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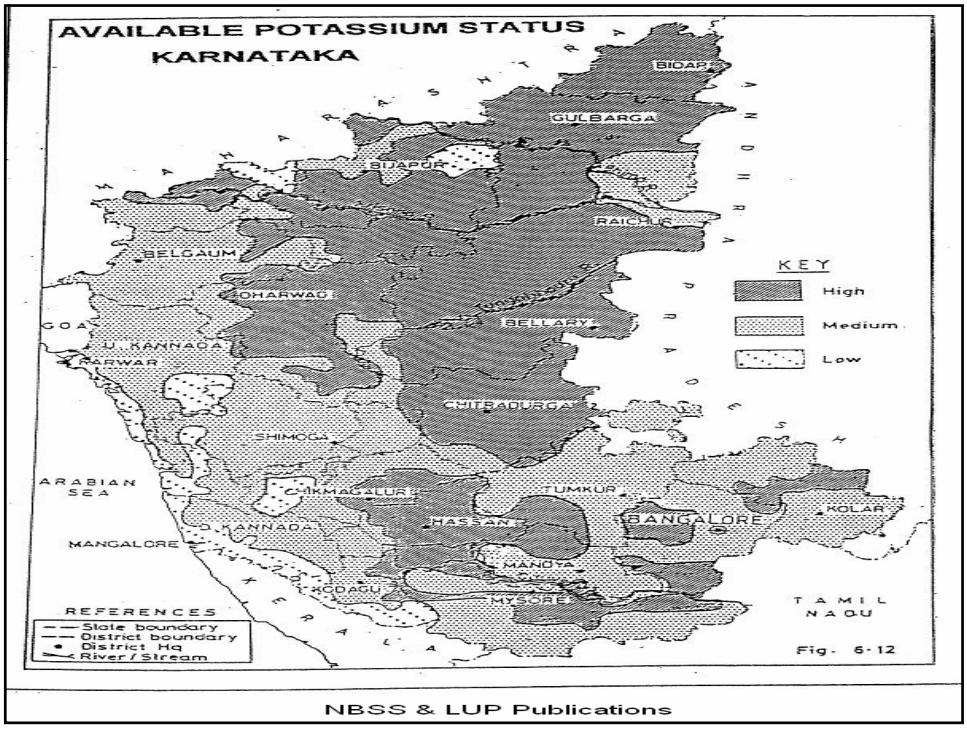
Distribution of vertisols and associated soils in India

State	Total area under vertisols and associated soils (million ha)	Area under vertisols and associated soils expressed as	
		Gross vertisols area in India (%)	Total geographical area in India (%)
Maharashtra	29.9	35.5	7.9
Madhya Pradesh	16.7	23.0	5.1
Gujarat	8.2	11.9	2.6
Andhra Pradesh	7.2	10.0	2.2
Karnataka	**6.9**	**9.4**	**2.1**
Tamil Nadu	3.2	4.2	1.0
Rajasthan	2.3	3.0	0.7
Orissa	1.3	2.0	0.4
Bihar	0.7	1.0	0.2
Uttar Pradesh	Negligible	Negligible	Negligible
Total	**76.4**	**100.0**	**22.2**

Source : Murthy (1981)
Note : 27.78% of worlds vertisols are in India (total vertisols in the world is 275 Mha)

Event: 7th IPI-FAI Round Table in collaboration with IPNI
Date and venue: 20/3/2012; NAAS Committee Room No.1, NASC Complex, New Delhi
Theme: Refinement of K recommendations in Vertisols



- Vertisols comprises of clay-textured soils occur extensively in tropics and temperate zones.
- Vertisols are synonymous with black cotton soils, black earths, dark clays, grumusols and regurs
- Vertisols of India have been classified in to

  Deep black soils

  Medium and light black soils

  Shallow black soils.

  (50% of total vertisols are shallow to medium black)

Mineralogical properties of vertisoils (Karnataka)

Clay - Chlorotized iron-rich smectite

No kaolinite : No mica

Sand - Orthoclase, microcline and albite feldspars

Silt - Alkali feldspars

Forms and status of potassium in vertisols of India (mmol/kg)

State	Water soluble	Exchangeable	1 N HNO_3-Soluble	HCl-soluble	Total
Andhra Pradesh	0.1	5.5	19.7	-	-
Bihar	Trace	2.5	36.0	-	231.9
Gujarat	0.9	12.8	81.0	91.9	-
Karnataka	Trace	5.5	15.0	-	173.4
Madhya Pradesh	Trace	10.0	-	-	-
Maharashtra	0.1	4.1	19.9	62.6	139.1
Rajasthan	0.1	10.0	36.0	120.0	256.0
Tamilnadu	0.3	5.1	21.0	7.2	230.0
Uttar Pradesh	Trace	5.6	31.0	121.5	600.0

Source : Zende 1978

Potassium fixation capacity of vertisols of India

State	K fixed (mmol/kg^{-1})	K fixation (%)	K saturation (%)
Andhra Pradesh	37.0	9.1	1.6
Bihar	-	39.7	1.4
Gujarat	12.0	11.0	2.7
Karnataka	13.0	42.0	1.2
Madhya Pradesh	30.0	-	1.5
Maharashtra	70.0	21.3	1.0
Rajasthan	30.0	-	-
Tamilnadu	-	11.6	-
Uttar Pradesh	13.0	28.0	2.1

Source : Zende (1978)

References

Zende, G.K. 1978, Potassium dynamics in black soils in potassium in soils and crops. Potash Research Institute of India, New Delhi 51-68

A.S.P.Murthy, 1981., Distribution, properties and management of vertisols of India, Advances in Soil Science Vol. 8 PP 151-215.

Status of different forms of potassium and potassium fixation capacity of soils:

No	Agro-climatic zone	Location		Water soluble K	Exchangeable K	K fixation capacity of surface soil
		Place	District	ppm	ppm	Per cent
Rice based cropping system						
1	Northern Dry Zone	Gangavati	Koppal	3.0	168.0	20.4
2	Northern Transition Zone	Belgaum	Belgaum	2.0	232.0	35.0
Sugarcane based cropping system						
3	Northern Dry Zone	Gangavati	Koppal	3.1	265.0	51.5
4	Northern Dry Zone	Sirguppa	Raichur	3.9	234.0	30.8
5	Northern Dry Zone	Godageri	Belgaum	1.9	148.0	44.5
6	Northern Dry Zone	Sankeshwar	Belgaum	3.5	261.0	36.3
7	Southern Transition Zone	MK Hubli	Belgaum	5.9	156.0	46.0
8	Northern Dry Zone	Hunnur	Bijapur	11.3	281.0	38.9
9	Northern Dry Zone	Mudhol	Bagalkot	2.0	179.0	47.9
Cotton based cropping system						
10	Northern Dry Zone	Aikur	Gulbarga	16.1	217.0	18.2
11	Northern Dry Zone	Rampur	Raichur	13.5	160.0	23.6
12	Northern Dry Zone	Hitnalli	Bijapur	14.9	234.0	23.2
13	Northern Dry Zone	Bagalkot	Bagalkot	14.3	192.0	26.8
14	Northern Dry Zone	Hanchinal	Belgaum	14.0	175.0	23.0
15	Northern Dry Zone	Hadagali	Gadag	18.0	118.0	15.6
16	Northern Dry Zone	Hagri	Bellary	12.4	167.0	19.6
17	Northern Dry Zone	Sindhanur	Raichur	15.1	143.0	16.2
18	NE Transition zone	Bailhongal	Belgaum	13.5	171.0	17.4
19	NE Transition zone	Dharwad	Dharwad	11.0	190.0	22.8

The values are mean of the profile samples

Effect of sources and levels of potassium on quality parameters of red chilli fruits

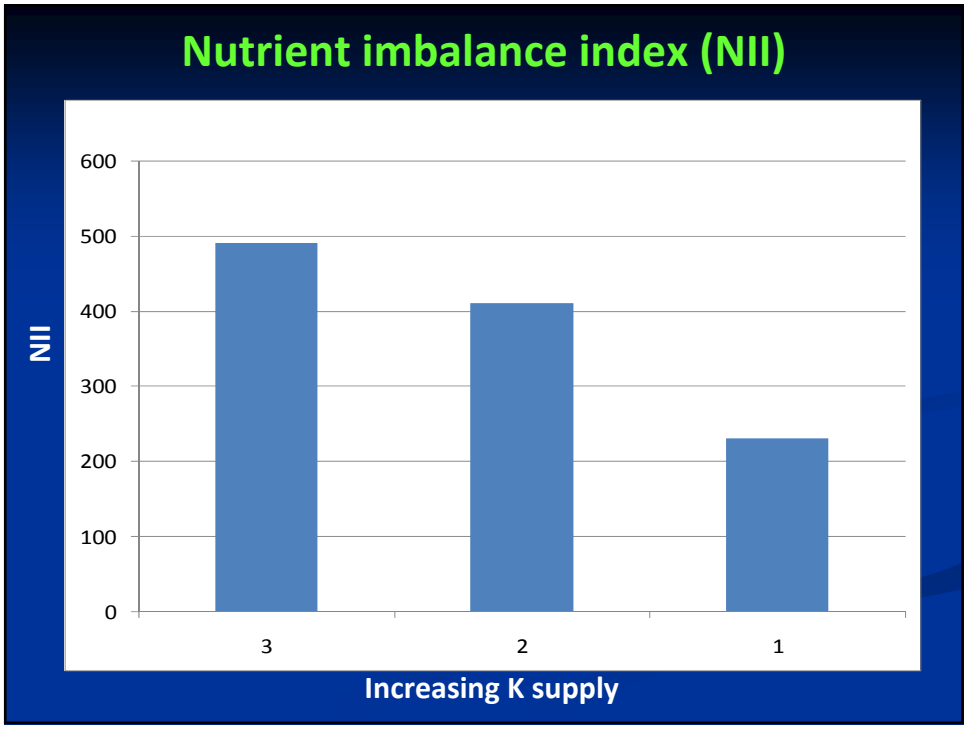
Treatments	Ascorbic acid (mg/100g) in green fruits	Colour value (ASTA** units)	Oleoresin (%)
T_1 - 100% RDK as MOP by basal application	131.54	184.92	13.21
T_2 - 100% RDK as SOP by basal application	136.93	186.04	13.56
T_3 - 100% RDK as MOP by ½ basal + ½ 45 DAT	144.62	187.74	13.92
T_4 - 100% RDK as SOP by ½ basal + ½ 45 DAT	150.70	194.90	14.28
T_5 - 150% RDK as MOP by basal + ½ 45 DAT	168.82	202.68	14.81
T_6 - 150% RDK as SOP by basal + ½ 45 DAT	175.16	225.28	16.79
T_7 – 200% RDK as MOP by ½ basal + ½ 45 DAT	165.77	204.57	15.12
T_8 - 200% RDK as SOP by ½ basal + ½ 45 DAT	171.59	221.12	16.97
T_9 - 100% RDK as MOP by basal + 2 per cent foliar spray of KCl at 75 DAT	130.64	182.44	12.28
T_{10} - 100% RDK as SOP by basal + 2 per cent foliar spray of K_2SO_4 at 75 DAT	132.30	206.96	13.11
S.Em± CD(0.05)	6.510 19.333	7.602 22.576	0.614 1.824

*RDK-Recommended dose potassium (50 kg K_2O ha^{-1})
**AST-American Spice Trade Association

Effect of K rate on tomato pericarp composition

K rate (Kg/ha)	Soluble solids (%)	% citric acid	pH	Reducing sugars (%)	Dry Wt (%)
0	4.5 b	0.23 c	4.49 a	3.62 a	5.31c
93	4.7 a	0.26 d	4.48 a	3.63 a	5.30 c
186	4.7 a	0.29 c	4.49 a	3.67 a	5.37 b
372	4.7 a	0.31 b	4.46 a	1.70 a	5.43 a
744	4.7 a	0.33 a	4.45 a	3.65 a	5.43 a
		NS	NS	NS	**

NS – Non significant, * - Significant at 5%
Data analysed by DMRT


Nutrient imbalance index (NII)
NII
600
500
400
300
200
100
0
3
2
1
Increasing K supply


THE END