
8	250	22	440	82	25	46
9	260	24	460	78	22	43
10	270	26	480	74	20	40
11	280	28	500	70	18	37

Recommendation domain

Soil type : Black Clay Loam
Yield target : 40 q ha⁻¹

Karnataka (IPNS Based)

SOIL	: Red lateritic	Soil phosphorus range :
Season	: Kharif	Soil potassium range :
Variety	: Indaf-8 & other HYV	FYM composition :
Season developed	: Kharif	FYM rate :
Target range	:	Green manure composition :
Soil Nitrogen range	:	Green manure rate :

Area of applicability : Bangalore, Kolar and Tumkur districts

Target yield equation

$$\text{F.N.} = 3.314 \text{ T} - 0.24 \text{ SN (KMnO}_4\text{- N)}, \text{ F.P}_2\text{O}_5 = 1.85 \text{ T} - 0.66 \text{ SP}_2\text{O}_5 \text{ (Bray's - P}_2\text{O}_5\text{)}$$

STV KMnO ₄ -N (kg/acre)	Fertilizer nitrogen (kg/acre)	STV Bray's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
20	48	2.5	28	10	28
30	46	5.0	26	20	26
40	43	7.5	25	30	23
50	41	10.0	23	40	21
60	39	12.5	20	50	19
70	36	15.0	20	60	17
80	34	17.5	18	70	15
90	31	20.0	16	80	13
100	29	22.5	15	90	11
110	27	25.0	13	100	10
120	24	27.5	11		
130	22	30.0	10		

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

$$\text{N} = \pm 3.25 \text{ kg/acre.} \quad \text{P}_2\text{O}_5 = \pm 1.75 \text{ kg/acre.} \quad \text{K}_2\text{O} = \pm 1.75 \text{ kg/acre.}$$

$$\text{F.K}_2\text{O} = 1.86 \text{ T} - 0.21 \text{ SK}_2\text{O (NH}_4\text{OAC - K}_2\text{O)}$$

Cotton

Andhra Pradesh Without IPNS Based

Name of the Centre : Nandyal

Soil : Vertisol

Crop and Variety : Rainfed Cotton

Season developed : *Kharif*, 2001

Target range : 10 q ha⁻¹ - 12 q ha⁻¹

Soil Nitrogen range : 100 – 240 kg ha⁻¹

ha⁻¹

Soil phosphorus range : 5 – 75 kg ha⁻¹

Soil potassium range : 125 – 475 kg

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

$$FN = 15.63 T - 0.70 SN, \quad FP_2O_5 = 8.96 T - 2.15 SP, \quad FK_2O = 13.41 T - 0.304 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	10 (q ha ⁻¹)			12 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	125	86	79	96	118	97	123
110	10	150	79	68	89	111	87	115
120	15	175	72	57	81	104	75	108
130	20	200	65	47	73	97	65	100
140	25	225	58	36	66	90	54	93
150	30	250	51	25	58	83	43	85
160	35	275	44	14	51	76	32	77
170	40	300	37	4*	43	69	22	70
180	45	325	30	4*	35	62	11	62
190	50	350	23	4*	28	55	11	55
200	55	375	16	4*	20	48	11	47
210	60	400	9	4*	13	41	11	39
220	65	425	2	4*	5	34	11	32
230	70	450	2	4*	5	27	11	24

* minnace dose

Verification: The above equations are yet to be verified on the farmers' fields.

Applicability

Soil Testing Laboratories : Nandyal, Kurnool district

Soil : Vertisol (Clay)

Crop : Rainfed Cotton

Season developed : *Kharif*

Yield target : Upto 12 q ha⁻¹

Note : The above equations may be verified in Vertisol (Clay) with three or four targets and pickup the best one for making recommendations.

Coimbatore (Cotton) IPNS Based

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 – 26 kg ha ⁻¹
Soil	: Mixed black (Perianaicken palayam series)	Soil potassium range	: 300 – 480 kg ha ⁻¹
Crop & Variety	: Cotton - MCU 5	FYM composition	:
Season developed	: Rabi	FYM rate	:
Target range	: 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 270 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	8.81	T	-	0.62	SN	-	0.77	ON
FP ₂ O ₅	=	2.53	T	-	1.36	SP	-	1.08	OP
FK ₂ O	=	4.92	T	-	0.25	SK	-	0.77	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	300	153	65	73
2	190	10	320	146	62	68
3	200	12	340	140	60	63
4	210	14	360	134	57	58
5	220	16	380	128	54	53
6	230	18	400	121	51	48
7	240	20	420	115	49	43
8	250	22	440	109	46	38
9	260	24	460	103	43	33
10	270	26	480	97	41	28

Recommendation domain

Soil type : Black - Clay Loam

Yield target : 30 q ha⁻¹

Cotton

Name of the centre : Coimbatore

Soil : Red (Irugur series)

Crop & Variety : Cotton - MCU 5

Season developed : Sep. - Feb. (Rabi)

Target range : 30 q ha⁻¹

Soil Nitrogen range : 180 – 270 kg ha⁻¹

Soil phosphorus range : 8 – 26 kg ha⁻¹

Soil potassium range : 180 – 270 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN	=	7.66	T	-	0.43	SN	-	0.71	ON
FP ₂ O ₅	=	3.22	T	-	3.27	SP	-	0.38	OP
FK ₂ O	=	5.97	T	-	0.50	SK	-	0.66	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 30 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	8	180	153	71	89
2	190	10	190	148	64	84
3	200	12	200	144	58	79
4	210	14	210	140	51	74
5	220	16	220	135	45	69
6	230	18	230	131	38	64
7	240	20	240	127	32	59
8	250	22	250	122	25	54
9	260	24	260	118	18	49
10	270	26	270	114	12	44

Recommendation domain

Soil type : Red - Sandy Clay Loam

Yield target : 30 q ha⁻¹

Hisar (Cotton) Without IPNS

Name of the centre	: Coimbatore	Soil phosphorus range	: 4– 30 kg ha ⁻¹
Soil	: Sierozem	Soil potassium range	:
(Inceptisols/Entisols)		FYM composition	:
Crop & Variety	: Cotton (H 777)	FYM rate	:
Season developed	: Sep. - Feb. (Rabi)	Green manure composition	:
Target range	: 16-20 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 80 – 240 kg ha ⁻¹		

Targeted yield equations used:

$$FN = 10.91T - 1.09 SN, \quad FP_2O_5 = 3.02T - 1.73 SP$$

Ready reckoner of soil test based fertilizer recommendations for cotton (H 777) for 16, 18 and 20 q/ha kapas yield

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	16	18	20		16	18	20
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	87	109	131	4	41	47	53
90	77	98	120	6	38	44	50
100	66	87	109	8	34	40	46
120	44	65	87	10	31	37	43
140	22	43	66	12	27	33	39
160	21	21	44	14	24	30	36
180	21	21	22	16	20	26	32
200	21	21	21	20	13	19	26
220	21	21	21	25	4	10	15
240	21	21	21	30	4	4	6

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 18 and 20 q/ha were achieved with -6.5 to +5.8% deviations.

Applicability: These fertilizer adjustment equations will hold good for American cotton in the cotton growing areas of Haryana.

Maharashtra (Cotton) Without IPNS

Crop : Cotton (*Kharif*)

Variety : RHR-253

Soil : Typic Haplusterts

Situation : Irrigated

Districts : Jalgaon, Akola, Buldana, Amravati, Nanded, Latur, Washim,

Pune, Parbhani, Wardha, Yeotmal, Ahmednagar, Satara,

Sangli, Solapur, Kolhapur.

Targeted Yield Equations

FN = 13.1 T – 0.75 SN, $FP_2O_5 = 6.83 T - 2.84 SP$, $FK_2O = 8.57 T - 0.18 SK$

Fertilizer prescription for targeted yields of cotton for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			20 q ha ⁻¹ target			24 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	250	187	119	126	239	146	160
120	10	300	172	108	117	224	135	151
140	14	350	157	96	108	209	124	142
160	18	400	142	85	99	194	112	133
180	22	450	127	68	90	179	95	124
200	26	500	112	57	81	164	84	115
220	30	550	97	45	72	149	73	106
240	34	600	82	34	63	139	61	97

Madhya Pradesh (Cotton)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 11.13 T - 0.59 SN \quad FP_2O_5 = 6.45 T - 4.47 SP \quad FK_2O = 4.71 T - 0.14 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) -----	SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) -----	SK = Soil – K (kg ha ⁻¹)	FK ₂ O = Fert. K (kg ha ⁻¹) -----
	T =Yield Target (q ha ⁻¹)		T =Yield Target (q ha ⁻¹)		T=Yield Target (q ha ⁻¹)
	15 20		15 20		15 20
100	108 164	5	75 107	200	43 66
150	78 134	10	52 84	250	36 59
200	49 105	15	30 62	300	29 52
250	19 75	20	8 40	350	22 45
300	- 46	25	- 17	400	15 37

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Indore, Khandwa, Khargone, Mandsaur, Powarkheda, Sehore, Ujjain.

Sugarcane

Andhra Pradesh (Sugarcane)

Name of the Centre	: Nellore	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Sandy clay loam (Alluvial)	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Sugarcane – 87A-298	FYM composition	: 0.75 : 0.60 : 1.20
Season/Year developed	: 1999-2000	FYM rate	:
Target range	: 80 q ha ⁻¹ - 100 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

FN = 3.43 T – 1.45 SN- 0.70 FYM N, FP_2O_5 = 1.30 T – 4.83 SP- 0.43 FYM P

FK_2O = 1.93 T – 0.56 SK- 0.03 FYM K

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 125 t ha ⁻¹					
Kmn O ₄ -N	Olsen-P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	5	150	276	141	162	230	131	144
140	10	170	244	120	148	201	107	132
160	15	190	212	98	135	172	83	121
180	20	210	180	76	121	143	59	110
200	25	230	148	55	108	114	35	99
220	30	250	116	33	94	85	10	88
240	35	270	84	12	81	56	0	76
260	40	290	52	0	67	27		65

Verification: The above equations are to be verified on the farmers' fields of Nellore district with yield targets of 45 and 50 q ha⁻¹ and in Prakasam district with yield targets of 55 and 60 q ha⁻¹ during *kharif*, 1997. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories	:	Nellore, Ongole, Tirupati and Cuddapah
Soil type	:	Sandy clay loam
Crop	:	Rice - high yielding varieties
Season developed	:	<i>Kharif</i>
Yield target	:	Up to 125-150 t ha ⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Sugarcane 1st Ratoon crop

Name of the Centre	: Nellore	Soil phosphorus range	: 5 – 35 kg ha ⁻¹
Soil	: Sandy clay loam (Alluvial)	Soil potassium range	: 150 – 270 kg ha ⁻¹
Crop and Variety	: Sugarcane – 87A-298	FYM composition	:
Season/Year developed	: 2000-2001	FYM rate	:
Target range	: 125 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 120 – 240 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.85 T - 2.60 SN - 0.20 FYM N, \quad FP_2O_5 = 1.36 T - 5.73 SP - 0.34 FYM P$$

$$FK_2O = 1.94 T - 0.85 SK - 0.40 FYM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 125 t ha ⁻¹					
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	5	150	294	141	115	285	126	76
140	10	170	242	113	98	233	97	59
160	15	190	190	84	81	181	68	42
180	20	210	138	55	64	129	40	25
200	25	230	86	27	47	77	11	0
220	30	250	34	0	30	25	0	
240	35	270	0					

Karnataka (Sugarcane)

Name of the centre	: Karnataka	Soil phosphorus range	: 15 -25 kg ha ⁻¹
Soil	:	Soil potassium range	: 300 – 550 kg ha ⁻¹
Crop & Variety	: CO – 419 and Other HYV	FYM composition	:
Season developed	: -	FYM rate	:
Target range	: 125 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 200 – 300 kg ha ⁻¹	Green manure rate	:

Targeted Yield Equation

FN = 5.52 T – 150.24 SN (OC %), $FP_2O_5 = 2.27 T - 0.96 SP_2O_5$ (Olsen's P_2O_5)

$FK_2O = 3.75 T - 0.38 SK_2O$ (NH_4OAC-K_2O) RYS = 8.70

Crop: Sugarcane (CO-62175)

Targeted Yield Equation

FN = 2.206 T-212.8 SN (OC%), $FP_2O_5 = 1.057 T - 3.196 SP_2O_5$ (Bray's P_2O_5)

$FK_2O = 1.192 T - 0.313 SK_2O$ (NH_4OAC-K_2O) RYS = 22.50

yield of sugarcane during 2002-03

Yield Target (t/ha)/Fertilizer prescription approach	Fertilizer nutrients applied (kg/ha)			Yield (t/ha)	Response (t/ha)	Deviation (%)	VCR
	N	P_2O_5	K_2O				
150– STCR (Fully Inorganic)	154	0	60	167.0	89.0	+11.3	1:33.8
150 – STCR (50% Organic + 50 % Inorganic) 15.5 t FYM	77	0	0	159.4	81.4	+6.3	1:7.6
150 – GRD	250	75	75	161.8	83.8	+7.9	1:13.8
150 – STL	213	63	50	147.4	69.4	-1.7	1:13.8
Control	-	-	-	78.0	.		

STV : O C – 0.82 %, Bray's P_2O_5 – 71.68 kg/ha, Amm.Acetate K_2O – 378.0 kg/ha

Coimbatore

Sugarcane

Name of the centre	: Coimbatore	Soil phosphorus range	: 15 -25 kg ha ⁻¹
Soil	: Mixed black (Perianaicken- palayamseries)	Soil potassium range	: 300 – 550 kg ha ⁻¹
Crop & Variety	: Sugarcane - COC 671	FYM composition	:
Season developed	: -	FYM rate	:
Target range	: 125 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 200 – 300 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	4.17	T	-	1.09	SN	-	1.11	ON
FP ₂ O ₅	=	1.01	T	-	2.56	SP	-	1.01	OP
FK ₂ O	=	3.44	T	-	0.84	SK	-	1.03	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 125 t ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	200	15	200	303	88	178
2	220	17	220	281	82	136
3	240	19	240	259	77	94
4	260	21	260	238	72	52
5	280	23	280	216	67	10
6	300	25	300	194	62	-

Recommendation domain

Soil type : Black clay loam
Yield target : 125 t ha⁻¹

Sugarcane

Name of the centre : Cuddalore (Sub centre)

Soil : Red (Gadillum series)

Crop & Variety : Sugarcane - CO 6304

Season developed : -

Target range : 125 t ha⁻¹

Soil Nitrogen range : 200 – 300 kg ha⁻¹

Soil phosphorus range : 15 -25 kg ha⁻¹

Soil potassium range : 200 – 300 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertiliser Adjustment Equations

FN = 4.06 T - 0.74 SN - 0.87 ON

FP₂O₅ = 0.71 T - 1.09 SP - 0.72 OP

FK₂O = 2.67 T - 0.57 SK - 1.30 OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 125 t ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	200	15	200	360	73	220
2	220	17	220	345	70	209
3	240	19	240	331	68	197
4	260	21	260	316	66	186
5	280	23	280	301	64	170
6	300	25	300	286	62	163

Recommendation domain

Soil type : Coastal Alluvium - Clay loam

Yield target : 150 t ha⁻¹

Sugarcane

Name of the centre : Bhavanisagar(sub-centre)
Soil : Red (Irugur series)
Crop & Variety : Sugarcane - COC 671
Season developed : -
Target range : 100 t ha⁻¹
Soil Nitrogen range : 200 – 300 kg ha⁻¹

Soil phosphorus range : 14 -24 kg ha⁻¹
Soil potassium range : 200 – 300 kg ha⁻¹
FYM composition :
FYM rate :
Green manure composition :
Green manure rate :

Fertiliser Adjustment Equations

FN = 3.42 **T** - 0.56 **SN** - 0.93 **ON**
FP₂O₅ = 1.15 **T** - 1.94 **SP** - 0.98 **OP**
FK₂O = 3.16 **T** - 0.73 **SK** - 0.99 **OK**

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 125 t ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	200	14	200	230	88	170
2	220	16	220	219	86	155
3	240	18	240	208	80	141
4	260	20	260	196	76	135
5	280	22	280	185	72	112
6	300	24	300	174	68	97

Recommendation domain

Soil type : Red Sandy Loam
Yield target : 100 t ha⁻¹

Maharashtra

Crop	:	Sugarcane (<i>Adsali</i>)
Variety	:	Co 7219
Soil	:	Typic Haplusterts
Situation	:	Irrigated :
Target range	:	175 – 200 t ha ⁻¹
Soil nitrogen range	:	100 – 200
Soil phosphorus	:	6 –16
Potassium	:	200- 700

Applicable Districts : Ahmednagar, Pune, Satara, Sangli, Kolhapur, Nasik, Dhule,
Latur, Solapur, Parbhani, Osmanabad, Nanded.

Targeted Yield Equations

$$\text{FN} = 4.39 \text{ T} - 1.56 \text{ SN}$$

$$\text{FP}_2\text{O}_5 = 1.62 \text{ T} - 4.56 \text{ SP}$$

$$\text{FK}_2\text{O} = 1.86 \text{ T} - 0.37 \text{ SK}$$

Fertilizer prescription for targeted yields of adsali sugarcane for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			175 t ha ⁻¹ target			200 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	612	256	252	722	297	298
120	8	300	581	247	215	691	288	261
140	10	400	550	238	178	660	278	224
160	12	500	519	229	141	628	269	187
180	14	600	487	220	104	597	260	150
200	16	700	456	211	67	566	251	113

Crop : **Sugarcane (Seasonal)**

Variety : **Co 86032**

Soil : **Vertic Haplusterts**

Situation : **Irrigated**

Target range : **100 – 120 t ha⁻¹**

Soil nitrogen range : **100 – 200**

Phosphorus range : **06 – 16**

Potassium range : **200 – 700**

FYM composition :

Applicable Districts : Ahmednagar, Pune, Satara, Sangli, Kolhapur, Solapur, Nasik,

Aurangabad, Nanded, Parbhani, Jalgaon, Buldhana, Kolhapur.

Targeted Yield Equations

$$FN = 4.76 T - 1.34 SN, \quad FP_2O_5 = 1.24 T - 1.55 SP, \quad FK_2O = 2.73 T - 0.21 SK$$

Fertilizer prescription for targeted yields of seasonal sugarcane for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			100 t ha ⁻¹ target			120 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	342	115	231	437	140	286
120	8	300	315	112	210	410	136	265
140	10	400	288	109	181	384	133	244
160	12	500	261	105	168	357	130	223
180	14	600	234	102	147	330	127	202
200	16	700	207	99	134	303	124	181

Pusa (Sugarcane)

Name of the centre	: Pusa	Soil phosphorus range	: 15 -25 kg ha ⁻¹
Soil	: Young Alluvium Calcareous	Soil potassium range	: 300 – 550 kg ha ⁻¹
Soil		FYM composition	:
Crop & Variety	: Sugarcane (irr./ dry)	FYM rate	:
Season developed	: -	Green manure composition	:
Target range	: 125 t ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 200 – 300 kg ha ⁻¹		

Applicability :

Targeted Yield Equations

$$FN = 0.236 T - 0.27 SN, \quad FP_2O_5 = 0.113 T - 1.59 SP_2O_5, \quad FK_2O = 0.101 T - 0.25 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	145	78	61	204	107	86
130	6	70	142	75	58	201	103	84
140	8	80	139	72	56	198	100	81
150	10	90	137	69	53	196	97	79
160	12	100	134	66	51	193	94	76
170	14	110	131	62	48	190	91	74
180	16	120	128	59	46	187	88	71
190	18	130	126	56	43	185	84	69
200	20	140	123	53	41	182	81	66
210	22	150	120	50	38	179	78	64
220	24	160	118	47	36	177	75	61
230	26	170	115	43	33	174	72	59
240	28	180	112	40	31	171	68	56
250	30	190	110	37	30	169	65	54
260	32	200	107	34	30	166	62	51
270	34	210	104	31	30	163	59	49
280	36	220	101	28	30	160	56	46
290	38	230	99	24	30	158	53	44
300	40	240	96	21	30	155	49	41
310	42	250	93	20	30	152	46	39
320	44	260	91	20	30	150	43	36
330	46	270	88	20	30	147	40	34
340	48	280	85	20	30	144	37	31
350	50	290	83	20	30	142	34	30
360	52	300	80	20	30	139	30	30
370	54	310	77	20	30	136	27	30

380	56	320	74	20	30	133	24	30
390	58	330	72	20	30	131	21	30
400	60	340	69	20	30	128	20	30

Crop : Sugarcane (Ratoon)

Soil : Young Alluvium Calcareous Soil

Applicable districts :

Targetted Yield Equations :

$$FN = 0.261 T - 0.29 SN$$

$$FP_2O_5 = 0.120 T - 1.50 SP_2O_5$$

$$FK_2O = 0.108 T - 0.19 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	161	84	70	226	114	97
130	6	70	158	81	68	223	111	95
140	8	80	155	78	66	220	108	93
150	10	90	152	75	64	218	105	91
160	12	100	149	72	62	215	102	89
170	14	110	146	69	60	212	99	87
180	16	120	144	66	58	209	96	85
190	18	130	141	63	56	206	93	83
200	20	140	138	60	54	203	90	81
210	22	150	135	57	53	200	87	80
220	24	160	132	54	51	197	84	78
230	26	170	129	51	49	194	81	76
240	28	180	126	48	47	191	78	74
250	30	190	123	45	45	189	75	72
260	32	200	120	42	43	186	72	70
270	34	210	117	39	41	183	69	68
280	36	220	115	36	39	180	66	66
290	38	230	112	33	37	177	63	64
300	40	240	109	30	35	174	60	62
310	42	250	106	27	34	171	57	61
320	44	260	103	24	32	168	54	59
330	46	270	100	21	30	165	51	57
340	48	280	97	20	30	162	48	55
350	50	290	94	20	30	160	45	53
360	52	300	91	20	30	157	42	51
370	54	310	88	20	30	154	39	49
380	56	320	86	20	30	151	36	47

390	58	330	83	20	30	148	33	45
400	60	340	80	20	30	145	30	43

Madhya Pradesh (Sugarcane)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 0.571 T - 1.66 SN \quad FP_2O_5 = 0.228 T - 11.73 SP \quad FK_2O = 0.16 T - 0.53 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)	
	12	14		12	14		12	14
100	519	633	5	215	260	200	86	118
200	353	467	15	98	143	300	33	65
250	270	384	20	39	84	350	6	38
300	187	301	25	-	26	400	-	12
350	104	218	30	-	-	450	-	-

Applicability : Shallow, Medium and Deep black soils ; Soil Testing Laboratories : Bhopal, Dhar, Jabalpur, Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Chindwara , Sehore.

Groundnut

Andhra Pradesh(Groundnut – Rice fallow) Without IPNS

Name of the Centre	: Jagtial	Soil phosphorus range	: 5 – 45 kg ha ⁻¹
Soil	: Chalka soil	Soil potassium range	: 100 – 500 kg ha ⁻¹
Crop and Variety	: Groundnut Girnar-1	FYM composition	: 0.75 : 0.6 : 1.3
Season developed	: January 1991 & 1992 (pooled data)	FYM rate	:
Target range	: 25 q ha ⁻¹ – 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 300 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 2.12 T - 0.14 SN, \quad FP_2O_5 = 2.40 T - 1.72 SP, \quad FK_2O = 1.84 T - 0.09 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	25 (q ha ⁻¹)			30 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	100	39	51	37	50	63	46
125	10	150	36	43	33	46	55	42
150	15	200	32	34	28	43	46	37
175	20	250	29	24	24	39	38	33
200	25	300	25	17	19	36	29	28
225	30	350	22	8*	15	32	20	24
250	35	400	18	8*	10	29	12	19
275	40	450	15	8*	6	25	3	15
300	45	500	11	8*	6*	22	3*	10

*maintainance dose.

Verification: The above results were verified in Nizamabad district with yield targets of 25 and 30 q ha⁻¹ in both light and black soils during the year 1993-94 and in light black soils of Kurnool district with yield targets of 25 and 30 q ha⁻¹ during *rabi* 1996-97. All the yield targets were attained at the places tested.

Applicability

Soil Testing Laboratories	:	Karimnagar, Nizamabad and Warangal
Soil type	:	Chalka sols and light black soils
Season developed	:	Rice fallow groundnut (January sowing)
Yield target	:	Upto 30 q ha ⁻¹

Note : The above equations may be tested in the districts of Mahaboobnagar, Nalgonda, Medak and Ranga Reddy where groundnut is sown in light textured soils during the January in rice fallows with two or three yield targets and pick up the best one for making fertilizer recommendations.

GROUNDNUT – Summer

Name of the Centre	: Nellore	Soil phosphorus range	: 10 – 50 kg ha ⁻¹
Soil	: Aluvial (sandy clay loam)	Soil potassium range	: 150 – 350 kg ha ⁻¹
Crop and Variety	: Groundnut – Tirupathi - 1	FYM composition	: 0.75 : 0.6 : 1.3
Season developed	: March, 1997 (Summer)	FYM rate	:
Target range	: 25 q ha ⁻¹ – 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 200 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.03 T - 0.23 SN, \quad FP_2O_5 = 4.68 T - 1.97 SP, \quad FK_2O = 4.06 T - 0.36 SK$$

Verification: The above equations are at to be verified on the farmers' fields.

Applicability

Soil Testing Laboratories	:	Nellore, Tirupatim Cuddapah and Ongole
Soil type	:	Sandy lay loam and sandy loam
Crop	:	Groundnut
Season developed	:	Summer (March)
Yield target	:	Upto 22 q ha ⁻¹

Note : The above equations may be tested in Anantapur and Kurnool districts with 3 or 4 yield targets and pickup the best one for fertilizer recommendation.

Reddy Reckoner Request

IPNS ON GROUNDNUT

Name of the centre	: Palem	Soil phosphorus range	: 5 – 20 kg ha ⁻¹
Soil	: Alfisol (Sandy loam)	Soil potassium range	: 75 – 150 kg ha ⁻¹
Crop and Variety	: Groundnut – TMV-2	FYM composition	: 0.75 : 0.6 : 1.3
Season developed	: <i>Kharif</i> , 1999-2000 and 2000-01	FYM rate	:
Target range	: 15 q ha ⁻¹ – 20 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 70 – 100 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 13.6 T - 0.82 SN - 0.36 FYM N$$

$$\text{FP}_2\text{O}_5 = 11.75 \text{ T} - 6.11 \text{ SP} - 0.55 \text{ FYM P}$$

$$\text{FK}_2\text{O} = 4.36 \text{ T} - 0.27 \text{ SK} - 0.16 \text{ FYM K}$$

Reddy Reckoner Request

Verification: The above equations were verified on the farmers' fields of Mahbubnagar district with yield targets of 8 and 10 q ha⁻¹ and in Ranga Reddy district with yield targets of 10 and 12 q ha⁻¹ during *kharif, 2002*. All the yield targets could be attained at the places tested.

Applicability

Soil Testing Laboratories : Mahbubnagar and Ranga Reddy districts

Soil type : Alfisol (Sandy loam, Loam)

Crop : Groundnut-TMV-2

Season developed : *Kharif*

Yield target : Up to 12 – 15 q ha⁻¹

Note: The above equations may be tested in soils other than sandy loam of Alfisol in the farmers' fields with two to three targets and pick up the best one for making recommendations in Southern Telangana Zone.

Groundnut

Name of the	: Nellore	Soil phosphorus range	: 5 – 20 kg ha ⁻¹
	sub-centre	Soil potassium range	: 75 – 150 kg ha ⁻¹
Soil	: Alfisol (Sandy loam)	FYM composition	: 0.75 : 0.6 : 1.3
Crop and Variety	: Groundnut – TMV-2	FYM rate	:
Season developed	: <i>Kharif</i> , 1999-2000 and	Green manure composition	:
	2000-01	Green manure rate	:
Target range	: 15 q ha ⁻¹		
Soil Nitrogen range	: 70 – 100 kg ha ⁻¹		

Fertilizer adjustment equations

$$\text{FN} = 5.5 \text{ T} - 0.25 \text{ SN} - 0.137 \text{ FYM N}$$

$$\text{FP}_2\text{O}_5 = 14.56 \text{ T} - 10.38 \text{ SP} - 0.31 \text{ FYM P}$$

Reddy Reckoner Requeat

Verification: The above equations were verified on the farmers' fields of Mahbubnagar district with yield targets of 8 and 10 q ha⁻¹ and in Ranga Reddy district with yield targets of 10 and 12 q ha⁻¹ during *kharif, 2002*. All the yield targets could be attained at the places

tested.

Applicability

Soil Testing Laboratories : Mahbubnagar and Ranga Reddy districts
 Soil type : Alfisol (Sandy loam, Loam)
 Crop : Groundnut-TMV-2
 Season developed : *Kharif*
 Yield target : Upto 12 – 15 q ha⁻¹

Note: The above equations may be tested in soils other than sandy loam of Alfisol in the farmers' fields with two to three targets and pick up the best one for making recommendations in Southern Telangana Zone.

Coimbatore (Groundnut) Without IPNS Based

Name of the centre	: Bhavanisagar (Sub-Centre)	Soil phosphorus range	: 8 -26 kg ha ⁻¹
		Soil potassium range	: 150 – 240 kg ha ⁻¹
Soil	: Red (Irugur series)	FYM composition	:
Crop & Variety	: Groundnut - POL 2	FYM rate	:
Season developed	: Kharif	Green manure composition	:
Target range	: 25 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 150 – 240 kg ha ⁻¹		

Fertiliser Adjustment Equations

FN	=	6.54	T	-	0.56	SN	-	0.69	ON
FP ₂ O ₅	=	3.80	T	-	3.32	SP	-	0.77	OP
FK ₂ O	=	8.35	T	-	0.65	SK	-	0.87	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	80	68	111
2	160	10	160	74	62	105
3	170	12	170	69	55	98
4	180	14	180	63	49	92
5	190	16	190	58	42	85
6	200	18	200	52	35	79
7	210	20	210	46	29	72
8	220	22	220	41	22	66
9	230	24	230	35	15	59
10	240	26	240	30	9	53

Recommendation domain

Soil type : Red Sandy Loam
Yield target : 25 q ha⁻¹

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 -26 kg ha ⁻¹
Soil	: Red (Somayanur series)	Soil potassium range	: 150 – 240 kg ha ⁻¹
Crop & Variety	: Groundnut - CO 1	FYM composition	:
Season developed	: Rabi	FYM rate	:
Target range	: 25 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 240 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	= 6.54	T	- 0.51	SN	- 1.10	ON
FP₂O₅	= 4.19	T	- 2.95	SP	- 0.77	OP
FK₂O	= 5.47	T	- 0.33	SK	- 0.87	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	87	81	87
2	160	10	160	82	75	84
3	170	12	170	77	69	81
4	180	14	180	72	64	78
5	190	16	190	67	58	71
6	200	18	200	62	52	71
7	210	20	210	56	46	68
8	220	22	220	51	40	64
9	230	24	230	46	34	61
10	240	26	240	41	28	58

Applicability :

Recommendation domain

Soil type : Red Sandy Clay Loam
Yield target : 25 q ha⁻¹

Groundnut

Name of the centre : Vridhachalam (Sub-centre)

Soil : Laterite
 Crop & Variety : Groundnut - VRI 1
 Season developed : Kharif
 Target range : 25 q ha⁻¹
 Soil Nitrogen range : 150 – 240 kg ha⁻¹

Soil phosphorus range : 8 -26 kg ha⁻¹
 Soil potassium range : 100 – 280 kg ha⁻¹
 FYM composition :
 FYM rate :
 Green manure composition :
 Green manure rate :

Fertiliser Adjustment Equations

FN	=	5.97	T	-	0.45	SN
FP ₂ O ₅	=	3.80	T	-	3.32	SP
FK ₂ O	=	7.08	T	-	0.58	SK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	81	68	119
2	160	10	160	77	62	107
3	170	12	170	72	55	96
4	180	14	180	68	49	84
5	190	16	190	63	42	72
6	200	18	200	59	35	61
7	210	20	210	54	29	49
8	220	22	220	50	22	38
9	230	24	230	45	15	26
10	240	26	240	41	9	14

Recommendation domain

Soil type : Laterite - Sandy Clay Loam

Yield target : 25 q ha⁻¹

Maharashtra

Crop	: Groundnut (<i>Kharif</i>)	Soil phosphorus range	: 6 -16 kg ha ⁻¹
Variety	: Phule Pragati (JL-24)	Soil potassium range	: 200 – 500 kg ha ⁻¹
Soil	: Vertic Haplustepts	FYM composition	:
Situation	: Protective Irrigated	FYM rate	:
Target range	: 20 q ha ⁻¹ - 25 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 220 kg ha ⁻¹	Green manure rate	:

Districts : Jalgaon, Dhule, Akola, Latur, Aurangabad, Jalna, Parbhani, Buldhana, Nanded, Pune, Wardha,

Yeotmal, Satara, Sangli, Kolhapur, Ahmednagar.

Targeted Yield Equations

$$FN = 4.16 T - 0.37 SN, \quad FP_2O_5 = 4.96 T - 4.36 SP, \quad FK_2O = 3.14 T - 0.16 SK$$

Fertilizer prescription for targeted yields of *Kharif* groundnut for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			20 q ha ⁻¹ target			25 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	46	73	31	67	98	47
120	8	250	39	64	23	60	89	39
140	10	300	31	56	15	52	80	31
160	12	350	24	47	25*	45	72	23
180	14	400	17	38	25*	37	63	15
200	16	450	25*	29	25*	30	54	25*
220	18	500	25*	21	25*	23	46	25*

* Minimum dose of N and K₂O

Centre Name	: Maharashtra	Soil phosphorus range	: 6 -16 kg ha ⁻¹
Crop	: Groundnut (Summer)	Soil potassium range	: 200 – 500 kg ha ⁻¹
Variety	: SB-IX	FYM composition	:
Soil	: Vertic Haplustepts	FYM rate	:
Situation	: Irrigated	Green manure composition	:
Target range	: 20 q ha ⁻¹ - 25 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100 – 220 kg ha ⁻¹		

Districts : Ahmednagar, Pune, Satara, Sangli, Kolhapur, Nasik, Jalgaon, Thane, Raigad,
Ratnagiri, Sindhudurg, Wardha, Nagpur, Buldhana, Gadchiroli, Chandrapur.

Targeted Yield Equations

$\text{FN} = 4.18 \text{ T} - 0.40 \text{ SN}$, $\text{FP}_2\text{O}_5 = 8.23 \text{ T} - 6.15 \text{ SP}$, $\text{FK}_2\text{O} = 3.22 \text{ T} - 0.10 \text{ SK}$

Fertilizer prescription for targeted yields of summer groundnut for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			20 q ha ⁻¹ target			25 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	65	169	61	85	210	77
120	8	300	57	157	51	77	198	67
140	10	400	49	144	41	69	185	57
160	12	500	41	132	31	61	173	47
180	14	600	33	120	21	53	161	37
200	16	700	25	107	11	45	149	27

Pusa (Groundnut)

Crop	: Groundnut	Soil phosphorus range	: 4 -44 kg ha ⁻¹
Variety	: Phule Pragati (JL-24)	Soil potassium range	: 60 – 260 kg ha ⁻¹
Soil	: Young Alluvium	FYM composition	:
	Calcareous Soil	FYM rate	:
Situation	:	Green manure composition	:
Target range	: 15 q ha ⁻¹ - 20 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 120 – 320 kg ha ⁻¹		

$$FN = 6.82 T - 0.31 SN, FP_2O_5 = 3.36 T - 0.86 SP_2O_5, FK_2O = 3.09 T - 0.28 SK_2O$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			15q/ha			20q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	65	47	30	99	64	45
130	6	70	62	45	27	96	62	42
140	8	80	59	44	24	93	60	39
150	10	90	56	42	21	90	59	37
160	12	100	53	40	18	87	57	34
170	14	110	50	38	16	84	55	31
180	16	120	47	37	13	81	53	28
190	18	130	43	35	10	78	52	25
200	20	140	40	33	10	74	50	23
210	22	150	37	31	10	71	48	20
220	24	160	34	30	10	68	47	17
230	26	170	31	28	10	65	45	14
240	28	180	28	26	10	62	43	11
250	30	190	25	25	10	59	41	10
260	32	200	22	23	10	56	40	10
270	34	210	19	21	10	53	38	10
280	36	220	16	19	10	50	36	10
290	38	230	12	18	10	47	35	10
300	40	240	10	16	10	43	33	10
310	42	250	10	14	10	40	31	10
320	44	260	10	13	10	37	29	10

Raipur (Groundnut)

Name of the Centre	: Raipur	Soil phosphorus range	:
Crop	: Groundnut	Soil potassium range	:
Variety	: J – 11	FYM composition	:
Soil	: Vertisol	FYM rate	:
Situation	:	Green manure composition	:
Season	: Rabi, 1996-97	Green manure rate	:
Target range	:		
Soil Nitrogen range	:		

Fertilizer adjustment equations

FN = General recommended dose (20 kg ha⁻¹)

FP₂O₅ = Critical value for SP = 13 kg P ha⁻¹

FK₂O = No K if SK >250 kg ha⁻¹

Reddy Reckoner Request

Kalyani

Name of the Centre	: Kalyani	Soil phosphorus range	:
Crop	: Groundnut	Soil potassium range	:
Variety	: TAQ - 24	FYM composition	:
Soil	:	FYM rate	:
Season and year	: Pre-kharif, 2005	Green manure composition	:
Situation	:	Green manure rate	:
Target range	:		
Soil Nitrogen range	:		

Fertilizer adjustment equations:

FN = 20.0 T – 1.3 SN, FP₂O₅ = 3.2 T – 0.47 SP, FK₂O = 6.9 T – 0.74 SK

Fertilizer levels (kg.ha⁻¹)	N	0, 20, 40, -
	P₂O₅	0, 20, 40, 60
	K₂O	0, 20, 40, -
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	269 - 271
	Olsen-P	39 - 92
	NH₄OAc-K	99 - 288

Yield (kg.ha⁻¹)	Control plot	2900 - 3120
	Treated plot	3160 - 4280

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha ⁻¹)			Fertilizer nutrient required (kg.ha ⁻¹)					
			Targeted yield 2.0 t.ha ⁻¹			Targeted yield 2.5 t.ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
250	5	100	35	55	50	43	62	64
275	10	150	7.5	53	13	43	59	27
300	15	200	5	51	10	10	57	10
325	20	250	5	48	10	5	55	10
350	25	300	5	46	10	5	52	10
375	30	350	5	44	10	5	50	10

*A minor modification was made in the ready reckoner.

Karnataka

Crop	: Groundnut	Soil phosphorus range	:
SOIL	: Red	Soil potassium range	:
Season	: Kharif	FYM composition	:
Variety	: TMV-2	FYM rate	:
Area of applicability	: Mandya and Mysore	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Target yield equations :

$$\begin{aligned}
 \text{FN} &= 3.88 T - 0.53 \text{ SN (KMnO}_4\text{-N)} - 0.000334 \text{ OM} \\
 \text{FP}_2\text{O}_5 &= 5.85 T - 1.063 \text{ SP}_2\text{O}_5 \text{ (Bray's-P}_2\text{O}_5\text{)} - 0.000332 \text{ OM} \\
 \text{FK}_2\text{O} &= 4.24 T - 0.533 \text{ SK}_2\text{O (NH}_4\text{OAC-K}_2\text{O)} - 0.000423 \text{ OM}
 \end{aligned}$$

STV KMnO ₄ - N (kg/acre)	Fertilizer nitrogen (kg/acre)	STV Bray's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
20	20.4	3	43.6	20	23.2
22	19.4	5	41.5	22	22.2
24	18.3	7	39.4	24	21.1
26	17.3	9	37.2	26	20.0
28	16.2	11	35.1	28	19.0
30	15.1	13	33.0	30	17.9
32	14.1	15	30.9	32	16.8
34	13.0	17	28.7	34	15.8
36	12.0	19	26.6	36	14.7
38	10.9	21	24.5	38	13.6
40	9.8	23	22.4	40	12.6
42	8.8	25	20.2	42	11.5
44	7.7	27	18.1	44	10.4
46	6.7	29	16.0	46	9.4
48	5.6	31	13.8	48	8.3
50	4.5	33	11.7	50	7.2

Note: If one tonne FYM /acre is used then decrease N by 0.3 kg/acre, P₂O₅ by 0.3 kg/acre and K₂O by 0.4 kg/acre

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 3.9 kg/acre

P₂O₅ = ± 5.9 kg/acre

K₂O = ± 4.2 kg/acre.

Bhubneswer (Groundnut)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Groundnut (Smruti)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.5 T - 0.4 SN, \quad FP_2O_5 = 4.1 T - 1.5 SP, \quad FK_2O = 2.5 T - 0.3 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	40 (q ha ⁻¹)			45 (q ha ⁻¹)			50 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
60	15	50	44	40	23	66	60	35	87	80	48
70	20	60	40	32	20	62	53	32	84	72	45
80	25	70	35	24	17	58	46	29	80	64	42
100	30	80	28	17	14	50	39	26	72	58	39
120	35	90	20	10	11	52	32	23	64	50	36
140	40	100	10	10	10	34	25	20	56	42	33
150	45	125	10	10	10	26	18	13	48	34	25
180	50	150	10	10	10	18	11	10	40	26	13
200	60	175	10	10	10	10	10	10	32	18	10
220	70	200	10	10	10	10	10	10	24	10	10

Mustard

Raipur (Mustard)

Crop	: Mustard	Soil phosphorus range	:
SOIL	: Vertisol	Soil potassium range	:
Season	: Rabi, 1993-94	FYM composition	:
Variety	: Pusa bold	FYM rate	:
Area of applicability	: Mandya and Mysore	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Fertilizer adjustment equation for targeted yield

$$FN = 9.18 Y - 0.256 SN, \quad FP_2O_5 = 188 - (35180 - 1715Y)^{1/2} - 2.79 SP$$

$$FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard (Pusa bold) in Vertisol (Kanhra).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) mustard (var. - Pusa bold)					
		12		16		20	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	72	59	108	92	145	150
175	6	65	50	102	83	139	142
200	9	59	42	96	75	132	133
225	12	53	34	89	67	126	125
250	15	46	25	83	58	120	117
275	18	40	17	76	50	113	108
300	21	33	9	70	41	107	100
350	24	21	6	57	33	94	92
400	28	8	6	44	22	81	80

Mustard

Village	Semariya	Block	Dhamdha
Distt.	Durg (C.G.)	Name of farmer	Gorakh Nath Maurya
Soil Type	Vertisol	Crop/variety	Mustard (Pusa bold)
Soil Test Value	SN = 152, SP = 6 kg, SK = 389 kg ha-1		
Targeted yield equations used (Date of sowing -5-12-99)			
FN	= 9.187 – 0.256 SN		
F P ₂ O ₅	= 188-2.79 SP – (35180-17157) ^{1/2}		
F K ₂ O	= No fertilizer K if SK is more than 250 kg ha-1		

Grain yield of mustard and net return as Rs/Re spent on fertilizer in relation to soil test based fertilizer recommendation and other adopted fertilizer doses

Treatments	Fertilizer doses (kg ha ⁻¹) N:P ₂ O ₅ :K ₂ O	Yield obtained q ha ⁻¹	Yield response q ha ⁻¹	Response as kg/kg for N	Net return as Rs/Re spent on fertilizer
Control	0-0-0	4.10	-	-	-
FPD	60-40-0	8.45	435	4.38	4.02
YT 12 q ha⁻¹	72-50-0	10.80	6.70	5.49	5.04
YT 15 q ha⁻¹	100-74-0	13.60	9.50	5.43	4.96
GRD	120-80-40	13.82	9.72	4.05	3.92

Crop	: Mustard	Soil phosphorus range	:
SOIL	: Inceptisol	Soil potassium range	:
Season	: Rabi, 1992-93	FYM composition	:
Variety	: Pusa Bold	FYM rate	:
Area of applicability	:	Green manure composition	:
Target range	: q ha⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Fertilizer adjustment equation for targeted yield

FN = 9.32 Y – 0.375SN, FP₂O₅ = 196.9 - (38784 – 1656Y)^{1/2} – 3.38 SP
 FK₂O = No K if SK >250 kg ha⁻¹

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard (Pusa bold) in Inceptisol (Matasi).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) mustard (var. - Pusa bold)					
		12		16		20	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	55	49	92	76	129	112
175	6	45	39	83	66	120	101
200	9	36	29	73	56	110	91
225	12	26	19	64	45	101	81
250	15	17	9	54	35	91	71
275	18	7	5	45	25	82	61
300	21	7	5	35	15	72	51
350	24	7	5	16	5	53	41
400	28	7	5	7	5	34	27

Pantnagar (Mustard)

Crop	: Mustard	Soil phosphorus range	:
SOIL	:	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Area of applicability	:	Green manure composition	:
Target range	: 15 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Fertilizer adjustment equations of STCR experiments for different crops under IPNS

$$\text{F N (N kg/ha)} = 15.63 \times \text{YT (q/ha)} - 1.04 \text{ SN} - 1.61 \text{ FYM-N}$$

$$\text{F P (P kg/ha)} = 2.40 \times \text{YT (q/ha)} - 1.03 \text{ SP} - 0.32 \text{ FYM-P}$$

$$\text{F K (K kg/ha)} = 3.88 \times \text{YT (q/ha)} - 0.16 \text{ SP} - 0.40 \text{ FYM-K}$$

fertilizer adjustment equations for different yield target.

$$\text{F N (N, kg/ha)} = 13.30 \times \text{YT (q/ha)} - 0.56$$

$$\text{F P (P}_2\text{O}_5, \text{ kg/ha)} = 13.40 \times \text{YT (q/ha)} - 160$$

$$\text{F K (K}_2\text{O kg/ha)} = 6.55 \times \text{YT (q/ha)} - 0.22$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
Org.Carbon	P	K	N	P ₂ O ₅	K ₂ O
0.2	10	100	67	75	59
0.4	13	125	62	72	58
0.6	15	150	58	70	56
0.8	18	175	53	68	54
1.0	20	200	48	70	52
1.2	23	225	43	63	51
1.4	25	250	38	62	49
1.6	28	275	33	59	47
1.8	30	300	29	57	45
2.0	33	325	24	55	44
2.2	35	350	19	53	42
2.4	38	375	14	50	41
2.6	40	400	9	49	38

Pantanagar (Forage Sarson)

Name of the Centre : Forage sarson

Soil :

Crop and Variety :

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for yield targets (kg/ha)

$$F N (N, \text{ kg/ha}) = 0.14 \times YT(q/\text{ha}) - 23.32$$

$$F P (P_2O_5, \text{ kg/ha}) = 0.195 \times YT(q/\text{ha}) - 2.29$$

$$F K (K_2O \text{ kg/ha}) = 0.174 \times YT (q/\text{ha}) - 0.141$$

New Delhi (Mustard) with FYM

Name of the Centre	: New Delhi	Soil phosphorus range	:
Soil	: Typic hapusttept (Alluvial)	Soil potassium range	:
Season	:	FYM composition	:
Variety	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equatins for targeted yield of crps in NCR of Delhi	
With FYM	Without FYM
$FN = 6.64 T - 0.38 SN - 1.72 FYM,$ $FP_2O_5 = 6.10 T - 4.02 SP - 2.43 FYM$ $FK_2O = 3.84 T - 0.24 SK - 1.21 FYM$	$FN = 7.41 T - 0.44 SN,$ $FP_2O_5 = 6.22 T - 3.41 SP,$ $FK_2O = 6.21 T - 0.39 SK$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Mustard FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	80	60	40	110	90	60
125	13	125	70	50	35	100	80	55
150	15	150	60	40	30	90	70	50
175	18	175	50	25	25	80	60	40
200	20	200	40	15	15	75	50	35
225	23	225	30	10*	10*	65	40	30
250	25	250	20	10*	10*	55	30	25
275	28	275	10*	10*	10*	45	20	20
300	30	300	10*	10*	10*	35	10	10
325	33	325	10*	10*	10*	25	10	10
350	36	350	10*	10*	10*	10	10	10
375	38	375	10*	10*	10*	10	10	10

*maintainace dose

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	105	90	85	100	140	120
125	13	125	95	80	75	125	130	115
150	15	150	80	75	65	150	120	105
175	18	175	70	65	55	175	110	95
200	20	200	60	55	45	200	95	85
225	23	225	50	50	35	225	85	80
250	25	250	40	40	25	250	75	70
275	28	275	25	30	15	275	65	60
300	30	300	15	20	10	300	55	55
325	33	325	10	10	10	325	40	45
350	36	350	10	10	10	350	30	35
375	38	375	10	10		375	20	30

Results of frontline demonstrations conducted at farmers' fields in NCR Delhi

Fertilizer nutrient dose (kg ha ⁻¹)			Treat-ment	Yield Obtain ed (q ha ⁻¹)	Extra yield (q ha ⁻¹)	Cost of extra yield (Rs.ha ⁻¹)	Cost of fertilize r (Rs.ha ⁻¹)	Response ratio kg grain kg ⁻¹ nutrient	Net profit (Rs. ha ⁻¹)							
N	P ₂ O ₅	K ₂ O														
Farmer : Shri Ram Chander										Village : Daulat pur						
Mustard (<i>Pusa Jai Kisan</i>)										Year : 1997-98						
0	0	0	C	6.1	-											
106	44	62	T ₂₅	17.5	11.4	17100	2658	5.4	14442							
80	40	40	Gen	14.3	8.2	12300	2040	5.1	10260							
60	57	0	FP	11.2	5.1	7650	1635	4.4	6015							
Farmer : Shri Sube Singh			Village : Nanakheri													
Mustard (<i>Pusa Bahar</i>)			Year : 1998-99													
0	0	0	C	7.0	-											
93	48	85	T ₂₅	23.8	16.8	25200	2779	7.4	22421							
80	40	40	Gen	18.2	11.2	16800	2040	7.0	14760							
60	57	0	FP	12.5	5.5	8250	1635	4.7	6615							

Farmer : Shri Raghu Nath					Village : Nanakheri				
Mustard (<i>Pusa Bahar</i>)					Year : 1998-99				
0	0	0	C	7.6	-				
66	76	87	T ₂₅	22.6	15.0	22500	2868	6.5	19632
80	40	40	Gen	19.1	11.5	17250	2040	7.1	15210
60	57	0	FP	13.2	5.6	8400	1635	4.6	6765
Mustard (<i>Pusa Bahar</i>)					Year : 1999-00				
0	0	0	C	7.5	-				
75	26	67	T ₂₅	22.8	15.3	22950	2035	9.1	20915
80	40	40	Gen	21.0	13.5	20250	2040	8.4	18210
60	57	0	FP	14.6	7.1	10650	1635	6.1	9015
Mustard (<i>Pusa Bahar</i>)					Year : 1999-00				
0	0	0	C	6.8	-				
110	67	54	T ₂₅	23.5	16.7	25050	2975	7.2	22075
80	40	40	Gen	18.4	11.6	17400	2040	7.3	15360
60	57	0	FP	12.8	6.0	9000	1635	5.1	7365
Farmer : Shri Daya Nand					Village : Bharthal				
Mustard (<i>Pusa Bahar</i>)					Year : 2000-01				
0	0	0	C	7.4	-				
88	71	34	T ₂₅	24.3	16.9	25350	2549	8.8	22801
80	40	40	Gen	21.0	13.6	20400	2040	8.5	18360
60	57	0	FP	14.4	7.0	10500	1635	6.0	8865
Mustard (<i>Pusa Bold</i>)					Year : 2000-01				
0	0	0	C	7.8	-				
83	26	62	T ₂₅	23.1	15.3	22950	2089	8.4	20861
80	40	40	Gen	19.2	11.4	17100	2040	7.1	15060
60	57	0	FP	15.8	8.0	12000	1635	6.8	10365
Farmer : Shri Rajendra					Village : Dorala				
Mustard (<i>Pusa Jai Kisan</i>)					Year : 2002-03				
0	0	0	C	8.2	-				
102	58	0	T ₂₅	22.2	14.0	21000	2196	8.8	18804
80	40	40	Gen	20.1	11.9	17850	2040	7.4	15810
60	57	0	FP	14.4	6.2	9300	1635	5.3	7665
Farmer : Shri Sukhbir					Village : Dorala				
Mustard (<i>Pusa Bold</i>)					Year : 2002-03				
0	0	0	C	7.4	-				
110	12	0	T ₂₅	24.5	17.1	25650	1610	14.1	24040
80	40	40	Gen	18.4	11.0	16500	2040	6.9	14460
60	57	0	FP	13.2	5.8	8700	1635	5.0	7065

Palampur (Raya)

Name of the Centre : Raya

Soil :

Crop and Variety :

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

F N = 6.11T - 0.08SN - 0.81ON, F P₂O₅ = 5.51 T - 0.36 SP - 1.88OP - 1.69 PBP

F K₂O = 5.81T - 0.16 SK - 1.31OK

IPNS based fertilizer doses at different soil test values for important crops

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Crop: Raya			Yield Target: 20 q ha ⁻¹		
300	10	120	53	27	23
400	15	170	45	25	15
500	20	220	37	23	7
If FYM with 10,0.50,0.25 and 0.50 % moisture, N, P ₂ O ₅ and K ₂ O is applied at the rate of 12.5 t ha ⁻¹ and raya seeds were coated with 250ml PBP liquid solution containing 106 cells per ml and dried before sowing.					

Frontline demonstration on raya (average of 20 demonstration) on farmers' fields in mid hills temperate wet zone (1991-92 to 1995-96, 2000-01)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	B:C ratio
	N	P ₂ O ₅	K ₂ O			
SLD	60	40	40	680	-	12.3
STB	60	40	40	876	-	10.7
Target based (kg ha ⁻¹)						
1500	178	50	52	1417	-5.5	14.3
2000	110	79	71	1813	-9.4	16.7

Hisar (Raya)

Name of the Centre : Raya

Soil : Sierozem

(Inceptisols/Entisols)

Crop and Variety : Raya (RH 8113)

Season developed : Rabi, 2002-03

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Targeted yield equations used:

$$FN = 9.76T - 0.81 SN, \quad FP_2O_5 = 4.12T - 2.03 SP$$

Ready reckoner of soil test based fertilizer recommendations for raya (RH 8113) seed yield of 16, 18 and 20 q/ha

SN* (kg/ha)	Targeted yield (q/ha)			SP* (kg/ha)	Targeted yield (q/ha)		
	16	18	20		16	18	20
	FN (Fertilizer N, kg/ha)				FP ₂ O ₅ (Fertiilzer P ₂ O ₅ , kg/ha)		
80	91	111	130	4	58	66	74
90	83	103	122	6	54	62	70
100	75	95	114	8	50	58	66
120	59	79	98	10	46	54	62
140	43	62	81	12	42	50	58
160	26	46	65	14	38	46	54
180	10	30	49	16	34	42	50
200	10	14	33	20	26	34	42
220	10	10	17	25	16	24	32
240	10	10	10	30	6	14	22

*SN = Available N, SP = Available P, T = Targeted yield

Verification: These fertilizer adjustment equations for yield targets were verified at farmers' fields in various agro-climatic zones of Haryana. The yield targets of 18 and 20 q/ha were achieved with -6.6 to +7.0% deviations.

Applicability: These fertilizer adjustment equations will hold good in Haryana in Mohindergarh, Faridabad, Mewat, Gurgaon, Bhiwani, Hisar, Sirsa, Fatehabad and Jind districts.

Targeted yield equations: $FN = 10.61T - 0.95 SN - 0.12 FYM (N)^*$
 $FP_2O_5 = 4.73T - 3.00SP - 0.10 FYM (P_2O_5)$

Ready reckoner of soil test based fertilizer recommendations for 18 and 20q/ha of seed yield of raya (Luxmi)

SN* (kg/ha)	Targeted yield (q/ha)		SP* (kg/ha)	Targeted yield (q/ha)	
	18	20		18	20
	FN (Fertilizer N, kg/ha)			FP ₂ O ₅ (Fertilizer P ₂ O ₅ , kg/ha)	
80	115	136	4	73	83
90	106	127	6	67	77
100	96	117	8	61	71
110	87	108	10	55	65
120	77	98	12	49	59
140	58	79	14	43	53
160	39	60	16	37	47
180	20	41	20	25	35
200	2	22	24	13	23
220	2	2	28	2	11

*SN and SP are soil available N and P (kg/ha), respectively; T = Yield target (q/ha) FYM(N) and FYM(P₂O₅) are N and P₂O₅ (kg/ha), respectively in applied FYM

Note : The dose of fertilzier N and P₂O₅ be reduced by 1.25 and 1.00 kg/ha, respectively, from above fertilzier doses for each ton of applied FYM/compost.

Ludhiana (Raya)

Name of the Centre : Raya

Soil :

Crop and Variety :

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Raya

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	15(q ha ⁻¹)			20 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
60	4	60	101	49	33	144	73	67
80	6	70	91	38	22	134	62	56
100	8	80	82	27	11	125	51	45

120	10	90	73	16	0	116	40	34
140	12	100	63	5	0	106	29	23
160	14	110	54	0	0	97	18	12
180	16	120	44		0	87	6	1
200			35		0	78		

*maintainanve dose

Appliocability :

Kalyani (Rape) Without IPNS

Name of the Centre : Rape

Soil :

Crop and Variety : Raoe (cv. B-9)

Season developed : Rabi, 2002-03

Target range : 1.0 – 1.2 t ha⁻¹

Soil Nitrogen range : 250 – 375 kg ha⁻¹

Soil phosphorus range : 5 –30 kg ha⁻¹

Soil potassium range : 100 – 350 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations :

$$FN = 10.02 T - 0.15 SN, \quad FP_2O_5 = 5.12 T - 0.67 SP, \quad FK_2O = 6.88 T - 0.17 SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 60, 80, 100
	P₂O₅	0, 35, 45
	K₂O	0, 35, 45
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	215 - 322
	Olsen-P	8 - 29
	NH₄OAc-K	73 - 224
Yield (kg.ha⁻¹)	Control plot	215 - 603
	Treated plot	865 - 1163

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha⁻¹)			Fertilizer nutrient required (kg.ha⁻¹)					
			Targeted yield 1.0 t.ha⁻¹			Targeted yield 1.2 t.ha⁻¹		
N	P	K	N	P₂O₅	K₂O	N	P₂O₅	K₂O
250	5	100	63	48	52	83	58	66
275	10	150	59	45	43	79	55	57
300	15	200	55	41	35	75	51	49
325	20	250	51	38	26	71	48	40
350	25	300	48	34	18	68	45	32
375	30	350	44	31	9	64	41	23

* No modification was made in the ready-reckoner.

Applicability :

Targeted yield equations used for the verification trials are given below:

$$FN = 10.02 T - 0.15 SN, \quad FP_2O_5 = 5.12 T - 0.67 SP, \quad FK_2O = 6.88 T - 0.17 SK$$

Verification trials for Rape (mean of 9 trials)

Treatment	Grain yield (kg.ha ⁻¹)	Straw yield (kg.ha ⁻¹)
T ₁ - Farmers' practice	1167	3333
T ₂ - Govt. recommended dose	1214	3333
T ₃ - Soil test based fertilizer dose for targeted yield of 1.0 t ha ⁻¹	1201	3750
T ₄ - Soil test based fertilizer dose for Targeted yield of 1.2 t ha ⁻¹ .	1300	3815

Pantanagar (Torja) without IPNS

Name of the Centre : Torja

Soil :

Crop and Variety : Torja var. PT 303

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for yield targets (kg/ha)

$$F K (K_2O \text{ kg/ha}) = 6.08 \times YT (q/ha) - 0.61 \times SK$$

$$F N (N, \text{ kg/ha}) = 11.07 \times YT (q/ha) - 101.63 \times SN$$

$$F P (P_2O_5, \text{ kg/ha}) = 7.56 \times YT (q/ha) - 1.63 \times SP$$

Soybean

Maharashtra (With & without IPNS)

Name of the Centre : Soybean

Soil : Typoc Japusterts

Crop and Variety : JS-335

Situation : Irrigated

Season developed : Kharif

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Districts : Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule

Targeted Yield Equations

Without FYM

With FYM

$$FN = 6.86 T - 0.68 SN$$

$$FP_2O_5 = 6.17 T - 4.46 SP$$

$$FK_2O = 3.96 T - 0.13 SK$$

$$FN = 3.97 T - 0.39 SN - 0.09 FYM$$

$$FP_2O_5 = 4.14 T - 2.95 SP - 1.5 FYM$$

$$FK_2O = 3.47 T - 0.11 SK - 0.27 FYM$$

Fertilizer prescription for targeted yields of Soybean for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (5 Mg FYM ha ⁻¹)		
			25 q ha ⁻¹ target			25 q ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	104	127	73	60	85	63
120	8	300	90	119	60	52	79	52
140	10	400	76	110	47	44	73	41
160	12	500	63	101	34	36	67	30
180	14	600	49	92	21	29	61	19
200	16	700	36	83	25*	21	56	25*
220	18	800	22	74	25*	13	50	25*

* Minimum dose of K₂O

Palampur (Soybean)

Name of the Centre : Soybean

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :



Plate 3. Performance of soybean crop following farmers' practice at Una, Himachal Pradesh



Plate 4. Performance of soybean crop at nutrients level targeted to get 15 q ha⁻¹ yield at Una, Himachal Pradesh



Plate 5. Performance of soybean crop at nutrients level targeted to get 20 q ha⁻¹ yield at Una, Himachal Pradesh

Fertilizer adjustment equations

F N = 6.32 T - 0.25SN - 0.85ON, F P₂O₅ = 4.40 T - 0.34 SP - 0.66OP - 0.41 PBP

F K₂O = 4.05T - 0.23 SK - 0.80OK

IPNS based fertilizer doses at different soil test values for important crops

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Crop: Soybean			Yield Target: 20 q ha ⁻¹		
300	10	120	4	60	8
400	15	170	0	58	0
500	20	220	0	56	0
If FYM with 10,0.50,0.25 and 0.50 % moisture, N, P ₂ O ₅ and K ₂ O is applied at the rate of 12.5 t ha ⁻¹ and soybean seeds were coated with 250ml PBP liquid solution containing 106 cells per ml and dried before sowing.					

Raipur (Soybean)

Name of the Centre : Soybean

Soil : Vertisol

Crop and Variety : Soybean (Gaurav)

Situation :

Season developed : Kharif, 1992

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for targeted yield

FN = General recommended dose (25 kg ha⁻¹)

FP₂O₅ = 117.7 - (13858 - 545Y)^{1/2} - 2.90 SP

FK₂O = No K if SK > 250 kg ha⁻¹

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of soybean in Vertisol (*Kanhar*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) (Soybean JS – 305)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	4	30	31	30	52	30	91
175	6	30	25	30	46	30	85
200	8	30	19	30	40	30	79
225	10	20	13	20	34	20	73
250	12	20	8	20	29	20	68
275	14	20	5	20	23	20	62
300	16	20	5	20	17	20	56
350	18	20	5	20	11	20	50
400	20	20	5	20	5	20	44
450	22	20	5	20	5	20	39
500	24	10	5	10	5	10	33

Soybean

Village	Dharampura	Block	Kawardha
Distt.	Kawardha (C.G.)	Name of farmer	Vijay Chandrawanshi
Soil Type	Vertisol	Crop/variety	Soybean (JS –335)
Soil Test Value	SN – 260, SP – 11.2 and SK = 526 kg ha ⁻¹		
Targeted yield equations used		(Date of sowing - 20-06-04)	
FN	=	GRD as 20 kg N ha ⁻¹	
F P ₂ O ₅	=	117.7– (13858 - 545Y) ^{1/2} – 2.9 SP	
F K ₂ O	=	No fertilizer K if SK is more than 250 kg ha ⁻¹	

Grain yield of soybean, yield response and net return as Rs/Re spent on fertilizer in relation to soil test based fertilizer recommendation and other adopted fertilizer doses

S. No.	Treatment	Fertilizer dose N:P ₂ O ₅ :K ₂ O	Grain yield obtained q ha ⁻¹	Yield response kg kg ⁻¹ fertilizer use	Net return Rs Re ⁻¹ spent on fertilizer
1.	Control	0:00:00	10.25		
2.	FPD	10:30:00	18.36	20.28	15.78
3.	GRD	20:50:20	21.95	13.00	11.61
4	YT of 20 q ha ⁻¹	20:30:00	19.12	17.74	14.72
5	YT of 25 q ha ⁻¹	20:69:00	24.16	15.63	20.04

Price of soybean = Rs.1200 q⁻¹, N=10.65, P₂O₅ =17.0 and K₂O =Rs. 7.30kg⁻¹

Pantanagar (Soybean)

Name of the Centre : Soybean

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : t ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations for different yield target.	
Soybean var. PS-1042 (With FYM)	Soybean var. PK 262 (Without FYM)
FN = 6.66T- 0.88SN-0.69FYM-N	F N (N, kg/ha) = 3.43 x YT (q/ha) – 643.21
FP = 8.48T- 5.49SP-1.14FYM-P	F P (P ₂ O ₅ , kg/ha) = 5.20 x YT (q/ha) – 2.78
FK = 8.98T- 1.21SK-1.55FYM-K	F K (K ₂ O kg/ha) = 4.00 x YT (q/ha)-0.36

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Soybean

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 30 - 35 q ha ⁻¹		
Org. Carbon	P	K	N	P ₂ O ₅	K ₂ O
0.2	10	100	85	102	64
0.4	13	125	83	94	55
0.6	15	150	82	88	46
0.8	18	175	81	80	37
1.0	20	200	79	74	28
1.2	23	225	78	66	19
1.4	25	250	77	61	10
1.6	28	275	71	52	10
1.8	30	300	74	47	10
2.0	33	325	73	38	10
2.2	35	350	72	33	10
2.4	38	375	70	24	10
2.6	40	400	69	19	10

New Delhi (Soybean)

Crop : Soybean

Variety :

Soil : Typic Haplustep (Alluvial)

Situation :

Target range : qha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Applicable area : Delhi state and adjoining soil-agro-climetic areas of UP, Haryana, Punjab, Rajasthan and MP

Fertilizer adjustment equations for targeted yield of crops in NCR of Delhi	
With FYM	Without FYM
$FN = 6.43 T - 0.34 SN - 1.33 FYM,$ $FP_2O_5 = 5.36 T - 2.83 SP - 2.92 FYM$ $FK_2O = 3.50 T - 0.19 SK - 0.88 FYM$	$FN = 6.60 T - 0.35 SN,$ $FP_2O_5 = 6.05 T - 3.19 SP,$ $FK_2O = 3.86 T - 0.21 SK$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Soybean FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	50	50	40	50	75	60
125	13	125	50	45	35	50	75	55
150	15	150	50	35	30	50	65	50
175	18	175	40	30	25	50	60	45
200	20	200	40	20	20	50	55	40
225	23	225	40	15	15	40	50	35
250	25	250	30	10	10	40	45	30
275	28	275	20	10	10	40	40	25
300	30	300	15	10	10	40	35	20
325	33	325	10	10	10	35	30	15
350	36	350	10	10	10	30	25	10
375	38	375	10	10	10	20	20	10

*maintainace dose

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Soybean FYM 10t ha⁻¹

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	50	90	55	50	120	75
125	13	125	50	80	50	50	110	70
150	15	150	50	75	45	50	100	65
175	18	175	50	65	35	50	95	60
200	20	200	50	55	30	50	85	55
225	23	225	50	50	25	50	80	50
250	25	250	45	40	20	50	70	45
275	28	275	35	35	15	50	65	40
300	30	300	25	25	10	50	55	35
325	33	325	20	15	10	50	45	30
350	36	350	10	10	10	40	40	25
375	38	375	10	10	10	35	30	20

*maintainace dose

Sunflower

Andhra Pradesh (Sunflower- Kharif)

Name of the Centre : Nandyal

Soil : Vertisol

Crop and Variety : Sunflower MSFH-17

Season developed : *Kharif*, 1997 (Magi season)

Target range : 15 q ha⁻¹ - 18 q ha⁻¹

Soil Nitrogen range : 100 – 200 kg ha⁻¹

Soil phosphorus range : 4 – 44 kg ha⁻¹

Soil potassium range : 250 – 750 kg ha⁻¹

FYM composition : 0.75 : 0.6 : 1.2%

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

$$FN = 8.23 T - 0.46 SN$$

$$FP_2O_5 = 8.91 T - 4.24 SP$$

$$FK_2O = 3.80 T - 0.10 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	15 (q ha ⁻¹)			18 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	4	250	77	17	32	102	143	43
110	8	300	73	100	27	98	126	38
120	12	350	68	83	22	93	110	33
130	16	400	64	66	17	88	93	28
140	20	450	59	49	12	84	76	23
150	24	500	54	32	7	79	59	18
160	28	550	50	15	2*	74	42	13
170	32	600	45	10*	2*	69	25	8
180	36	650	41	10*	2*	64	8*	8*
190	40	700	36	10*	2*	60	8*	8*
200	44	750	31	10*	2*	55	8*	8*

* maintainance of dose

Verification: **The above equations are yet to be verified on the farmers' fields.**

Applicability

Soil Testing Laboratories : **Yemmiganur, Cuddapah and Anantapur**

Soil type : **Black soils**
Crop : **Hybrid Sunflower**

Season developed : **Kharif**

Yield target : **Upto 18 q ha⁻¹**

Note : **The above equations may be verified in black soils with three or four targets and pickup the best one for making recommendations.**

SUNFLOWER - *Rabi*

Name of the Centre	: Jagtial	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Sandy clay loam	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Sunflower Mahyco-8	FYM composition	: 0.75 : 0.6 : 1.2%
Season developed	: <i>Rabi</i> , 1994-95	FYM rate	:
Target range	: 15 q ha ⁻¹ - 18 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 11.44 T - 0.41 SN$$

$$FP_2O_5 = 7.49 T - 2.10 SP$$

$$FK_2O = 4.93 T - 0.18 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
Kmn O ₄ N	Olsens' P	Amm. Ac-K	15 (q ha ⁻¹)			18 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
150	10	150	110	91	47	145	114	62
175	15	200	99	81	38	134	103	53
200	20	250	90	70	29	124	93	44
225	25	300	79	60	20	114	82	35
250	30	350	69	49	11	104	72	26
275	35	400	59	39	2*	93	61	17
300	40	450	49	28	2*	83	51	8
325	45	500	38	18	2*	73	40	8*
350	50	550	28	7	2*	63	30	8*
375	55	600	18	7*	2*	53	20	8*
400	60	650	8	7*	2*	43	9	8*

* maintenance of dose

Applicability

Soil Testing Laboratories : Nizamabad, Adilabad, Karimnagar and Warangal

Soil type : Sandy clay loam soil

Crop : Hybrid Sunflower

Season developed : *Rabi*

Yield target : Upto 18 q ha⁻¹

Note : The above equations may be tested in Nizamabad, Adilabad, Karimnagar and Warangal districts and in soils other than sandy clay loam with three or four targets and pick up the best one for adoption for making fertilizer recommendations.

Safflower - *rabi*

Name of the Centre : Tandur

Soil : Vertisol

Crop and Variety : Safflower - Manjera

Season developed : *rabi*, 2003

Target range : 20 q ha⁻¹ - 25 q ha⁻¹

Soil Nitrogen range : 80 – 320 kg ha⁻¹

Soil phosphorus range : 10 – 70 kg ha⁻¹

Soil potassium range : 125 – 400 kg ha⁻¹

FYM composition : 0.75 : 0.6 : 1.2%

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

$$FN = 9.04 T - 0.75 SN, \quad FP_2O_5 = 3.74 T - 0.85 SP, \quad FK_2O = 5.76 T - 0.50 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for specific yield target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
mnO ₄ N	Olsens' P	Amm. Ac-K	20 (q ha ⁻¹)			25 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
80	10	125	121	66	53	166	85	82
100	15	150	106	62	40	151	81	69
120	20	175	91	58	28	136	77	57
140	25	200	76	54	15	121	72	44
160	30	225	61	49	3	106	68	32
180	35	250	46	45	0	91	64	19
200	40	275	3	41		76	60	7
220	45	300	16	37		61	55	0
240	50	325	1	32		46	51	
260	55	350	0	28		31	47	
280	60	375		24		16	43	
300	65	400		20		1	38	
320	70			15		0	34	

Verification: **The above equations are at to be verified on the farmers' fields.**

Applicability : Districts

Soil Testing Laboratories : Jadcherla, Mahabubnagar district

Soil type : Vertisol

Crop : Safflower – Manjera

Season developed : *rabi*

Yield target : Upto 20 to 25 q ha⁻¹

Madhya Pradesh (Safflower)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 9.11 \text{ T} - 0.45 \text{ SN} \quad FP_2O_5 = 6.27 \text{ T} - 2.19 \text{ SP} \quad FK_2O = 9.27 \text{ T} - 0.38 \text{ SK}$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)	
	16	20		16	20		16	20
100	101	137	5	89	114	200	72	109
150	78	114	10	78	103	250	53	90
200	56	92	15	67	92	300	34	71
250	33	69	20	56	81	350	15	52
300	11	47	25	45	70	400	-	33

Applicability : Shallow, Medium black soils: Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Sagar, Ujjain., Chindwara.

Karnataka (Sunflower)

Name of the Centre	: Karnataka	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Red, Alkaline	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: EC-68419 AREA	FYM composition	: 0.75 : 0.6 : 1.2%
Season developed	: Kharif	FYM rate	:
Target range	: 15 q ha ⁻¹ - 18 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Target yield equations:

F.N. = 5.12 T- 37.4 SN (OC %), F.P₂O₅ = 6.21 T- 0.68 SP₂O₅ Olsen's - P₂O₅)

F.K₂O = 5.62 T- 0.19 SK₂O (NH₄OAC - K₂O)

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.05	34	2.5	42	10	37
0.10	32	5.0	40	20	36
0.15	30	7.5	38	30	34
0.20	28	10.0	37	40	32
0.25	27	12.5	35	50	30
0.30	25	15.0	33	60	28
0.35	23	17.5	32	70	26
0.40	21	20.0	30	80	24
0.45	19	22.5	28	90	22
0.50	17	25.0	27	100	20
0.55	15	27.5	25	110	18
0.60	13	30.0	23	120	17
0.65	12	32.5	21	130	15

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 5.00 kg/acre P₂O₅ = ± 6.25 kg/acre K₂O = ± 5.5 kg/acre

Name of the Centre	: Karnataka	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Black Clayey	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: BSH-1	FYM composition	: 0.75 : 0.6 : 1.2%
Season developed	: Kharif	FYM rate	:
Target range	: 15 q ha ⁻¹ - 18 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Target yield equations:

F.N. = 8.38 T- 0.57 SN (KMnO₄ - N), F.P₂O₅ = 8.05 T- 6.00 SP₂O₅ (Olsen's - P₂O₅)

F.K₂O = 9.87 T- 0.47 SK₂O (NH₄OAC - K₂O)

STV KMnO ₄ -N (kg/acre)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
-	-	3.50	60	100	52
60	50	4.00	57	105	49
65	47	4.50	54	110	47
70	44	5.00	51	115	45
75	41	5.50	48	120	42
80	38	6.00	45	125	40
85	35	6.50	42	130	38
90	33	7.00	39	135	35
95	30	7.50	36	140	33
100	27	8.00	33	145	31
105	24	8.50	30	150	28
110	21	9.00	27	155	26
115	18	9.50	24	160	24
120	15	10.00	21	165	21
125	13	10.50	18	170	19
130	10	11.00	15	175	17
				180	14
				185	12

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 8.25 kg/acre P₂O₅ = ± 8.00 kg/acre K₂O = ± 9.75 kg/acre

Coimbatore (Sunflower)

Name of the centre	: Bhavanisagar (Sub-Centre)	Soil Nitrogen range	: 150 – 240 kg ha ⁻¹
Soil	: Mixed black (Perianaickenpalayam)	Soil phosphorus range	: 8 – 26 kg ha ⁻¹
Crop & Variety	: Sunflower - Morden	Soil potassium range	: 150 – 240 kg ha ⁻¹
Season developed	: Kharif	FYM composition	:
Target range	: 15 – 20 t ha ⁻¹	FYM rate	:
		Green manure composition	:
		Green manure rate	:

Fertiliser Adjustment Equations

FN	=	9.60	T	-	0.49	SN	-	0.68	ON
FP ₂ O ₅	=	4.20	T	-	1.87	SP	-	0.80	OP
FK ₂ O	=	9.24	T	-	0.45	SK	-	0.64	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	150	8	150	70	48	71
2	160	10	160	66	44	67
3	170	12	170	61	41	62
4	180	14	180	56	36	58
5	190	16	190	51	33	55
6	200	18	200	46	29	49
7	210	20	210	41	26	44
8	220	22	220	36	22	40
9	230	24	230	31	18	35
10	240	26	240	26	14	31

Recommendation domain

Soil type	: Black Clay Loam
Yield target	: 15 q ha ⁻¹
Applicable	:
Irrig / Dry	:
Applicable	:

Maharashtra

Name of the Centre	: Maharashtra	Soil phosphorus range	: 8-16 kg ha ⁻¹
Soil	: Typic Haplusterts	Soil potassium range	: 250-450 kg ha ⁻¹
Crop and Variety	: Sunflower (SS-56)	FYM composition	:
Situation	: Irrigated	FYM rate	:
Season developed	: Kharif	Green manure composition	:
Target range	: 16-18 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 160-240 kg ha ⁻¹		
Districts	: Ahmednagar, Dhule, Nandurbar, Jalna, Aurangabad, Nanded, Parbhani, Satara, Sangli, Pune		

Targeted Yield Equations

$$FN = 13.94 T - 0.61 SN, FP_2O_5 = 7.18 T - 6.82 SP, FK_2O = 4.82 T - 0.12 SK$$

Fertilizer prescription for targeted yields of sunflower for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			16 q ha ⁻¹ target			18 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
160	8	250	123	59	45	150	74	54
180	10	300	110	45	39	137	60	48
200	12	350	97	31	33	124	46	42
220	14	400	84	17	27	111	32	36
240	16	450	71	25*	21	98	25*	30

* Minimum dose of P₂O₅

Pusa (Sunflower)

Name of the Centre	: Pusa	Soil phosphorus range	:
Soil	: Young Alluvium Calcareous	Soil potassium range	:
Crop and Variety	: Sunflower	FYM composition	:
Situation	: Irrigated	FYM rate	:
Season developed	: Kharif	Green manure composition	:
Target range	: q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Targetted Yield Equations

$$FN = 15.64 T - 0.40 SN, \quad FP_2O_5 = 8.31 T - 1.79 SP_2O_5, \quad FK_2O = 6.92 T - 0.41 SK_2O$$

Reddy Reckoner Request

Raipur (Sunflower)

Name of the Centre	: Raipur	Soil phosphorus range	: 150 - 400 kg ha ⁻¹
Soil	: Vertisol	Soil potassium range	:
Crop and Variety	: Sunflower (Jwalamukhi)	FYM composition	:
Situation	: Irrigated	FYM rate	:
Season developed	: <i>Rabi</i> , 2002-03	Green manure composition	:
Target range	: 15 – 25 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 1 50 – 400 kg ha ⁻¹		

Applicable Dist :

Fertilizer adjustment equations

$$FN = 9.09 Y - (0.45 SN + 4.6 t FYM)$$

$$FP_2O_5 = 2010 - (4040100 - 16666Y)^{1/2} - (2.75 SP + 4.2 t FYM)$$

$$FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of sunflower (Jwalamukhi) in Vertisol (*Kanhar*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Sunflower (var. - Jwalamukhi)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	4	69	52	114	74	160	95
175	8	58	41	103	63	149	84
200	12	46	30	92	52	137	73
225	16	35	19	81	41	126	62
250	20	24	8	69	30	115	51
275	24	13	7	58	19	104	40
300	28	2	7	47	8	92	29
350	32	2	7	24	7	70	18
400	36	2	7	2	7	47	7

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of sunflower (Jwalamukhi) in Vertisol (*Kanhar*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Sunflower (var. - Jwalamukhi)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	4	46	31	91	53	137	74
175	8	35	20	80	42	126	63
200	12	23	9	69	31	114	52
225	16	12	8	58	20	103	41
250	20	10	8	46	9	92	30
275	24	10	8	35	8	81	19
300	28	10	8	24	8	69	8
350	32	10	8	10	8	47	8
400	36	10	8	10	8	24	8

Name of the Centre : Raipur

Soil : Inceptisol

Crop and Variety : Sunflower (Jwalamukhi)

Situation : Irrigated

Season developed : *Rabi*, 2004-05

Target range : 15 – 20 q ha⁻¹

Soil Nitrogen range : 4 – 36 kg ha⁻¹

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

FN = 13.97 Y – (0.68 SN + 6.34 t FYM), $FP_2O_5 = 183 - (33620 - 1429Y)^{1/2} - (3.1 SP + 4.98 t FYM)$,
 $FK_2O = No K$ if SK > 250 kg ha⁻¹

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of sunflower (Jwalamukhi) in Inceptisol (*Matasi*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Sunflower (var. - Jwalamukhi)			
		15		20	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	4	108	60	177	100
175	8	91	48	160	87
200	12	74	35	143	75
225	16	57	23	126	62
250	20	40	11	109	50
275	24	23	11	92	38
300	28	6	11	75	25
350	32	6	11	41	13
400	36	6	11	7	11

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of sunflower (Jwalamukhi) in Inceptisol (*Matasi*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Sunflower (var. - Jwalamukhi)					
		15		20		25	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	4	76	35	146	75	216	123
175	8	59	23	129	62	199	114
200	12	42	11	112	50	182	105
225	16	25	10	95	38	165	95
250	20	8	10	78	25	148	86

275	24	8	10	61	13	131	77
300	28	8	10	44	10	114	68
350	32	8	10	10	10	80	58
400	36	8	10	8	10	46	46

Kalyani (Sunflower)

Name of the Centre : Kalyani

Soil : Inceptisol

Crop and Variety : Sunflower (PAC - 36)

Situation : Irrigated

Season developed : Rabi, 2004-05

Target range : 15 – 20 q ha⁻¹

Soil Nitrogen range : 4 – 36 kg ha⁻¹

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Applicability :

Fertilizer adjustment equations:

$$FN = 31.4 T - 1.63 SN, \quad FP_2O_5 = 8.98 T - 2.91 SP, \quad FK_2O = 4.7 T - .041 SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 40, 60, 80
	P₂O₅	0, 35, 45
	K₂O	0, 35, 45
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	290 - 341
	Olsen-P	19 - 32
	NH₄OAc-K	94 - 308
Yield (kg.ha⁻¹)	Control plot	1600 - 1960
	Treated plot	2500 - 2800

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha ⁻¹)			Fertilizer nutrient required (kg.ha ⁻¹)					
			Targeted yield 2.0 t.ha ⁻¹			Targeted yield 2.5 t.ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
250	5	100	221	165	90	378	210	113
275	10	150	180	151	88	337	195	111
300	15	200	139	136	86	296	181	109
325	20	250	98	121	84	255	166	107
350	25	300	58	107	82	215	152	105
375	30	350	17	92	80	174	137	103

- No modification was made in the ready-reckoner.

Pantnagar (Sunflower)

Name of the Centre : Raipur

Soil :
 Crop and Variety : Sunflower (GK 2002)
 Situation :
 Season developed :
 Target range : q ha⁻¹
 Soil Nitrogen range :

Soil phosphorus range :
 Soil potassium range :
 FYM composition :
 FYM rate :
 Green manure composition :
 Green manure rate :

Fertilizer adjustment equation for yield targets (kg/ha)

F K (K₂O kg/ha) = 4.64 x YT (q/ha) - 0.037 SK

F N (N, kg/ha) = 5.34 x YT (q/ha) - 0.091 SN

F P (P₂O₅, kg/ha) = 7.44 x YT (q/ha) - 0.32 SP

Madhya Pradesh (Sunflower)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

FN = 12.54 T – 0.64 SN – 0.59 ON ; FP₂O₅ = 3.6T – 1.24 SP – 1.36 OP ; FK₂O 8.09 T – 0.30 SK – 0.35OK

Soil test Values (kg ha⁻¹)

Target yield (q ha⁻¹) = 20

N	P	K	Without FYM			With 5 t FYM ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	100	156	65	159	164	27	146
150	10	150	134	59	144	132	21	131
200	15	200	122	53	129	100	15	116
250	20	250	90	47	104	68	9	91
300	25	300	58	41	89	36	2	76

Composition of FYM : N(%) = 0.72 P₂O₅ (%) = 0.72 K₂O (%) = 0.75

Applicability : Shallow, Medium black and Deep black soils

Safflower

Raipur (Safflower)

Name of the centre	: Raipur	Soil phosphorus range	: 3-28 kg ha ⁻¹
Soil	: Vertisol	Soil potassium range	:
Crop & Variety	: JSF-1	FYM composition	:
Season developed	: <i>Rabi</i> , 2004-05	FYM rate	:
Target range	: 10-16 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150-400 kg ha ⁻¹	Green manure rate	:

Applicability :

Fertilizer adjustment equation for targeted yield

$FN = 14.55 Y - (0.62 SN + 5.56 \text{ t FYM})$, $FP_2O_5 = 133 - (17689 - 1000Y)^{1/2} - (2.70 SP + 4.34 \text{ t FYM})$
 $FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of safflower (JSF-1) in Vertisol (Kanhra)

Alkaline KMnO ₄ - N(kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Safflower (JSF-1)							
		10		12		14		16	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	90	37	119	49	148	64	177	84
175	6	81	29	110	41	139	56	168	76
200	9	72	21	101	33	130	48	159	68
225	12	62	13	91	25	120	40	150	60
250	15	53	5	82	17	111	32	140	51
275	18	44	5	73	9	102	24	131	43
300	21	35	5	64	5	93	16	122	35
350	24	16	5	45	5	74	7	103	27
400	28	15	5	27	5	56	5	85	16

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of safflower in Vertisol (Kanhra)

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Safflower (JSF-1)							
		10		12		14		16	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	62	16	91	28	120	42	149	62
175	6	53	7	82	20	111	34	140	54
200	9	44	2	73	12	102	26	131	46
225	12	34	2	64	3	93	18	122	38
250	15	25	2	54	2	83	10	112	30
275	18	16	2	45	2	74	2	103	22
300	21	7	2	36	2	65	2	94	14
350	24	7	2	17	2	46	2	75	5
400	28	7	2	7	2	28	2	57	2

Applicability :

Andhra Pradesh (Safflower – rabi)

Name of the centre	: Tandur	Soil phosphorus range	:
Soil	: Vertisol	Soil potassium range	:
Crop & Variety	: Safflower - Manjera	FYM composition	:
Season developed	: <i>Rabi</i> , 2003	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer Adjustment Equations for Specific Yield Targeted

$$FN = 9.04 T - 0.75 SN, FP_2O_5 = 3.74 T - 0.85 SP, FK_2O = 5.76 T - 0.50 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for specific yield target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of					
mn O ₄ N	Olsens' P	Amm. Ac-K	20 (q ha ⁻¹)			25 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
80	10	125	121	66	53	166	85	82
100	15	150	106	62	40	151	81	69
120	20	175	91	58	28	136	77	57
140	25	200	76	54	15	121	72	44
160	30	225	61	49	3	106	68	32
180	35	250	46	45	0	91	64	19
200	40	275	31	41		76	60	7
220	45	300	16	37		61	55	0

Verification: The above equations are at to be verified on the farmers' fields.

Applicability

Soil Testing Laboratories	:	Jadcherla, Mahabubnagar district
Soil type	:	Vertisol
Crop	:	Safflower – Manjera
Season developed	:	<i>rabi</i>
Yield target	:	Upto 20 to 25 q ha⁻¹

Karnataka (Safflower)

Name of the centre	: Karnataka	Soil phosphorus range	:
Soil	: Black Clayey	Soil potassium range	:
Crop & Variety	: A-1	FYM composition	:
Season developed	: <i>Rabi</i>	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Applicability : Tungabhadra Command area of Bellary and Raichur districts.

Target yield equations :

F.N. = 7.49 T- 68.9 SN (OC%), F.P₂O₅ = 11.83 T- 3.34 SP₂O₅ (Olsen's - P₂O₅)

F.K₂O = 4.99 T- 0.20 SK₂O (NH₄OAC - K₂O)

STV O.C. (%)	Fertilizer nitrogen (kg/acre)	STV Olsen's P ₂ O ₅ (kg/acre)	Fertilizer phosphorus (kg/acre)	STV Amm.Ace. K ₂ O (kg/acre)	Fertilizer potash (kg/acre)
0.10	38	1	68	10	28
0.15	35	2	64	20	26
0.20	31	3	61	30	24
0.25	28	4	58	40	22
0.30	24	5	54	50	20
0.35	21	6	51	60	18
0.40	17	7	47	70	16
0.45	14	8	44	80	14
		9	40	90	12
		10	37	100	10
		11	33	110	8

To increase or decrease the yield target by one q/acre the variations to be made in the fertilizer recommendations are as follows:

N = ± 7.5 kg/acre P₂O₅ = ± 11.75 kg/acre K₂O = ± 5.0 kg/acre

Linseed

Palampur (Linseed)

Name of the Centre : Palampur

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Applicability :

Fertilizer adjustment equations

F N = 5.55 T - 0.15S N - 0.09ON , F P₂O₅ = 5.36 T - 0.32 SP - 0.130 P - 0.16 PBP

F K₂O = 62.8 T - 0.08 SK - 0.11OK

IPNS based fertilizer doses at different soil test values for important crops

Soil test value (kg ha ⁻¹)			Fertilizer nutrient dose (kg ha ⁻¹)		
Crop: Linseed			Yield Target: 10 q ha ⁻¹		
200	10	120	22	46	14
300	15	170	6	44	10
400	20	220	0	43	6
If FYM with 10, 0.50, 0.25 and 0.50 % moisture, N, P ₂ O ₅ and K ₂ O is applied at the rate of 5 t ha ⁻¹ (oven dry basis) and linseed seeds were coated with 250ml PBP liquid solution containing 106 cells per ml and dried before sowing.					

Madhya Pradesh (Linseed)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 8.48 T - 0.46 SN$$

$$FP_2O_5 = 7.38 T - 5.08 SP$$

$$FK_2O = 6.59 T - 0.25 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)		SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)	
	16	20		16	20		16	20
100	90	123	5	93	122	200	55	82
150	67	100	10	67	96	250	42	69
200	44	77	15	42	71	300	30	57
250	21	54	20	16	45	350	17	44
300	-	31	25	-	20	400	10	32

Applicability : Shallow, Medium black and Deep black soils ; Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Sagar, Ujjain., Chindwara

Gingelly

Coimbatore (Without IPNS Based)

Name of the centre	: Aduthurai (Sub-Centre)	Soil phosphorus range	: 10 – 30 kg ha ⁻¹
Soil	: Delta Alluvial (Adanur series)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Gingelly - TMV 4	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 10 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	13.7	T	-	0.46	SN
FP₂O₅	=	6.3	T	-	1.79	SP
FK₂O	=	12.8	T	-	0.47	SK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No.	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 10 q ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	10	180	54	45	44
2	190	12	190	50	42	39
3	200	14	200	45	38	34
4	210	16	210	40	34	29
5	220	18	220	36	31	24
6	230	20	230	31	27	20
7	240	22	240	27	24	15
8	250	24	250	22	20	10
9	260	26	260	17	17	6
10	270	28	270	13	13	1
11	280	30	280	8	9	0

Recommendation domain

Soil type : River Alluvium - Clay Loam

Yield target : 10 q ha⁻¹

Bhubneswer (Sesamum)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: sesamum (Nirmala)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 13.4 T - 0.5 SN, \quad FP_2O_5 = 12.3 T - 3.1 SP, \quad FK_2O = 12.4 T - 1.4 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	6 (q ha ⁻¹)			8 (q ha ⁻¹)			10 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
80	20	50	40	12	5	67	36	19	94	61	54
90	25	60	35	5	5	62	21	15	89	45	40
100	30	70	30	5	5	57	6	5	84	30	26
110	35	80	25	5	5	52	5	5	79	15	12
120	40	90	20	5	5	47	5	5	74	5	5
130	45	100	15	5	5	42	5	5	69	5	5
140	50	120	10	5	5	37	5	5	64	5	5

New Delhi (Mungbean) Without IPNS Based

Name of the centre	: New Delhi	Soil potassium range	: 180 – 250 kg ha ⁻¹
Soil	:	FYM composition	:
Crop & Variety	: Mungbean	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: 8-10 q ha ⁻¹	Greenmanure rate	:
Soil Nitrogen range	: 100 – 250 kg ha ⁻¹	Soil	
phosphorus range	: 10 – 25 kg ha ⁻¹		

Fertilizer adjustment equations for targeted yields of crops in NCR of Delhi (Without FYM)

$$\text{FN} = 9.06 \text{ T} - 0.31 \text{ SN}, \text{FP}_2\text{O}_5 = 10.47 \text{ T} - 3.50 \text{ SP}, \text{FK}_2\text{O} = 9.98 \text{ T} - 0.45 \text{ SK}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Mungbean

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 8 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	40	50	35
125	13	125	35	40	25
150	15	150	25	30	10
175	18	175	20	20	10
200	20	200	10	10	10
225	23	225	10	10	10
250	25	250	10	10	10

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Mungbean

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 10 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	70	55
125	13	125	50	60	45
150	15	150	45	50	30
175	18	175	35	45	20
200	20	200	30	35	10
225	23	225	20	25	10
250	25	250	15	15	10
275	28	275	10	10	
300	30	300	10	10	
325	33	325	10	10	

350	36	350			
375	38	375			
400	40	400			

Castor

Andhra Pradesh (Castor – Kharif) IPNS Based

Name of the Centre	: Palem	Soil phosphorus range	: 5 - 115 kg ha ⁻¹
Soil	: Inceptisol	Soil potassium range	: 175 - 900 kg ha ⁻¹
Crop and Variety	: Castor - Kranthi	FYM composition (%)	: 0.75 : 0.60 : 1.2
Season developed	: <i>Kharif</i> , 1997	FYM rate	:
Target range	: 25 – 35 q ha ⁻¹	Green manure composition	:
Soil nitrogen range	: 125 – 235 kg ha ⁻¹	Green manure rate	:

Applicability

Soil Testing Laboratories	: Jadcherla, Miryalaguda
Soil type	: Chalka soil
Crop	: Castor – High yielding variety
Season developed	: <i>Kharif</i>
Yield target	: Upto 15 q ha ⁻¹

Fertilizer adjustment equations

$$FN = 8.35 T - 0.40 SN, FP_2O_5 = 7.17 T - 2.88 SP, FK_2O = 3.02 T - 0.10 SK$$

Add Reddy Reckoner

New Delhi (Pigeon pea)

Name of the Centre : New Delhi

Crop :

Variety :

Soil :

Situation :

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations for targeted yields of crops in NCR of Delhi (Without FYM)

$$FN = 5.44 T - 0.29 SN, \quad FP_2O_5 = 6.09 T - 3.95 SP, \quad FK_2O = 3.15 T - 0.20 SK$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Pigeonpea

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	50	25
125	13	125	45	40	20
150	15	150	40	30	15
175	18	175	30	20	10
200	20	200	25	10	10
225	23	225	15	10	10
250	25	250	10	10	
275	28	275	10		
300	30	300	10		
325	33	325			
350	36	350			
375	38	375			
400	40	400			

Pantanagar (Arhar)

Crop : Arhar

Variety : UPAS- 120

Soil :

Situation :

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for yield targets (kg/ha)

$$\text{FN (N, kg/ha)} = 3.52 \times \text{YT (q/ha)} - 66$$

$$\text{F P (P}_2\text{O}_5, \text{ kg/ha)} = 2.12 \times \text{YT (q/ha)} - 3.18$$

$$\text{F K (K}_2\text{O kg/ha)} = 4.59 \times \text{YT (q/ha)} - 0.46$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Pigeonpea

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	80	45
125	13	125	50	70	50
150	15	150	50	60	35
175	18	175	50	50	30
200	20	200	50	45	25
225	23	225	45	35	20
250	25	250	35	25	15
275	28	275	30	15	10
300	30	300	20	10	10
325	33	325	15	10	10
350	36	350	10	10	
375	38	375	10		
400	40	400	10		

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Pigeonpea

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	80	60
125	13	125	50	80	55
150	15	150	50	80	50
175	18	175	50	80	45
200	20	200	50	75	40
225	23	225	50	65	35
250	25	250	40	55	30
275	28	275	40	45	25
300	30	300	40	35	20
325	33	325	40	25	15
350	36	350	20	15	10
375	38	375	20	10	10
400	40	400	20	10	10

Madhya Pradesh (Arhar)

Name of the Centre : Madhya Pradesh	Soil phosphorus range :
Soil :	Soil potassium range :
Crop and Variety :	FYM composition :
Situation :	FYM rate :
Season developed :	Green manure composition :
Target range : q ha ⁻¹	Green manure rate :
Soil Nitrogen range :	

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 4.87 T - 0.37 SN \quad FP_2O_5 = 5.34 T - 3.47 SP \quad FK_2O = 3.61 T - 0.16 SK$$

SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹)	SK = Soil – K (kg ha ⁻¹)	FK ₂ O = Fert. K (kg ha ⁻¹)
	T = Yield Target (q ha ⁻¹)		T = Yield Target (q ha ⁻¹)
	20 25		20 25
5	90 116	200	40 58
10	72 98	250	32 50
15	55 81	300	24 42
20	38 64	350	16 34
25	20 46	400	8 26

Applicability : Shallow, Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur, Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.

Urid

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 7.82 T - 0.39 SN \quad FP_2O_5 = 5.36 T - 2.62 SP \quad FK_2O = 10.83 T - 0.44 SK$$

SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹)	SK = Soil – K (kg ha ⁻¹)	FK ₂ O = Fert. K (kg ha ⁻¹)
	T = Yield Target (q ha ⁻¹)		T = Yield Target (q ha ⁻¹)
	12 15		12 15
5	51 67	200	42 74

10	38	54	250	20	52
15	25	41	300	-	30
20	12	28	350	-	8
25	-	14	400	-	-

Applicability : Shallow , Medium black and Deep black soils ; Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain.

Madhya Pradesh (Niger)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 11.80 T - 0.17 SN \quad FP_2O_5 = 11.17 T - 3.53 SP \quad FK_2O = 10.52 T - 0.16 SK$$

SN = Soil – N (kg ha ⁻¹)	FN = Fert. N (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)	SP = Soil – P (kg ha ⁻¹)	FP ₂ O ₅ = Fert. P (kg ha ⁻¹) ----- T =Yield Target (q ha ⁻¹)	SK= Soil – K (kg ha ⁻¹)	FK ₂ O =Fert. K (kg ha ⁻¹) ----- T=Yield Target (q ha ⁻¹)
	6 8		6 8		6 8
100	54 77	5	49 71	200	31 52
200	37 60	15	14 36	300	14 36
250	28 51	20	- 18	350	- 28
300	20 43	25	- -	400	- 20
350	11 34	30	- -	450	- 12

Applicability : Shallow black ,Skeletal , mixed red and black soils ; Soil Testing Laboratories : Jabalpur , Rewa, Chindwara.

Pigeon pea

Maharashtra

Crop	: Pigeonpea (<i>kharif</i>)	Soil phosphorus range	:
Variety	: ICPL-87	Soil potassium range	:
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:
Districts	: Jalgaon, Ahmednagar, Aurangabad, Jalna, Parbhani, Pune, Nanded, Akola, Buldhana, Wardha, Yeotmal, Satara, Sangli, Kolhapur.		

Targeted Yield Equations

$$\text{FN} = 5.61 \text{ T} - 0.54 \text{ SN}, \quad \text{FP}_2\text{O}_5 = 5.72 \text{ T} - 4.73 \text{ SP}, \quad \text{FK}_2\text{O} = 6.33 \text{ T} - 0.17 \text{ SK}$$

Fertilizer prescription for targeted yields of pigeonpea for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			16 q ha ⁻¹ target			20 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	36	63	67	58	86	93
120	8	300	25	54	50	47	77	76
140	10	400	14	44	33	37	67	59
160	12	500	25*	35	16	25	58	42
180	14	600	25*	25	1	15	48	25
200	16	700	25*	16	25*	25*	39	25*
> 200	18	800	25*	25*	25*	25*	29	25*
> 200	20	-	25*	25*	25*	25*	20	25*

- Minimum dose of N, P₂O₅ and K₂O

Pantanagar (Pea)

Crop	: Pigeonpea	Soil phosphorus range	:
Variety	: Arkel	Soil potassium range	:
Soil	:	FYM composition	:
Situation	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equation for yield targets (kg/ha)

$\text{FN (N, kg/ha)} = 4.38 \times \text{YT (q/ha)} - 20$

$\text{F P (P}_2\text{O}_5, \text{ kg/ha)} = 4.95 \times \text{YT (q/ha)} - 1.53$

$\text{F K (K}_2\text{O kg/ha)} = 15.49 \times \text{YT (q/ha)} - 0.38$

Reddy Reckoner Request

Crop	: Pigeonpea	Soil phosphorus range	:
Variety	: Pant P-5	Soil potassium range	:
Soil	:	FYM composition	:
Situation	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equation for yield targets (kg/ha)

$\text{F K (K}_2\text{O kg/ha)} = 14.87 \times \text{YT (q/ha)} - 0.427$

$\text{F N (N, kg/ha)} = 4.83 \times \text{YT (q/ha)} - 19.87$

$\text{F P (P}_2\text{O}_5, \text{ kg/ha)} = 5.01 \times \text{YT (q/ha)} - 1.49$

Reddy Reckoner Request

Lentil

Palampur (Lentil)

Crop	: Lentil	Soil phosphorus range	:
Variety	:	Soil potassium range	:
Soil	:	FYM composition	:
Situation	:	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer Target yield equation:

$$F N = 3.94 T - 0.04 SN, \quad F P_2O_5 = 3.22 T - 2.72 SP, \quad F K_2O = 3.41 T - 0.16 SK$$

Validation of fertilizer adjustment equations of lentil on farmers' fields (average of 2 experiments) in mid hills wet temperate zone (1985-86)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	B:C ratio
	N	P ₂ O ₅	K ₂ O			
Control	0	0	0	1150	-	-
State level dose	10	40	0	1400	-	4.0
Target (kg ha ⁻¹) based						
1000	0	0	13	1375	+37.5	38.8
1500	0	0	29	1350	-10.0	14.6
2000	0	0	45	1400	-30.0	11.5
2500	38	7	62	1700	-32.0	5.1

Pantanagar (Lentil)**Fertilizer adjustment equations for different yield target.**

$$F N (N, \text{Kg/ha}) = 2.88 \times Y T (\text{q/ha}) - 55.00$$

$$F P (P_2O_5, \text{kg/ha}) = 4.02 \times Y T (\text{q/ha}) - 2.81$$

$$F K (K_2O \text{ kg/ha}) = 10.83 \times Y T (\text{q/ha}) - 0.92$$

Madhya Pradesh((Lentili))

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

For Calculating the fertilizer nutrient Requirement:

FN = 5.84 T – 0.159 SN – 0.270 ON ; $FP_2O_5 = 2.10T - 0.658 SP - 0.789 OP$; $FK_2O = 4.40 T - 0.094 SK - 0.774K$

Soil test Values (kg ha⁻¹)

Target yield (q ha⁻¹) = 10

			Without FYM		With 3 t FYM ha ⁻¹			
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	100	42	17	34	37	6	17
150	10	150	34	15	29	29	3	12
200	15	200	26	12	24	21	1	7
250	20	250	18	10	20	13	-	3
300	25	300	10	8	16	5	-	-
350	30	350	-	5	12	-	-	-

Composition of FYM : N(%) = 0.72 P₂O₅ (%) = 0.72 K₂O (%) = 0.75

Gram Maharashtra

Crop	: Green gram	Soil phosphorus range	: 6 – 18 kg ha ⁻¹
(Kharif)		Soil potassium range	: 200 – 500 kg ha ⁻¹
Variety	: S-8	FYM composition	:
Soil	: Typic Haplusterts	FYM rate	:
Situation	: Rainfed	Green manure composition	:
Target range	: 10 - 12 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 100 – 220 kg ha ⁻¹		
Districts	: Jalgaon, Akola, Buldhana, Amravati, Nanded, Wardha, Yeotmal, Satara, Sangli, Dhule.		

Targeted Yield Equations

$$\text{FN} = 4.56 \text{ T} - 0.18 \text{ SN}, \quad \text{FP}_2\text{O}_5 = 12.51 \text{ T} - 7.61 \text{ SP}, \quad \text{FK}_2\text{O} = 3.53 \text{ T} - 0.05 \text{ SK}$$

Fertilizer prescription for targeted yields of green gram for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			10 q ha ⁻¹ target			12 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	28	79	25	37	105	32
120	8	250	24	64	22	33	90	29
140	10	300	22	49	20	30	75	27
160	12	350	17	34	17	26	60	24
180	14	400	14	19	14	23	45	21
200	16	450	10	25*	11	19	29	18
220	18	500	25*	25*	25*	15	14	16

* Minimum dose of N, P₂O₅ and K₂O

Palampur (Gram) Without IPNS Based

Crop	:Gram	Soil phosphorus range	:
Variety	:	Soil potassium range	:
Soil	:	FYM composition	:
Situation	: Irrigated/Rainfed	FYM rate	:
Target range	: 10 - 25 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer Target yield equation:

$$F N = 1.69 T - 0.01 SN, \quad F P_2O_5 = 5.02 T - 2.32 SP, \quad F K_2O = 1.10 T - 0.04 SK$$

Validation of fertilizer adjustment equations of gram on farmers' fields (average of 2 experiments) in mid hills wet temperate zone 1985-86)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (kg ha ⁻¹)	Per cent deviation	B:C ratio
	N	P ₂ O ₅	K ₂ O			
Control	0	0	0	1715	-	-
State level dose	10	40	0	3150	-	23.5
Target (kg ha⁻¹) based						
1000	0	0	8	2800	+180.0	357.2
1500	0	0	18	2975	+98.3	172.3
2000	8	0	29	2475	+23.7	32.0
2500	74	0	39	2550	+2.0	6.4

Ludhiana(Green gram)

Crop	:Green gram	Soil phosphorus range	: 10 – 30 kg ha ⁻¹
Variety	:	Soil potassium range	: 100 – 300 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated/Rainfed	FYM rate	:
Target range	: 10 - 15 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 200 kg ha ⁻¹	Green manure rate	:

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets of Greb gram

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of				
Kmn O ₄ N	Olsens' P	Amm. Ac-K	10(q ha ⁻¹)		15 (q ha ⁻¹)		
			P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	39	35	56	70	70
110	12	120	34	28	44	65	63
120	14	140	29	21	32	61	56
130	16	160	25	14	20	56	49
140	18	180	20	7	9	51	42
150	20	200	15	5*	5*	46	35
160	22	220	10	5*	5*	42	28
170	24	240	6	5*	5*	37	25
180	26	260	5*	5*	5*	32	25
190	28	280	5*	5*	5*	27	25
200	30	300	5*	5*	5*	23	25

* maintainance dose.

Pantanagar (Gram)

Crop	: Gram	Soil phosphorus range	: 10 – 30 kg ha ⁻¹
Variety	: BG-209	Soil potassium range	: 100 – 300 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated/Rainfed	FYM rate	:
Target range	: 10 - 15 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 200 kg ha ⁻¹	Green manure rate	:

Gram Var. BG-209

Fertilizer adjustment equation for yield targets (kg/ha)

FN (N, kg/ha) = 4.97 x YT - 69

FP (P, kg/ha) = 3.96 YT – 3.10

FK (K, kg/ha) = 11.4 x YT – 0.57

Reddy Reckoner request

New Delhi (Gram)

Name of the Centre	: New Delhi	Soil phosphorus range	:
Crop	:	Soil potassium range	:
Variety	:	FYM composition	:
Soil	:	FYM rate	:
Situation	:	Green manure composition	:
Target range	:	Green manure rate	:
Soil Nitrogen range	:		

Fertilizer adjustment equations for targeted yields of crops in NCR of Delhi (Without FYM)

FN = 5.29 T – 0.39 SN, FP₂O₅ = 5.10 T – 5.24 SP, FK₂O = 3.04 T – 0.24 SK

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Gram

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	50	40
125	13	125	50	35	30
150	15	150	45	25	25
175	18	175	40	10*	20
200	20	200	30	10*	10*

225	23	225	20	10*	10*
250	25	250	10	10*	10*
275	28	275	10	10*	10*
300	30	300	10	10*	10*

*maintainance dose

Applicability : District & soil type

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Gram

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 25 q ha ⁻¹		
KMnO ₄ -N (kg ha ⁻¹)	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	50	75	50
125	13	125	50	60	45
150	15	150	50	50	40
175	18	175	50	35	35
200	20	200	50	25	30
225	23	225	45	10	20
250	25	250	35	10	15
275	28	275	25	10	10
300	30	300	15		10
325	33	325	10		10
350	36	350	10		
375	38	375	10		
400	40	400			

Madhya Pradesh (Gram)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 5.19 T - 0.48 SN$$

$$FP_2O_5 = 5.2 T - 4.1 SP$$

$$FK_2O = 3.9 T - 0.22 SK$$

SP =
Soil – P
(kg ha⁻¹)

FP₂O₅ = Fert. P
(kg ha⁻¹)

T =Yield Target
(q ha⁻¹)

SK= Soil –
K
(kg ha⁻¹)

FK₂O =Fert. K
(kg ha⁻¹)

T=Yield Target (q ha⁻¹)

	20	25		20	25
5	83	109	200	34	53
10	63	89	250	23	42
15	42	68	300	12	31
20	22	48	350		20
25	-	27	400		9

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.Chindwara .

Chickpea Maharashtra

Crop	: Chickpea (<i>Rabi</i>)	Soil phosphorus range	: 6 – 24 kg ha ⁻¹
Variety	: Vishal	Soil potassium range	: 200 – 650 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 20 - 25 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 260 kg ha ⁻¹	Green manure rate	:

Districts : Ahmednagar, Jalgaon, Pune, Nasik, Nanded, Aurangabad, Beed,

Jalna, Akola, Buldhana, Wardha, Yeotmal, Satara, Sangli, Kolhapur

Targeted Yield Equations

$$FN = 5.25 T - 0.46 SN, \quad FP_2O_5 = 3.87 T - 2.77 SP, \quad FK_2O = 1.29 T - 0.04 SK$$

Fertilizer prescription for targeted yields of chickpea for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			20 q ha ⁻¹ target			25 q ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	59	61	18	85	802	24
120	8	250	50	55	16	76	75	22
140	10	300	41	50	14	64	69	20
160	12	350	31	44	12	58	64	18
180	14	400	22	39	10	48	58	16
200	16	450	13	33	8	39	52	14
220	18	500	25*	28	25*	30	47	12
240	20	550	25*	22	25*	21	41	25*
260	22	600	25*	16	25*	25*	36	25*
> 260	24	650	25*	25*	25*	25*	30	25*

* Minimum dose of N, P₂O₅ and K₂O

Raipur (Chickpea)

Name of the Centre : Raipur

Crop :

Variety : JG – 74

Soil : Vertisol

Situation :

Season - *Rabi*, 1997-98

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations

FN = General recommended dose (20 kg ha⁻¹)

FP₂O₅ = Critical value for SP = 12 kg P ha⁻¹

FK₂O = No K if SK >250 kg ha⁻¹

Add Reddy Reckoner

Brinjal

Raipur (Brinjal) IPNS Based

Crop	: Brinjal	Soil phosphorus range	: 3 – 28 kg ha ⁻¹
Variety	: Matka kesi	Soil potassium range	: 200 – 650 kg ha ⁻¹
Soil	: Inceptisol	FYM composition	:
Situation	:	FYM rate	:
Session	: Rabi	Green manure composition	:
Target range	: 150 - 225 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹		

Fertilizer adjustment equation for targeted yield

$$FN = 1.30 Y - (0.55 SN + 4.86 t FYM)$$

$$FP_2O_5 = 115 - (13254.6 - 58.5Y)^{1/2} - (2.99 SP + 6.25 t FYM)$$

$$FK_2O = \text{No K if SK} > 250 \text{ kg ha}^{-1}$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of Brinjal (Mukta Kesi) in Inceptisol (*Matasi*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Brinjal (Mukta Kesi)							
		150		175		200		225	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	113	39	145	51	178	67	210	96
175	6	99	30	131	42	164	58	196	87
200	9	85	21	118	33	150	49	183	78
225	12	71	12	104	24	136	40	169	70
250	15	58	3	90	15	123	31	155	61
275	18	44	3	76	6	109	22	141	52
300	21	30	3	63	4	95	13	128	43
350	24	2	3	35	4	68	4	100	34
400	28	2	3	7	4	40	4	73	25

Ready reckoners on soil test based fertilizer recommendations with INM (5 ton FYM) for specific yield targets of Brinjal (Mukta Kesi) in Inceptisol (*Matasi*).

Alkaline KMnO ₄ -N (kg ha ⁻¹)	Olsen's P (kg ha ⁻¹)	Yield Targets (q ha ⁻¹) Brinjal (Mukta Kesi)							
		150		175		200		225	
		FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅	FN	FP ₂ O ₅
150	3	88	8	121	20	153	35	186	65
175	6	74	2	107	11	139	26	172	56
200	9	61	2	93	2	126	17	158	47
225	12	47	2	79	2	112	8	144	38
250	15	33	2	66	2	98	2	131	29
275	18	19	2	52	2	84	2	117	20
300	21	6	2	38	2	71	2	103	11
350	24	6	2	6	2	43	2	76	2
400	28	6	2	6	2	16	2	48	2

Maharashtra (Brinal)

Crop : Brinjal Summer
Variety : Matka kesi
Soil : Typic haplustert
Situation : Irrigated
Session :
Target range : 50 - 60 q ha⁻¹
Soil Nitrogen range : 100 – 200 kg ha⁻¹

Soil phosphorus range : 6 – 16 kg ha⁻¹
Soil potassium range : 200 – 700 kg ha⁻¹
FYM composition :
FYM rate :
Green manure composition :
Green manure rate :

Districts : Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule

Targeted Yield Equations

FN = 4.82 T – 0.53 SN, FP₂O₅ = 3.14 T – 7.32 SP, FK₂O = 3.21 T – 0.13 SK

Fertilizer prescription for targeted yields of brinjal for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			50 t ha ⁻¹ target			60 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	188	113	135	236	144	167
120	8	300	177	98	122	226	130	154
140	10	400	167	84	109	215	115	141
160	12	500	156	69	96	204	101	128

180	14	600	146	55	83	194	86	115
200	16	700	135	40	70	183	71	102

Bhubneswer (Brinjal)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Brinjal (Utkal Anushree)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 1.0 T - 0.3 SN, \quad FP_2O_5 = 0.7 T - 1.6 SP, \quad FK_2O = 4.7 T - 0.7 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	200 (q ha ⁻¹)			225 (q ha ⁻¹)			250 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
140	20	60	158	108	98	182	126	115	208	143	133
150	25	70	155	92	91	180	118	108	205	135	126
160	30	80	152	84	84	177	110	101	202	127	119
170	35	90	149	76	77	174	102	94	199	119	112
180	40	100	146	68	70	171	94	87	196	111	105
190	45	110	143	60	63	168	86	80	193	102	98
200	50	120	140	62	56	165	78	73	190	94	91
220	55	130	134	52	49	159	70	66	184	86	84
250	60	140	125	44	42	150	62	59	175	78	77
280	65	150	116	36	35	141	54	52	166	70	70

Cabbage

Coimbatore (Cabbage)

Name of the centre	: Coimbatore	Soil phosphorus range	: 10 – 22 kg ha ⁻¹
Soil	: Irugur	Soil potassium range	: 200 – 500 kg ha ⁻¹
Crop & Variety	: Hybrid-Questo	FYM composition	:
Season developed	: 2003-04	FYM rate	:
Season developed	: Kharif	Green manure composition	:
Target range	: 650 q ha ⁻¹	Green manure rate	:
Soil Nitrogen range	: 180 – 300 kg ha ⁻¹		

Fertilizer Adjustment Equations

$$\text{FN} = 0.55 \text{ T} - 0.89 \text{ SN} - 0.76 \text{ ON}, \text{FP}_2\text{O}_5 = 0.29 \text{ T} - 2.75 \text{ SP} - 0.86 \text{ OP}$$

$$\text{FK}_2\text{O} = 0.36 \text{ T} - 0.31 \text{ SK} - 0.59 \text{ OK}$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets of cabbage

Initial soil test values (kg ha ⁻¹)			Nutrients needed (kg ha ⁻¹) for yield targets								
			650 q ha ⁻¹			700 q ha ⁻¹			750 q ha ⁻¹		
SN	SP	SK	FN	FP ₂ O ₅	FK ₂ O	FN	FP ₂ O ₅	FK ₂ O	FN	FP ₂ O ₅	FK ₂ O
180	10	200	197	161	172	225	176	190	253	190	208
200	12	250	180	156	157	207	170	175	235	185	193
220	14	300	162	150	141	189	165	159	217	179	177
240	16	350	144	145	126	171	159	144	199	174	162
260	18	400	126	139	110	154	154	128	181	168	146
280	20	450	108	134	95	136	148	113	163	163	131
300	22	500	91	128	79	118	143	97	146	157	115

Recommendation domain

Soil type : Red – sandy clay loam

Maharashtra (Cabbage)

Crop	: Cabbage (<i>Rabi</i>)	Soil phosphorus range	: 6 – 16 kg ha ⁻¹
Variety	: Golden acre	Soil potassium range	: 200 – 700 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 30 q ha ⁻¹ – 40 q ha ⁻¹ Soil	Green manure composition	:
Nitrogen range	: 100 – 200 kg ha ⁻¹	Green manure rate	:

Districts : Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule

Targeted Yield Equations

$$FN = 8.28 T - 0.21 SN, \quad FP_2O_5 = 4.72 T - 2.34 SP, \quad FK_2O = 6.68 T - 0.19 SK$$

Fertilizer prescription for targeted yields of cabbage for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			30 t ha ⁻¹ target			40 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	227.4	128	162	310	175	229
120	8	300	223.2	123	143	306	170	210
140	10	400	219.0	118	124	302	165	191
160	12	500	214.8	114	105	298	108	172
180	14	600	210.6	109	86	293	156	153
200	16	700	206.4	104	67	289	151	134

IPNS Based Fertiliser Recommendations

Karnataka

Crop: Cabbage (Golden Acre and Other HYV)

Targeted Yield Equation

$$FN = 0.851 T - 87.08 SN \text{ (OC \%)}$$

$$FP_2O_5 = 0.563 T - 0.192 SP_2O_5 \text{ (Olsen's } SP_2O_5)$$

$$FK_2O = 0.709 T - 0.165 SK_2O \text{ (NH}_4\text{OAC-K}_2\text{O)}$$

$$RYS = 47.103 \text{ kg}$$

New Delhi (Cabbage)

Crop : Cabbage (cv. Green Express)

Season and year : Rabi, 2005 – '06

Targeted yield equation:

$$FN = 4.65 T - 0.76STVN - 0.75M, \quad FP_2O_5 = 0.93 T - 1.14 STVP - 0.48M$$

$$FK_2O = 4.79 T - 1.78 STVK - 1.22M$$

Fertilizer levels (kg.ha ⁻¹)	N	0, 120, 150, 170
	P ₂ O ₅	50, 60, 80
	K ₂ O	60, 80, 100
	FYM (t ha ⁻¹)	2.5, 5.0
Initial soil test values (kg.ha ⁻¹)	KMnO ₄ -N	218- 271
	Olsen-P	12 - 32
	NH ₄ OAc-K	89 - 238
Yield (kg.ha ⁻¹)	Control plot	37760 - 39706
	Treated plot	75791 – 82928

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha ⁻¹)			Fertilizer nutrient required (kg.ha ⁻¹)					
			Targeted yield 70.0 t.ha ⁻¹			Targeted yield 80.0 t.ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
250	5	100	133	52	145	156	57	168
275	10	125	114	46	101	137	51	124
300	15	150	95	41	56	118	45	80
325	20	200	76	35	23	99	40	36
350	25	225	57	29	12	80	34	28
375	30	250	39	24	10	62	28	10

Carrot

Coimbatore(Carrot) IPNS Based

Name of the centre	: Coimbatore	Soil phosphorus range	: 50 – 650 kg ha ⁻¹
Soil	: Laterite Alluvium (Ooty series)	Soil potassium range	: 100 – 700 kg ha ⁻¹
Crop & Variety	: Kuruda Super	FYM composition	:
Season developed	: 2002-03	FYM rate	:
Target range	: 40 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer Prescription Equations

FN = 0.48 T- 0.17 SN- 0.33 ON
 FP₂O₅ = 1.11 T- 1.17 SP- 0.31 OP
 FK₂O = 0.83 T- 0.40 SK- 0.43 OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

Initial soil test values (kg / ha)			40 tons ha ⁻¹ - NPK alone		
KMnO ₄ -N	Bray-P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
100	50	100	175	386	284
125	100	150	171	327	260
150	150	200	167	269	236
175	200	250	162	210	212
200	250	300	158	152	188
225	300	350	154	93	164
250	350	400	150	35	140
275	400	450	145		116
300	450	500	141		92
325	500	550	137		68
350	550	600	133		44
375	600	650	128		20
400	650	700	124		

Recommendation domain

Soil type : Laterite – sandy clay loam
 Yield target : 40 t ha⁻¹

Cauliflower

Coimbatore(Cauliflower) Without IPNS

Name of the centre	: Coimbatore	Soil phosphorus range	: 10 – 22 kg ha ⁻¹
Soil	: Irugur	Soil potassium range	: 200 – 500 kg ha ⁻¹
Crop & Variety	: Hybrid Pawas	FYM composition	:
Season developed/year	: 2003-04, Kharif	FYM rate	:
Target range	: 350 - 450 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 160 – 280 kg ha ⁻¹	Green manure rate	:

Fertilizer Adjustment Equations

FN = 0.93 T - 0.79 SN - 0.63 ON, FP_2O_5 = 0.44 T - 1.74 SP - 0.85 OP

FK_2O = 0.44 T - 0.18 SK - 0.46 OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets of cauliflower

Initial soil test values (kg ha ⁻¹)			Nutrients needed (kg ha ⁻¹) for yield targets								
			350 q ha ⁻¹			400 q ha ⁻¹			450 q ha ⁻¹		
SN	SP	SK	FN	FP_2O_5	FK_2O	FN	FP_2O_5	FK_2O	FN	FP_2O_5	FK_2O
160	10	200	199	137	118	246	159	140	292	181	162
180	12	250	183	133	109	230	155	131	276	177	153
200	14	300	168	130	100	214	152	122	261	174	144
220	16	350	152	126	91	198	148	113	245	170	135
240	18	400	136	123	82	182	145	104	229	167	126
260	20	450	120	119	73	167	141	95	213	163	117
280	22	500	104	116	64	151	138	86	197	160	108

Recommendation domain

Soil type : Red – sandy clay loam

Yield target : 400 q ha⁻¹

Maharashtra (Cauliflower)

Crop	: Cauliflower (<i>Rabi</i>)	Soil phosphorus range	: 6 – 18 kg ha ⁻¹
Variety	: Namdhari N0. 90	Soil potassium range	: 200 – 800 kg ha ⁻¹
Soil	: Typic Haplustert	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 25 - 25 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 220 kg ha ⁻¹	Green manure rate	:
Districts	: Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule		

Targeted Yield Equations

Without FYM

$$FN = 6.83 T - 0.35 SN$$

$$FP_2O_5 = 4.25 T - 2.21 SP$$

$$FK_2O = 3.90 T - 0.08 SK$$

With FYM

$$FN = 6.0 T - 0.30 SN - 1.44 FYM$$

$$FP_2O_5 = 3.92 T - 2.04 SP - 1.20 FYM$$

$$FK_2O = 3.07 T - 0.06 SK - 1.12 FYM$$

Fertilizer prescription for targeted yields of cauliflower for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (10 t FYM ha ⁻¹)		
			25 t ha ⁻¹ target			25 t ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	136	93	82	106	74	54
120	8	300	128	89	74	100	70	48
140	10	400	122	83	66	94	66	42
160	12	500	115	80	58	88	62	36
180	14	600	108	75	50	82	57	30
200	16	700	101	71	42	76	53	24
220	18	800	94	66	34	70	49	18

IPNS based fertilizer recommendation

Colocassia

Andhra Pradesh (Colocassia)with & without IPNS based

Name of the Centre	: Nellore	Soil phosphorus range	: 5 – 70 kg ha ⁻¹
Soil	: Alluvial soil	Soil potassium range	: 125 – 450 kg ha ⁻¹
Crop and Variety	: Colocassia-KCS-2	FYM composition	:
Season/Year developed	: 2002-2003	FYM rate	:
Target range	: 20 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 360 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 12.11 T - 0.53 SN - 0.32 FYM N$$

$$FP_2O_5 = 6.70 T - 1.84 SP - 0.36 FYM P$$

$$FK_2O = 14.45 T - 0.64 SK - 0.075 FYM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 20 t ha ⁻¹					
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	125	189	125	209	175	120	203
120	10	150	179	116	193	164	111	187
140	15	175	168	106	177	154	101	171
160	20	200	157	97	161	143	92	155
180	25	225	147	88	145	132	83	139
200	30	250	136	79	129	122	74	123
220	35	275	126	70	113	111	65	107
240	40	300	115	60	97	101	55	91
260	45	325	104	51	81	90	46	75
280	50	350	94	42	65	79	37	59
300	55	375	83	33	49	69	28	43
320	60	400	73	24	33	58	19	27
340	65	425	62	14	17	48	9	11
360	70	450	51	5	1	37	0	0

Verification: The above equations are to be verified on the farmers' fields of Nellore district with yield targets of 20 and 25 t ha⁻¹

Applicability

Soil Testing Laboratories	:	Nellore and Ongole
Soil type	:	Sandy clay loam
Crop	:	Colocasia –KCS-2/RCNA-1 or high yielding varieties
Season developed	:	<i>Rabi</i>
Yield target	:	Up to 20-25 t ha ⁻¹

Note: The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

Chillies

Andhra Pradesh (CHILLIES – Kharif)

Name of the Centre	: Lam Farm	Soil phosphorus range	: 10 – 60 kg ha ⁻¹
Soil	: Black soil (Vertisol)	Soil potassium range	: 150 – 650 kg ha ⁻¹
Crop and Variety	: Chillies-X-235	FYM composition	: 0.75 : 0.60 : 1.2
Season developed	: <i>Kharif</i> , 1986 & 1987 (pooled data)	FYM rate	:
Target range	: 25 q ha ⁻¹ – 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 150 – 400 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 10.66 T - 0.84 SN, \text{ } FP_2O_5 = 3.43 T - 1.68 SP, \text{ } FK_2O = 10.23 T - 0.60 SK$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for yield target of		
mnO ₄ N	Olsens' P	Amm. Ac-K	25 (q ha ⁻¹)		
			N	P ₂ O ₅	K ₂ O
150	10	150	141	69	166
175	15	200	120	61	136
200	20	250	99	52	106
225	25	300	78	44	76
250	30	350	57	35	46
275	35	400	36	27	16
300	40	450	5	19	0
325	45	500	5*	10	5*
350	50	550	5*	2	5*
375	55	600	5*	5*	5*
400	60	650	5*	5*	5*

* minimum dose to be applied

Verification: The above fertilizer adjustment equations were tested in the farmers' fields of Guntur district during *kharif* 1997 for yield targets of 25 and 30 q ha⁻¹. All the yield targets were attained at the places tested.

Applicability

Soil Testing Laboratories : Guntur, Ongole, Vijayawada and Khammam

Soil type : Black sols

Crop : Chillies high yielding varieties

Season developed : *Kharif*

Yield target : Upto 30 q ha⁻¹

Note : The above equations may be tested in Prakasam, Krishna and Khammam districts and in soils other than black at 3 or 4 yield targets. The best one maybe adopted for making fertilizer recommendations.

Maharashtra (Chilli) With and without IPNS Based

Crop	: Chilli (Rabi)	Soil phosphorus range	: 6 – 18 kg ha ⁻¹
Variety	: Phule Jyoti	Soil potassium range	: 200 – 800 kg ha ⁻¹
Soil	: Typic Haplustert	FYM composition	:
Situation	: Irrigated	FYM rate	: 10 t ha ⁻¹
Target range	: 7 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 220 kg ha ⁻¹	Green manure rate	:
Districts	: Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule		

Targeted Yield Equations

Without FYM

$$FN = 50.23 T - 0.54 SN$$

$$FP_2O_5 = 27.09 T - 3.17 SP$$

$$FK_2O = 36.48 T - 0.30 SK$$

With FYM

$$FN = 37.25 T - 0.40 SN - 3.38 FYM$$

$$FP_2O_5 = 25.40 T - 2.97 SP - 1.88 FYM$$

$$FK_2O = 34.00 T - 0.26 SK - 1.66 FYM$$

Fertilizer prescription for targeted yields of chilli for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (10 t FYM ha ⁻¹)		
			7 t ha ⁻¹ target			7 t ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	298	171	195	187	141	169
120	8	300	287	164	165	179	135	143
140	10	400	276	158	135	171	129	117
160	12	500	265	152	105	163	123	91
180	14	600	254	145	75	155	117	65
200	16	700	244	139	45	147	111	39
220	18	800	233	133	15	139	101	13

Coimbatore (Chilli)

Name of the Centre : Coimbatore
Crop : Chilli (Kharif)
Variety : Chilli var. K 1
Soil : Red (Inceptisol)
Situation :
Target range :
Soil Nitrogen range :

Soil phosphorus range :
Soil potassium range :
FYM composition :
FYM rate :
Green manure composition :
Green manure rate :

Fertilizer Prescription Equations

$FN = 8.29T - 0.32 SN$, $FP_2O_5 = 7.13T - 5.24SP$, $FK_2O = 5.86T - 0.15 SK$

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 20 q ha ⁻¹ of Dry pod		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	160	8	200	114	100	87
2	180	10	220	108	90	84
3	200	12	240	102	80	81
4	220	14	260	95	69	78
5	240	16	280	89	59	75
6	260	18	300	83	48	72
7	280	20	320	76	38	69

Recommendation domain

Soil type : Black- sandy loam
Yield target : 20q ha⁻¹

Potato

Coimbatore (Potato)

Name of the Centre : Coimbatore

Crop : Kufri Thenmalai

Variety :

Soil : Laterite Alluvium (Ooty series)

Situation :

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer Prescription Equations

FN = 0.70 T - 0.24 SN - 0.41 ON, FP_2O_5 = 1.40 T - 0.55 SP - 0.95 OP

FK₂O = 0.72 T - 0.25 SK - 0.39 OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

Initial soil test values (kg / ha)			40 tons ha ⁻¹ - NPK alone		
KMnO ₄ -N	Bray-P	NH ₄ OAc-K	N	P ₂ O ₅	K ₂ O
100	50	100	256	537	263
125	100	150	250	509	251
150	150	200	244	482	238
175	200	250	238	454	226
200	250	300	232	427	213
225	300	350	226	399	201
250	350	400	220	372	188
275	400	450	214	344	176
300	450	500	208	317	163
325	500	550	202	289	151
350	550	600	196	262	138
375	600	650	190	234	126
400	650	700	184	207	113

Recommendation domain

Soil type : Laterite – sandy clay loam

Yield target : 40 q ha⁻¹

Raipur (Potato)

Name of the Centre : Raipur

Crop : Potato

Variety : JH-222

Soil : Vertisol

Situation :

Session : *Rabi*, 2000-01

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for targeted yield

$FN = 1.67 Y - 0.36 SN$, $FP_2O_5 = 0.54 Y - 2.27 SP$

$FK_2O = \text{No K if } SK > 250 \text{ kg ha}^{-1}$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of potato (JH-222) in Vertisol (Kanhra).

Alkaline $KMnO_4-N$ ($kg\ ha^{-1}$)	Olsen's P ($kg\ ha^{-1}$)	Yield Targets ($q\ ha^{-1}$) Potato (var. - JH-222)					
		120		160		200	
		FN	FP_2O_5	FN	FP_2O_5	FN	FP_2O_5
150	3	146	58	213	80	280	101
175	6	137	51	204	73	271	94
200	9	128	44	195	66	262	88
225	12	119	38	186	59	253	81
250	15	110	31	177	52	244	74
275	18	101	24	168	46	235	67
300	21	92	17	159	39	226	60
350	24	74	10	141	32	208	54
400	28	56	1	123	23	190	44

Pantanagar (Potato)

Name of the Centre : Pantnagar

Crop : Potato

Variety : Khufri Jyoti

Soil :

Situation :

Target range :

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Cropping Sequence

$$\text{PHN} = 104.94 + 0.281\text{FN} - 0.0412^* \text{SN} - 0.112\text{Y} \quad (\text{R}^2 = 0.352^{**})$$

$$\text{PHP} = -2.738 + 0.0911^{**} \text{FP} + 0.844^{**} \text{SP} + 0.0126\text{Y} \quad (\text{R}^2 = 0.778^{**})$$

$$\text{PHK} = 31.281 + 0.713^{**} \text{FK} + 0.445^{**} \text{SK} - 0.193\text{Y} \quad (\text{R}^2 = 0.703^{**})$$

Yellow Sarson (*Var. PYS-I*)

$$\text{PHN} = 107.909 + 0.359\text{FN} - 0.07954\text{SN} - 0.790\text{Y} \quad (\text{R}^2 = 0.722^{**})$$

$$\text{PHP} = 23.195 + 0.260\text{FP} + 0.01136\text{SP} - 0.242\text{Y} \quad (\text{R}^2 = 0.704^{**})$$

$$\text{PHK} = 153.25 + 0.402\text{FK} + 0.0166\text{SK} - 0.537\text{Y} \quad (\text{R}^2 = 0.562^{**})$$

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 300 q ha ⁻¹		
KmnO ₄ -N	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	236.0	164.1	74.364.0
125	13	125	213.7	150.7	53.8
150	15	150	191.3	141.8	43.6
175	18	175	168.9	128.3	33.3
200	20	200	146.6	119.4	23.1
225	23	225	124.2	106.0	12.8
250	25	250	101.9	97.1	2.6
275	28	275	79.5	83.7	
300	30	300	57.1	74.7	
325	33	325	34.8	61.3	
350	35	350	12.4	52.4	
375	38	375	10	39.0	
400	40	400	10	30.0	

Maharashtra (Potato)

Name of the Centre : Maharashtra	Soil phosphorus range :
Crop : Potato(<i>Rabi</i>)	Soil potassium range :
Variety : Khufri Jyoti	FYM composition :
Soil : Typic Ustorthent	FYM rate :
Situation : Irrigated	Green manure composition :
Target range :	Green manure rate :
Soil Nitrogen range :	
Districts : Pune, Ahmednagar, Aurangabad, Nasik	

Targeted Yield Equations	
Without FYM	With FYM
$FN = 1.549 T - 0.40 SN$ $FP_2O_5 = 0.906 T - 5.53 SP$ $FK_2O = 1.315 T - 0.17 SK$	$FN = 1.207 T - 0.315 SN - 0.81 FYM$ $FP_2O_5 = 0.878 T - 5.35 SP - 0.71 FYM$ $FK_2O = 1.180 T - 1.156 SK - 0.76 FYM$

Fertilizer prescription for targeted yields of Potato for varying soil test values.

A calibration chart showing the saving in fertilizers under IPNS system compared to fertilizer alone for potato crop revealed that about 40 kg N, 10 kg P₂O₅ and 30 kg K₂O can be saved for yield target of potato under IPNS system.

Fertilizer prescription for targeted yields of potato for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (10 t FYM ha ⁻¹)		
			175 q ha ⁻¹ target			175 q ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	231	125	196	171	113	175
120	8	300	223	114	179	165	104	152
140	10	400	251	103	162	158	93	137
160	12	500	207	92	145	152	82	121
180	14	600	199	81	128	146	72	105
200	16	700	191	70	111	140	61	90
220	18	800	183.0	59.0	94.12	133.2	50.2	74.1

Yield Targeting in Potato with IPNS based STCR

The fertilizer prescription equations were developed for potato by using IPNS based STCR concept involving conjoint use of FYM and inorganic fertilizers. The high fertilizer adjustment coefficients with the use of FYM in the yield targeting equation for potato i.e. 0.81, 0.71 and 0.76 for N, P and K respectively show the scope for considerable saving of fertilizer nutrients for achieving specific yield targets.

Economics of fertilizer use for yield target of potato (2004-2005)

Treatment	Fertilizer dose (kg ha ⁻¹)			Grain yield (t ha ⁻¹)	Cost of ferti. (Rs ha ⁻¹)	Increase over farmers’ practice.		Returns /Rs. Invested on fert.
	N	P ₂ O ₅	K ₂ O			Increase in yield (t ha ⁻¹)	Value of Produce	
							-----Rs. ha ⁻¹ -----	
Control	0	0	0	63.7	-	--	--	--
RD	120	60	120	177.6	9279	113.9	45560	4.91
AST	150	60	90	142.2	3374	78.5	31400	9.30
150 q ha ⁻¹ target	153	46	131	158.9	3441	95.2	38080	11.06
200q ha ⁻¹ target	230	92	196	202.2	5599	138.5	55400	9.89
150 q ha ⁻¹ target + 10 Mg FYM ha ⁻¹	110	38	108	170.5	8669	106.8	42720	4.92
200 q ha ⁻¹ target + 10 Mg FYM ha ⁻¹	170	81	167	223.9	10548	160.2	64080	6.07
30 Mg FYM ha ⁻¹	252	102	234	124.3	18000	60.6	24240	1.34

Rates : N 7.20, P₂O₅ 18.0, K₂O 7.0 Rs kg⁻¹, Potato Rs 400 q⁻¹

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha ⁻¹)			Fertilizer nutrient required (kg.ha ⁻¹)					
			Targeted yield 17.5 t.ha ⁻¹			Targeted yield 20.0 t.ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
250	5	100	233	205	172	278	238	201
275	10	150	224	198	158	269	235	187
300	15	200	216	191	143	261	231	172
325	20	250	208	184	129	253	227	158
350	25	300	200	177	114	245	224	143
375	30	350	191	170	100	236	220	129

No modification was made in the ready-reckoner.

Sweet Potato

Kalyani

Name of the centre	: Kalyani	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop & Variety	: Potato (cv. Kufri Jyoti)	FYM composition	:
Season developed	: Rabi, 2004-'05	FYM rate	:
Target range	:	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations:

$$FN = 1.61 T - 0.43 SN, \quad FP_2O_5 = 0.95 T - 1.80 SP, \quad FK_2O = 0.87 T - 0.34 SK$$

Fertilizer levels (kg.ha ⁻¹)	N	0, 200, 250, 300
	P ₂ O ₅	0, 125, 150
	K ₂ O	0, 125, 150
Initial soil test values (kg.ha ⁻¹)	KMnO ₄ -N	239 - 328
	Olsen-P	6 - 32
	NH ₄ OAc-K	76 - 285
Yield (kg.ha ⁻¹)	Control plot	4600 - 14100
	Treated plot	26600 - 34500

Ready-reckoner* of fertilizer doses at varying soil test values for specific yield target

Available soil nutrients (kg.ha ⁻¹)			Fertilizer nutrient required (kg.ha ⁻¹)					
			Targeted yield 20.0 t.ha ⁻¹			Targeted yield 22.5 t.ha ⁻¹		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
250	5	100	174	157	118	215	181	140
275	10	150	164	148	101	204	172	123
300	15	200	153	139	84	193	163	106
325	20	250	142	130	67	182	154	89
350	25	300	131	121	50	172	145	72
375	30	350	121	112	33	161	136	55

* No modification was made in the ready-reckoner.

Crop : Potato (cv. Chandra Mukhi)

Season and year : Rabi, 2003 – '04

Fertilizer adjustment equations:

$$FN = 1.80 T - 0.33 SN, \quad FP_2O_5 = 1.21T - 1.39 SP, \quad FK_2O = 1.15 T - 0.29SK$$

Fertilizer levels (kg.ha⁻¹)	N	0, 200, 250, 300
	P₂O₅	0, 125, 150
	K₂O	0, 125, 150
Initial soil test values (kg.ha⁻¹)	KMnO₄-N	218- 271
	Olsen-P	12 - 32
	NH₄OAc-K	89 - 238
Yield (kg.ha⁻¹)	Control plot	11450 - 12510
	Treated plot	34770 – 42870

Bhubneswer (Potato)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Potato (Ashoka)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 1.8 T - 0.1 SN, \quad FP_2O_5 = 0.5 T - 1.8 SP, \quad FK_2O = 1.1 T - 1.3 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	200 (q ha ⁻¹)			225 (q ha ⁻¹)			250 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
140	20	60	296	89	197	341	102	224	386	114	252
150	25	70	274	80	184	319	93	211	364	105	239
160	30	80	252	71	171	397	84	198	342	96	226
200	35	90	230	62	158	275	75	185	320	87	213
220	40	100	208	53	145	253	66	172	298	78	200
240	45	120	186	44	132	231	57	169	276	69	187

260	50	140	164	35	119	209	48	146	54	60	174
280	55	160	142	26	106	187	39	133	232	51	161
300	60	180	120	17	93	165	30	120	210	42	148
320	65	200	98	8	80	143	21	107	188	33	135

Bhubneswer (Pumpkin)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Pumpkin (Goamal)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 4.9 T - 1.2 SN, \quad FP_2O_5 = 2.7 T - 2.7 SP, \quad FK_2O = 2.0 T - 0.5 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	50 (q ha ⁻¹)			60 (q ha ⁻¹)			70 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
80	15	60	76	55	40	12	81	60	174	108	80
100	20	80	52	41	30	100	68	50	150	94	70
120	25	100	28	27	20	76	54	40	126	81	60
140	30	120	20	20	20	52	41	30	102	68	50
160	35	140	20	20	20	28	28	20	76	52	40
180	40	160	20	20	20	24	20	20	54	38	30
200	50	180	20	20	20	20	20	20	30	24	20

Tapioca

Coimbatore (Tapioca)

Name of the centre	: Salem (Sub-Centre)	Soil phosphorus range	: 10 – 30 kg ha ⁻¹
Soil	: Red (Irugur series)	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Tapioca - H 226	FYM composition	:
Season developed	: (8 months crop)	FYM rate	:
Target range	: 40 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:

Fertiliser Adjustment Equations

FN	=	5.60	T	-	0.61	SN	-	0.81	ON
FP ₂ O ₅	=	3.53	T	-	1.80	SP	-	0.53	OP
FK ₂ O	=	9.42	T	-	0.67	SK	-	0.70	OK

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 40 t ha ⁻¹		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	180	10	180	114	123	256
2	190	12	190	108	119	250
3	200	14	200	102	116	243
4	210	16	210	96	112	236
5	220	18	220	90	109	230
6	230	20	230	84	105	223
7	240	22	240	78	101	216
8	250	24	250	71	98	209
9	260	26	260	65	94	203
10	270	28	270	59	91	196
11	280	30	280	53	87	189

Recommendation domain

Soil type : Red - Sandy Loam
Yield target : 40 t ha⁻¹

Tomato

Andhra Pradesh (Tomato)

Name of the centre	: Rajendranagar	Soil phosphorus range	:
Soil	: Alfisol	Soil potassium range	:
Crop & Variety	: Tomato – Pusa rabi	FYM composition	:
Season developed	: 2002-03	FYM rate	:
Target range	: t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 15.48 T - 2.28 SN - 0.681 FYM N, \quad FP_2O_5 = 1.78 T - 1.14 SP - 0.383 FYM P$$

$$FK_2O = 6.82 T - 1.02 SK - 0.082 FYM K$$

Applicability

Soil Testing Laboratories	:	Ranga Reddy and Mahabubnagar districts
Soil type	:	Sandy clay loam
Crop	:	Tomato-Pusa Rubi
Season developed	:	<i>Rabi</i>
Yield target	:	Up to 150-200 q ha ⁻¹

Note: **The above equations may be tested in soils other than sandy clay loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.**

Maharashtra (Tomato)

Name of the centre	: Maharashtra	Soil phosphorus range	:
Soil	: Typic Ustorthent	Soil potassium range	:
Crop & Variety	: Tomato (Dhanshree)	FYM composition	:
Season developed	:	FYM rate	:
Situation	: Irrigated	Green manure composition	:
Target range	: t ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		
Districts	: Ahmednagar, Nasik, Pune, Satara, Sangli, Kolhapur, Solapur, Dhule		

Targeted Yield Equations Without FYM

$$FN = 5.33 T - 0.46 SN, FP_2O_5 = 3.88 T - 4.16 SP$$

$$FK_2O = 5.16 T - 0.25 SK$$

Targeted Yield Equations With FYM

$$FN = 4.13 T - 0.43 SN - 1.13 FYM$$

$$FP_2O_5 = 2.5 T - 2.78 SP - 0.57 FYM$$

$$FK_2O = 3.44 T - 0.22 SK - 0.75 FYM$$

Fertilizer prescription for targeted yields of tomato for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (20 t FYM ha ⁻¹)		
			30 t ha ⁻¹ target			30 t ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	114	91	105	70	53	52
120	8	300	105	84	80	61	47	30
140	10	400	96	75	55	52	42	25*
160	12	500	86	66	30	44	36	25*
180	14	600	77	55	25*	35	30	25*
200	16	700	68	50	25*	27	25	25*
220	18	800	59	42	25*	18	19	25*

* Minimum dose of K₂O

Turmeric

Maharashtra

Name of the centre	: Maharashtra	Soil phosphorus range	: 10 – 30 kg ha ⁻¹
Soil	: Typic Haplustert	Soil potassium range	: 180 – 280 kg ha ⁻¹
Crop & Variety	: Turmeric (Salem)	FYM composition	:
Season developed	: <i>Kharif</i>	FYM rate	:
Target range	: 40 t ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 180 – 280 kg ha ⁻¹	Green manure rate	:
Districts	: Kolhapur, Sangli, Satara		

<i>Without FYM Targeted Yield Equations</i>	<i>With FYM Targeted Yield Equations</i>
$FN = 11.10 T - 1.78 SN$ $FP_2O_5 = 4.54 T - 7.55 SP$ $FK_2O = 5.40 T - 0.545 SK$	$FN = 6.45 T - 0.88 SN - 2.55 FYM$ $FP_2O_5 = 4.03 T - 6.48 SP - 0.59 FYM$ $FK_2O = 4.52 T - 0.45 SK - 1.40 FYM$

Fertilizer prescription for targeted yields of Turmeric for varying soil test values.

Soil test values (Kg ha ⁻¹)			Without FYM			With FYM (20 t FYM ha ⁻¹)		
			70 q ha ⁻¹ target			70 q ha ⁻¹ target		
N	P	K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	6	200	599	273	269	313	231	198
120	8	300	563	257	215	295	218	153
140	10	400	528	242	160	277	206	108
160	12	500	492	227	106	260	193	63
180	14	600	457	212	51	242	180	18
200	16	700	421	197	25*	225	167	25*
220	18	800	385	182	25*	207	154	25*

* Minimum dose of K₂O

IPNS based fertilizer recommendation

Pusa (Turmeric)

Name of the centre	: Pusa	Soil phosphorus range	:
Soil	: Young Alluvium	Soil potassium range	:
Calcareous Soil		FYM composition	:
Crop & Variety	: Turmeric	FYM rate	:
Season developed	:	Green manure composition	:
Target range	: t ha ⁻¹	Green manure rate	:
Soil Nitrogen range	:		

Targetted Yield Equations

$$FN = 0.663 T - 0.43 SN$$

$$FP_2O_5 = 0.227 T - 1.81 SP_2O_5$$

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			300 q/ha			400 q/ha		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	147	76	104	214	84	152
130	6	70	143	72	98	209	80	145
140	8	80	139	69	91	205	76	139
150	10	90	134	65	84	201	73	132
160	12	100	130	61	78	196	69	126
170	14	110	126	58	71	192	65	119
180	16	120	122	54	65	188	62	112
190	18	130	117	51	58	184	58	106
200	20	140	113	47	51	179	55	99
210	22	150	109	43	45	175	51	93
220	24	160	104	40	38	171	47	86
230	26	170	100	36	32	166	44	79
240	28	180	96	32	25	162	40	73
250	30	190	91	29	18	158	37	66
260	32	200	87	25	12	153	33	60
270	34	210	83	22	10	149	29	53
280	36	220	79	18	10	145	26	46
290	38	230	74	14	10	141	22	40
300	40	240	70	11	10	136	18	33
310	42	250	66	10	10	132	15	27
320	44	260	61	10	10	128	11	20
330	46	270	57	10	10	123	10	13
340	48	280	53	10	10	119	10	10
350	50	290	48	10	10	115	10	10
360	52	300	44	10	10	110	10	10
370	54	310	40	10	10	106	10	10
380	56	320	36	10	10	102	10	10

390	58	330	31	10	10	98	10	10
400	60	340	27	10	10	93	10	10

Onion

Andhra Pradesh (Onion) IPNS Based

Name of the sub-centre :Rajendaranagar	Soil phosphorus range : 10 – 110 kg ha ⁻¹
Soil : Alfisols	Soil potassium range : 100 – 350 kg ha ⁻¹
Crop and Variety : Onion / Nasic Red	FYM composition :
Season developed : <i>Rabi</i> , 1999-2000	FYM rate :
Target range : 25 q ha ⁻¹ – 30 q ha ⁻¹	Green manure composition :
Soil Nitrogen range : 100 – 300 kg ha ⁻¹	Green manure rate :

Fertilizer adjustment equations

$$\begin{aligned} \text{FN} &= 0.745 \text{ T} - 0.38 \text{ SN} - 0.23 \text{ FYM N} \\ \text{FP}_2\text{O}_5 &= 1.15 \text{ T} - 2.59 \text{ SP} - 0.830 \text{ FYM P} \\ \text{FK}_2\text{O} &= 1.08 \text{ T} - 0.31 \text{ SK} - 1.410 \text{ FYM K} \end{aligned}$$

Fertilizer adjustment equations

$$\begin{aligned} \text{FN} &= 0.745 \text{ T} - 0.38 \text{ SN} - 0.469 \text{ VC N} \\ \text{FP}_2\text{O}_5 &= 1.15 \text{ T} - 2.59 \text{ SP} - 0.75 \text{ VC P} \\ \text{FK}_2\text{O} &= 1.08 \text{ T} - 0.31 \text{ SK} - 0.98 \text{ VC K} \end{aligned}$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 200 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With Vermicompost @ 2 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	111	204	185	83	167	79	100	194	170
120	20	125	103	178	177	76	141	72	93	168	163
140	30	150	96	152	170	68	115	64	85	143	155
160	40	175	88	126	162	61	89	56	78	117	147
180	50	200	81	101	154	53	63	48	70	91	139
200	60	225	73	75	146	45	37	41	62	65	132
220	70	250	65	49	139	38	11	33	55	39	124
240	80	275	58	23	131	30	0	25	47	13	116
260	90	300	50	0	123	23		17	40	0	108
280	100	325	43		115	15		10	32		101
300	110	350	35		108	7		2	24		93

Verification: The above equations are to be verified on the farmers' fields of Ranga Reddy and other districts with yield targets of 150 and 200 q ha⁻¹

Applicability

Soil Testing Laboratories	:	Rajendranagar
Soil type	:	Alfisol Sandy loam
Crop	:	Onion – Nasic Red
Season developed	:	<i>Rabi</i>
Yield target	:	Up to 200 q ha ⁻¹

Note: The above equations may be tested in soils other than Alfisol sandy loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.

IPNS BASED

Name of the sub-centre	:	Rajendranagar	Soil phosphorus range	:	
Soil	:	Alfisols	Soil potassium range	:	
Crop and Variety	:	Onion / Nasic Red	FYM composition	:	
Season developed	:	<i>Rabi</i> , 2000-2001	FYM rate	:	
Target range	:	200 q ha ⁻¹	Green manure composition	:	
Soil Nitrogen range	:		Green manure rate	:	

Fertilizer adjustment equations

$$FN = 0.83 T - 0.30 SN - 0.34 FYM N$$

$$FP_2O_5 = 0.96 T - 1.76 SP - 0.66 FYM P$$

$$FK_2O = 1.86 T - 0.75 SK - 0.77 FYM K$$

Fertilizer adjustment equations

$$FN = 0.83 T - 0.30 SN - 0.55 VC N$$

$$FP_2O_5 = 0.96 T - 1.76 SP - 0.78 VC P$$

$$FK_2O = 1.86 T - 0.75 SK - 0.93 VC K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 200 q ha ⁻¹								
Kmn O ₄ -N	Olsen- P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With Vermicompost @ 2 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	10	100	136	174	297	102	145	205	12 2	163	278
120	20	125	130	157	278	96	127	186	11 6	146	259
140	30	150	124	139	260	90	110	167	11 0	128	241
160	40	175	118	122	241	84	92	148	10 4	110	222
180	50	200	112	104	222	78	74	130	98	93	203

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 200 q ha ⁻¹								
Kmn O ₄ -N	Olsen-P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹			With Vermicompost @ 2 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
200	60	225	106	86	203	72	57	111	92	75	184
220	70	250	100	69	185	66	39	92	86	58	166
240	80	275	94	51	166	60	22	73	80	40	147
260	90	300	88	34	147	54	4	55	74	22	128
280	100	325	82	16	128	48	0	36	68	5	109
300	110	350	76	0	110	42		17	62	0	91
320	120	375	70		91	36		0	56		72
340	130	400	64		72	30			50		53
360	140	425	58		53	24			44		34
380	150	450	52		35	18			38		16
400	160	475	46		16	12			32		0
420	170	500	40		0	6			26		
440	180	525	34			0			20		
460	190	550	28						14		
480	200	575	22						8		
500		600	16						2		
520		625	10						0		
540		650	4								
560			0								

Verification: **The above equations are to be verified on the farmers' fields of Ranga Reddy and other districts with yield targets of 150 and 200 q ha⁻¹**

Applicability

Soil Testing Laboratories : **Rajendranagar**

Soil type : **Alfisol Sandy loam**

Crop : **Onion – Nasic Red**

Season developed : **Rabi**

Yield target : **Up to 200 q ha⁻¹**

Note: **The above equations may be tested in soils other than Alfisol sandy loam in the farmers' fields with three or four targets and pick up the best one for making recommendations.**

Pantanagar (Onion)

Name of the Centre : Onion

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : 15 q ha⁻¹

Soil Nitrogen range : 100-400 kg ha⁻¹

Soil phosphorus range : 10-70 kg ha⁻¹

Soil potassium range : 100-400 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equation for yield targets (kg/ha)

F N (N kg/ha) = 0.62 x YT (q/ha) - 0.691SN - 2.07FYM-N

F P (P kg/ha) = 0.136x YT (q/ha) - 0.45SP - 0.598FYM-P

F K (K kg/ha) = 0.237 x YT (q/ha) - 0.306SP - 0.188FYM-K

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
KmnO ₄ -N	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	125.5	42	39
125	15	125	107	39	31
150	20	150	89	37	24
175	25	175	70	34	17
200	30	200	52	32	9
225	35	225	33	29	2
250	40	250	15	27	2
275	45	275	10	24	2
300	50	300	10	21	2
325	55	325	10	19	2
350	60	350	10	16	2
375	65	375	10	15	2
400	70	400	10	15	2

Applicability :

Coimbatore (Onion)

Name of the centre	: Coimbatore	Soil phosphorus range	: 8 – 20 kg ha ⁻¹
Soil	: Red (Inceptisol)	Soil potassium range	: 200 – 500 kg ha ⁻¹
Crop & Variety	: Onion var CO 4	FYM composition	:
Season developed	: Kharif	FYM rate	:
Target range	: 170 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 160 – 300 kg ha ⁻¹	Green manure rate	:

Fertilizer Prescription Equations

$$FN = 0.99 T - 0.37 SN - 0.58 ON, \quad FP_2O_5 = 0.58 T - 1.43 SP - 0.69 OP$$

$$FK_2O = 0.67 T - 0.25 SK - 0.44 OK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield target

S.No	Initial soil tests (kg ha ⁻¹)			Nutrients required (kg ha ⁻¹) for an yield target of 170 q ha ⁻¹ of fresh bulb		
	N	P	K	N	P ₂ O ₅	K ₂ O
1	160	10	200	109	85	64
2	180	12	220	101	83	59
3	200	14	240	94	80	54
4	220	16	260	87	77	49
5	240	18	280	79	74	44
6	260	20	300	72	71	39
7	280	22	320	64	68	34
8	300	24	340	57	65	29

Applicability :

Recommendation domain

Soil type : Red – sandy loam
Yield target : 170 q ha⁻¹

Maharashtra (Onion)

Crop	: Onion (<i>Rabi</i>)	Soil phosphorus range	: 6 – 16 kg ha ⁻¹
Variety	: N-2-4-1	Soil potassium range	: 200 – 700 kg ha ⁻¹
Soil	: Typic Haplusterts	FYM composition	:
Situation	: Irrigated	FYM rate	:
Target range	: 25 q ha ⁻¹ - 30 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 200 kg ha ⁻¹	Green manure rate	:
Districts	: Nasik, Ahmednagar, Pune, Satara, Dhule, Solapur, Jalgaon, Aurangabad, Beed, Latur.		

Targeted Yield Equations

$$FN = 5.40 T - 0.54 SN, \quad FP_2O_5 = 4.00 T - 4.32 SP, \quad FK_2O = 3.10 T - 0.13 SK$$

Fertilizer prescription for targeted yields of onion for varying soil test values.

Soil test values (kg ha ⁻¹)			Fertilizer prescriptions (kg ha ⁻¹)					
			25 t ha ⁻¹ target			30 t ha ⁻¹ target		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
N	P	K						
100	6	200	81	74	52	108	94	67
120	8	300	70	65	39	97	85	54
140	10	400	59	57	26	86	77	41
160	12	500	49	48	25*	76	68	28
180	14	600	38	39	25*	65	60	25*
200	16	700	27	30	25*	54	51	25*

* Minimum dose of K₂O

Pusa (onion)

Crop : Onion

Soil : Young Alluvium

Calcareous Soil

Soil : Typic Haplusterts

Situation : Irrigated

Target range : 25 q ha⁻¹ - 30 q ha⁻¹

Soil Nitrogen range : 100 – 200 kg ha⁻¹

Soil phosphorus range : 6 – 16 kg ha⁻¹

Soil potassium range : 200 – 700 kg ha⁻¹

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Targetted Yield Equations

FN = 0.687 T – 0.22 SN - 0.61CN, FP₂O₅ = 0.455 T – 1.16 SP₂O₅-1.04 CP₂O₅

FK₂O = 0.501 T – 0.33 SK₂O -0.55CK₂O

Fertilizer Recommendation Schedule for Specific Yield Target at Varying Soil Test Values
Without FYM

Soil Available Nutrients (kg/ha)			Fertilizer Nutrients Required (kg/ha) for Yield Target of					
			200 q/ha (Onion bulb)			250 q/ha(Onion bulb)		
N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
120	4	60	111	86	80	145	109	105
130	6	70	109	84	77	143	107	102
140	8	80	107	82	74	141	104	99
150	10	90	104	79	71	139	102	96
160	12	100	102	77	67	137	100	92
170	14	110	100	75	64	134	98	89
180	16	120	98	72	61	132	95	86
190	18	130	96	70	57	130	93	82
200	20	140	93	68	54	128	91	79
210	22	150	91	65	51	126	88	76
220	24	160	89	63	47	123	86	72
230	26	170	87	61	44	121	84	69
240	28	180	85	59	41	119	81	66
250	30	190	82	56	38	117	79	63
260	32	200	80	54	34	115	77	59
270	34	210	78	52	31	112	74	56
280	36	220	76	49	28	110	72	53
290	38	230	74	47	24	108	70	49
300	40	240	71	45	21	106	67	46
310	42	250	69	42	18	104	65	43
320	44	260	67	40	14	101	63	39
330	46	270	65	38	11	99	60	36
340	48	280	63	35	10	97	58	33
350	50	290	60	33	10	95	56	30
360	52	300	58	31	10	93	53	26
370	54	310	56	28	10	90	51	23
380	56	320	54	26	10	88	49	20
390	58	330	52	24	10	86	46	16
400	60	340	49	21	10	84	44	13
Reduction in Fertilizer recommendation with the application of FYM. (N -0.45, P2O5- 0.25 & K2O- 0.60 %)@								
Nutrients	1 t/ha	2 t/ha	3 t/ha	4 t/ha	5 t/ha	6 t/ha	8 t/ha	10 t/ha
N	3	5	8	11	14	16	22	27

P ₂ O ₅	3	5	8	10	13	16	21	26
K ₂ O	3	7	10	13	17	20	26	33

Garlic

Pantanagar (Garlic)

Crop : **Garlic**

Soil :

Soil :

Situation :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Fertilizer adjustment equations of STCR experiments for different crops under IPNS

F N (N kg/ha) = 2.9 x YT (q/ha) – 1.28SN-0.227FYM-N

F P (P kg/ha) = 0.90x YT (q/ha) –1.68SP-0.47FYM-P

F K (K kg/ha) =1.27 x YT (q/ha) –0.64SP-0.048FYM-K

Ready reckoners on soil test based fertilizer recommendations for specific yield targets of mustard

Initial soil tests (kg ha ⁻¹)			Nutrient added (kg ha ⁻¹) for an yield target of 15 q ha ⁻¹		
KmnO ₄ N	P	K	N	P ₂ O ₅	K ₂ O
100	10	100	215	81	71
125	15	125	185	76	59
150	20	150	154	72	46
175	25	175	123	67	34
200	30	200	92	62	21
225	35	225	61	57	8
250	40	250	30	52	5
275	45	275	10	47	5
300	50	300	10	42	5
325	55	325	10	37	5
350	60	350	10	32	5
375	65	375	10	10	5
400	70	400	10	10	5

Madhya Pradesh (Mustard)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 9.11 T - 0.37 SN \quad FP_2O_5 = 3.6 T - 0.75 SP \quad FK_2O = 4.66 T - 0.13 SK$$

SN =	FN = Fert. N		SP =	FP₂O₅ = Fert. P		SK =	FK₂O = Fert. K	
Soil – N	FN = Fert. N		Soil – P	FP₂O₅ = Fert. P		Soil – K	FK₂O = Fert. K	
(kg ha⁻¹)	(kg ha⁻¹)		(kg ha⁻¹)	(kg ha⁻¹)		(kg ha⁻¹)	(kg ha⁻¹)	
	T =Yield Target			T =Yield Target			T=Yield Target	
	(q ha⁻¹)			(q ha⁻¹)			(q ha⁻¹)	
	10	16		10	16		10	16
100	72	109	5	39	54	200	30	49
150	53	90	10	35	50	250	23	42
200	35	72	15	32	47	300	17	36
250	16	53	20	28	43	350	10	29
300	-	35	25	24	39	400	-	23

Applicability : Shallow, Medium black soils ; Soil Testing Laboratories : Bhopal, Dhar, Jabalpur ,Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain,Chindwara.

Madhya Pradesh (Mustard)

Name of the Centre : Madhya Pradesh

Soil :

Crop and Variety :

Situation :

Season developed :

Target range : q ha⁻¹

Soil Nitrogen range :

Soil phosphorus range :

Soil potassium range :

FYM composition :

FYM rate :

Green manure composition :

Green manure rate :

Equation for Calculating the fertilizer nutrient Requirement:

$$FN = 12.5 T - 0.44 SN \quad FP_2O_5 = 4.6 T - 1.5 SP \quad FK_2O = 6.5 T - 0.19 SK$$

SN =	FN = Fert. N		SP =	FP ₂ O ₅ = Fert. P		SK =	FK ₂ O = Fert. K	
Soil – N (kg ha ⁻¹)	(kg ha ⁻¹)		Soil – P (kg ha ⁻¹)	(kg ha ⁻¹)		Soil – K (kg ha ⁻¹)	(kg ha ⁻¹)	
	T =Yield Target (q ha ⁻¹)			T =Yield Target (q ha ⁻¹)			T =Yield Target (q ha ⁻¹)	
	12	16		12	16		12	16
100	106	156	5	47	66	200	40	66
150	84	134	10	40	59	250	30	56
200	62	112	15	32	51	300	21	47
250	40	90	20	25	44	350	11	37
300	18	68	25	17	36	400	-	28

Applicability : Medium black and Deep black soils : Soil Testing Laboratories : Bhopal, Dhar, Jabalpur Indore, Khandwa, Khargone, Mandsaur,, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain.

Bhubneswer (Lady's Finger)

Name of the Centre	: Bhubneswer	Soil phosphorus range	:
Soil	:	Soil potassium range	:
Crop and variety	: Lady's finger(B.O.2)	FYM composition	:
Season developed	:	FYM rate	:
Target range	: q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	:	Green manure rate	:

Fertilizer adjustment equations

$$FN = 6.8 T - 1.8 SN, \quad FP_2O_5 = 2.2 T - 1.9 SP, \quad FK_2O = 4.7 T - 2.1 SK$$

Ready reckoner of fertilizer doses at varying soil test values for specific yield targets.

Soil available nutrient (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) For yield target of								
KmnO4	Olsens'	Amm.	50 (q ha ⁻¹)			60 (q ha ⁻¹)			70 (q ha ⁻¹)		
N	P	Ac-K	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
140	20	70	88	72	88	156	94	135	224	116	182
150	25	80	70	63	67	138	85	114	206	107	161
160	30	90	62	53	25	120	75	93	188	97	142
170	35	100	34	44	20	102	66	72	170	88	119
180	40	110	25	34	20	84	56	51	152	78	98
190	45	120	25	25	20	68	47	30	134	69	77
200	50	130	25	15	20	48	37	20	116	60	56
210	55	140	25	15	20	30	28	20	98	51	45
220	60	150	25	15	20	25	15	20	80	42	34
230	70	160	25	15	20	25	15	20	62	24	23

Coriander

Andhara Pradesh(Coriandar) With & without IPNS Based

Name of the Centre	: Nandyal, Kurnool district	Soil phosphorus range	: 5 – 65 kg ha ⁻¹
Soil	: Vertisol (Clay)	Soil potassium range	: 125 – 425 kg ha ⁻¹
Crop and Variety	: Coriander – CS-4	FYM composition	: 0.75 : 0.60 : 1.2
Season developed	: <i>Rabi</i> , 2001 & 2002	FYM rate	:
Target range	: 6 q ha ⁻¹ – 8 q ha ⁻¹	Green manure composition	:
Soil Nitrogen range	: 100 – 340 kg ha ⁻¹	Green manure rate	:

Fertilizer adjustment equations

$$FN = 14.60 T - 0.234 SN - 0.26 FYM N$$

$$FP_2O_5 = 9.31 T - 0.529 SP - 0.19 FYM P$$

$$FK_2O = 23.05 T - 0.389 SK - 0.17 FYM K$$

Ready Reckoner of Fertilizer Doses at Varying Soil Test Values for Specific Yield Target

Soil available nutrients (kg ha ⁻¹)			Fertilizer nutrient required (kg ha ⁻¹) for production of 8 q ha ⁻¹					
KmnO ₄ -N	Olsen-P	Amm Aoc-K	Only Chemical fert.			With Fym @ 10 t ha ⁻¹		
			N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
100	5	125	93	72	136	62	60	117
120	10	150	84	69	126	58	58	107
140	15	175	67	67	116	53	55	97
160	20	200	51	64	106	48	52	88
180	25	225	35	61	97	43	50	78
200	30	250	18	59	8	39	47	68
220	3	27	2*	56	77	34	45	58
240	40	300	2*	53	67	29	42	49
260	45	325	2*	51	58	25	39	39
280	50	350	2*	48	48	20	37	29
300	55	375	2*	45	38	15	34	19
320	60	400	2*	43	28	11	31	10
340	65	425	2*	40	19	6	29	10*

Verification: **The above equations were verified on the farmers' fields of Nandyal Kurnool district with yield targets of 6 and 8 q ha⁻¹ during *rabi*, 2002 and 2003. All the yield targets could be attained at the places tested.**

Applicability

Soil Testing Laboratories	:	Nandyal, Kurnool district in Scarce Rainfall Zone
Soil type	:	Vertisol
Crop	:	Coriander - CS-4 or any other variety
Season developed	:	<i>rabi</i>
Yield target	:	Up to 6- 8 q ha⁻¹

Note: The above equations may be tested in soils other than Clay of Vertisol in the farmers' fields with three or four targets and pick up the best one for making recommendations in Scarce Rainfall zone.