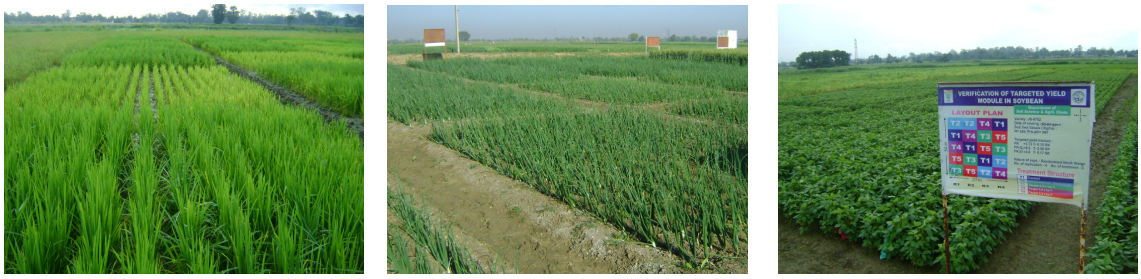
Brief background of the project and mandate

The major challenges in 21st century are food security, environmental quality and soil health. Besides, shrinking land holdings and increasing cost of inputs in India merit adoption of scientific use of plant nutrient for higher crop productivity. The soil fertility and fertilizer use project initiated in 1953 following a study by Stewart in 1947 which was the first systematic attempt in India to relate the knowledge of the soils to the judicious use of chemical fertilizers. The soil testing programme was started in India during the year 1955-56 with the setting up of 16 soil testing laboratories under the Indo-US Operational Agreement for "Determination of Soil Fertility and Fertilizer Use". In 1965, five of the existing laboratories were strengthened and nine new laboratories were established to serve the Intensive Agricultural District Programme (IADP) in selected districts. Muhr and coworker describe sets of critical values that characterized the estimates as low, medium or high in a monograph on soil testing in India in 1965. Background research for the choice of critical values consisted of a few pot culture and field experiments with paddy and wheat, carried out in the Division of Soil Science & Agricultural Chemistry at Indian Agricultural Research Institute, New Delhi. Taking a simplistic view of the situation, the differences among soil groups in the range of properties, which influence the susceptibility to absorption by plants of native and applied nutrients, were ignored. The generalized recommendations of fertilizer use developed for the soil testing laboratory area were thought applicable to the medium category of soil testing estimates with an arbitrary adjustment (decrease or increase by 25-50 per cent) for high and low categories of soil test estimates. The ICAR project on soil test crop response correlation has used the multiple regression approach to develop relationship between crop yield on the one hand, and soil test estimates and fertilizer inputs, on the other. Nutrient supplying power of soils, crop responses to added nutrients and amendment needs can safely be assessed through sound soil testing programme. Soil test calibration that is intended to establish a relationship between the levels of soil nutrients determined in the laboratory and crop response to fertilizers in the field permits balanced fertilization through right kind and amount of fertilizers as suggested by Ramamoorthy and Velayutham in 1971. In 2005, the conclusion of a collaborative project with IASRI, New Delhi and recommendations of QRT suggested to adopt a new design for STCR experiments, i.e. response surface design.

Mandate: Proposed mandate is "To provide scientific recommendations and guidelines for soil fertility management vis-à-vis sustainable crop production".



Growing tTest crop in different fertility gradient created under field condition

Objectives

The original objectives of the STCR project were

1. To develop relationships between soil test values and crop response to fertilizers, in order to provide a calibration for fertilizer recommendation based on soil testing.
2. To obtain a basis for making fertilizer recommendations for targeted yields.
3. To evaluate various soil test methods for their suitability under field conditions.

During the XI Plan, the following objectives were added.

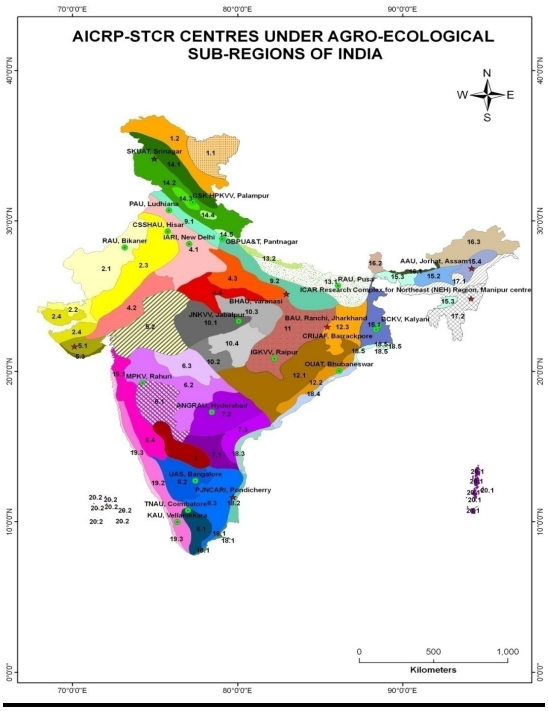
1. To evaluate the joint use of chemical fertilizers and organic manures for enhanced nutrient use efficiency.
2. To derive a basis for making fertilizer recommendations for a whole cropping sequence based on initial soil test values.

Centres

S.No.	Name of the center	Date of start
Main Centres		
1	ANGRAU, Hyderabad	01.04.1967
2	BCKVV, Kalyani	25.03.1968
3	CRIJAF, Barrackpore	27.02.1971
4	CSK HPKVV, Palampur	01.07.1970
5	CCSHAU, Hisar	01.04.1967
6	GBPUA&T, Pantnagar	01.04.1970
7	IARI, New Delhi	01.05.1967
8	IGKVV, Raipur	01.04.1981
9	JNKVV, Jabalpur	01.04.1967
10	KAU, Vellanikkara	01.11.1996
11	MPKVV, Rahuri	28.10.1970
12	OUAT, Bhubaneswar	01.09.1996
13	PAU, Ludhiana	01.04.1967
14	RAU, Bikaner	01.09.1996
15	RAU, Pusa	01.12.1967
16	TNAU, Coimbatore	01.04.1967
17	UAS, Bangalore	01.10.1970

Voluntary Centres started during 2010-11	
18	PJNCARI, Pondicherry

19	JAU, Junagarh, Gujarat
20	BHU, Varanasi
21	AAU, Jorhat, Assam
22	SKUAT, Srinagar
23	BAU, Ranchi, Jharkhand
24	ICAR Research Complex for Northeast (NEH) Region, Manipur centre



Achievements

The salient achievements are summarized below.

- **Development of Target Yield Equation**

  Liebig's law of minimum states that the growth of plants is limited by the plant nutrient element present in the smallest amount, all others being in adequate quantities. From this, it follows that a given amount of a soil nutrient is sufficient for any one yield of a given percentage nutrient composition. Taking a cue from Truog regarding the basis for fertilizer application for targeted yields, Ramamoorthy and coworkers in 1967 established the theoretical basis and experimental proof for the fact that Liebig's law of the minimum operates equally well for N, P and K. Among the various methods of fertilizer recommendation, the one based on yield targeting is unique in the sense that this method not only indicates soil test based fertilizer dose but also the level of yield the farmer can hope to achieve if good agronomic practices are followed in raising the crop. The essential basic data required for formulating fertilizer recommendation for targeted

yield are (i) nutrient requirement in kg q^{-1} of produce, grain or other economic produce (ii) the per cent contribution from the soil available nutrients (iii) the per cent contribution from the applied fertilizer nutrients.

The above mentioned three parameters are calculated as follows:

Nutrient Requirement of N, P and K for Grain Production:

kg of nutrient/q of grain = $\frac{\text{Total uptake of nutrient (kg)}}{\text{Grain yield (q)}}$

Contribution of nutrient from soil =

$$\frac{\text{Total uptake in control plot (kg per ha)} \times 100}{\text{Soil test values of nutrient in control plot (kg per ha)}}$$

Contribution of nutrient from fertilizer:

Contribution from fertilizer (CF) =

Total uptake of nutrients in treated plots – (Soil test value of nutrients in fertilizer treated plots × CS)

% Contribution from Fertilizer = $\frac{\text{CF}}{\text{Fertilizer dose (kg per ha)}} \times 100$

Calculation of fertilizer dose:

The above basic data are transformed into workable adjustment equation as follows:

Fertilizer dose = $\frac{\text{Nutrient requirement in kg per ha of grain}}{\text{\% CF}} \times 100 \times \text{T} - \frac{\text{\% CS}}{\text{\% CF}} \times$ soil test value

= a constant × yield target (q/ha) – b constant × soil test value (kg/ha)

Ramamoorthy and coworkers in 1967 have refined the procedure of fertilizer prescription as given by Truog in 1960 and later extended to different crops in different soils (Ramamoorthy *et al* 1975; Randhawa and Velayutham 1982). Targeted yield concept strikes a balance between 'fertilizing the crop' and 'fertilizing the soil'. The procedure provides a scientific basis for balanced fertilization and balance between applied nutrients and soil available nutrients. In the targeted yield approach, it is assumed that there is a linear relationship between grain yield and nutrient uptake by the crop, and for obtaining a particular yield, a definite amount of nutrients are taken up by the plant. Once this requirement is known for a given yield level, the fertilizer needed can be estimated taking into consideration the contribution from soil available nutrients.

Different centres of AICRP on STCR developed fertilizer prescription equations for different crops which are given below along with the applicable districts.

Andhra Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice (Mashuri)	Black soil (Vertisols)	FN =3.79T-0.50 SN FP_2O_5=3.19T-3.17 SP FK_2O=1.60T-0.19 SK	50-55	Guntur, West Godavari, Ongole
Rice (Pothana)	Inceptisols (Sandy Loam)	FN =3.78T-0.44 SN FP_2O_5=1.96T-2.13 SP FK_2O=2.96T-0.36 SK	50-60	Karimnagar, Khammam, Nizamabad, Adilabad
Rice (MTU-2067)	Alluvial	FN =2.30T-0.32 SN FP_2O_5=1.91T-1.90 SP FK_2O=2.27T-0.27 SK	50-60	East Godavari, West Godavari and Krishna
Rice (MTU-5182)	Black soil	FN =3.35T-0.33 SN FP_2O_5=2.52T-4.53 SP FK_2O=1.24T-0.12 SK	60-70	Anantapur, Cuddapah and Kurnool
Rice (NLR-9672)	Sandy clay loam (Alluvial)	FN =3.47T-0.37 SN FP_2O_5=2.53T-2.12 SP FK_2O=1.89T-0.20 SK	45-50	Nellore, Ongole, Cuddapah and Chittoor
Rice (Tellahamsa)	Light black soil (Sandy clay)	FN =4.20T-0.55 SN FP_2O_5=2.70T-2.67 SP FK_2O=2.22T-0.21 SK	50-55	Ranga Reddy, Mahaboobnagar, Sanga Reddy and Nalgonda
Rice (Pothana)	Black soil (Vertisol)	FN =4.75T-0.75 SN FP_2O_5=2.75T-4.20 SP FK_2O=1.99T-0.15 SK	50-55	Warangal, Karimnagar, Nizamabad and Adilabad
Rice (Tellahamsa)	Black soil	FN =2.83T-0.32 SN FP_2O_5=2.29T-2.98 SP FK_2O=1.34T-0.17 SK	50-55	Anantapur, Cuddapah and Kurnool
Rice (NLR 33057)	Alluvial soils (Sandy loam)	FN =4.53T-0.51 SN FP_2O_5=2.12T-2.06 SP FK_2O=2.35T-0.21 SK	45-50	Nellore, Chittoor, Cuddapah and Prakasam
Rice (IR -64)	Alluvial	FN =2.65T-0.28 SN FP_2O_5=2.00T-2.16 SP FK_2O=1.96T-0.21 SK	70-80	East and West Godavari and Krishna
Rice (Tellahamsa)	Chalka soils	FN =3.23T-0.26 SN FP_2O_5=1.51T-1.80 SP FK_2O=1.65T-0.16 SK	70-80	Ranga Reddy, Nalgonda, Mahaboobnagar and Medak
Rice (Tellahamsa)	Light Black soil (Sandy clay)	FN =3.58T-0.57 SN FP_2O_5=1.71T-2.46 SP FK_2O=1.48T-0.16 SK	60-70	Ranga Reddy, Nalgonda, Mahoobnagar, Medak
Maize (DHM-105)	Chalka soils	FN =4.19T-0.40 SN FP_2O_5=1.50T-1.55 SP FK_2O=1.49T-0.16S K	40-50	Karimnagar,Warangal, Nizamabad and Medak
Maize (DHM-101)	Chalka soils	FN =4.00T-0.49 SN FP_2O_5=2.15T-2.58 SP FK_2O=2.58T-0.30 SK	40-50	Ranga Reddy and Mahaboobnagar and Medak
Maize (Local cultivar)	Alfisol (Sandy Loam)	FN =18.76T-0.30 SN FP_2O_5=3.29T-0.78 SP FK_2O=3.47T-0.02 SK	8-12	Ranga Reddy Mahaboobnagar and Medak
Rainfed Cotton	Vertisol	FN =15.63T-0.70 SN FP_2O_5=8.96T-2.15 SP FK_2O=13.41T-0.304 SK	10-12	Kurnool

Sugarcane (Co-419)	Black soil	FN =5.4T-1.25 SN FP_2O_5=1.8T-4.73 SP FK_2O=1.7T-0.33 SK	(t/ha) 80-100	Nizamabad
Mustard (Pusa Jaikishan)	Alfisol (Sandy loam)	FN =22.21T-0.17 SN FP_2O_5=7.90T-0.25 SP FK_2O=6.38T-0.06 SK	8-10	Ranga Reddy
Sunflower (MSFH-17)	Vertisol	FN =8.23T-0.46 SN FP_2O_5=8.91T-4.24 SP FK_2O=3.80T-0.10 SK	15-18	Yemmiganur, Cuddapah and Anantapur
Sunflower (Mahyco-8)	Sandy clay loam	FN=11.44T-0.41SN FP_2O_5=7.49T-2.10 SP FK_2O=4.93T-0.18 SK	15-18	Nizamabad ,Adilabad, Karimmagar and Warangal
Sunflower (Manjera)	Vertisol	FN =9.04T-0.75 SN FP_2O_5=3.74 T-0.85 SP FK_2O=5.76T-0.50 SK	20-25	Mahaboobnagar
Castor (Kranthi)	Inceptisol	FN =8.35T-0.40 SN FP_2O_5=7.17 T-2.88 SP FK_2O=3.02T-0.10SK	12-15	Mahaboobnagar and Nalgonda
Pigeonpea (LRG-30)	Vertisol	FN=4.71T-0.21SN FP_2O_5=5.83 T-2.93SP FK_2O=6.96T-0.31SK	15-20	Mahabubnagar
Chickpea (Annegiri)	Vertisol	FN=5.03T-0.27SN FP_2O_5=9.71T-1.82SP FK_2O=6.23T-0.22SK	15-20	Kurnool
Cabbage (Golden Acre)	Alfisol (Sandy loam)	FN=1.574T-0.626SN FP_2O_5=0.606T-0.915SP FK_2O=0.486T-0.095SK	150-200	Ranga Reddy
Turmeric (PCT - 13)	Incepisol (Sandy clay loam)	FN=14.31T-1.73SN FP_2O_5=4.01 T-1.66SP FK_2O=12.22T-1.17 SK	30-40	Nizamabad, Adilabad and Karimnagar
Turmeric (Mydukur)	Alfisol	FN=13.62T-1.66SN FP_2O_5=3.74T-1.48SP FK_2O=9.29T-0.68 SK	30-40	Kadapa
Maharashtra				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Sugarcane (Adsali- Co 7219)	Typic Haplusterts	FN=4.39T-1.56 SN FP_2O_5=1.62T-4.56 SP FK_2O=1.86T-0.37SK	175-200 t ha^{1}	Ahmednagar,Pune,Satara, Sangil,Kolhapur,Nasik, Dhule, Latur, Solapur, Parbhani, Osmanabad and Nanded
Wheat (HD-2189)	Vertic Haplusterts	FN=7.54T-0.74 SN FP_2O_5=1.90T-2.88 SP FK_2O=2.49T-0.22SK	40-50	Ahmednagar,Pune, Jalgaon ,Nasik,Aurangabad, Pune, Jalgaon, Nasik, Aurangabad, Parbhani, Jalna, Akola Buldhana, Wardha, Yawatmal, Stara, Sangli ,Kolhapur, Dhule and Nandurbar

Upiand Paddy Rabi (R-24)	Typic Haplusterts	FN=5.25T-0.54 SN FP_2O_5=2.19T-0.83 SP FK_2O=2.37T-0.05SK	30-40	Kolhapur,Sangli And Satara
Transplanted paddy (Indrayani)	Typic Ustorthents	FN=5.20T-0.34SN FP_2O_5=9.40T-13.66 SP FK_2O=2.73T-0.16SK	40-45	Nasik, Pune, Nandurbar, Gadchiroli and Kolhapur
Pearl millet Kharif (Saburi-RHRBH-8609)	Vertic Haplusterts	FN=3.31T-0.38SN FP_2O_5=3.38T-4.11 SP FK_2O=1.65T-0.06SK	30-35	Dhule,Nashik,Ahmednagar,Beed ,Aurangabad , Akola Buldhana, Wardha, Yawatmal, Stara, Pune and Solapur
Sorghum Kharif (CSH-9)	Vertic Ustropepts	FN=4.58T-0.96SN FP_2O_5=2.21T-6.94 SP FK_2O=3.34T-0.22SK	40-45	Jalgaon, Dhule, Nandurbar, Satara, Kolhapur, Sangil, Akola, Parbhani, Buldhana Aurangabad, Wardha, Yeotmal and Pune
Sorghum Rabi (CSH-8 R)	Typic Haplusterts	FN=4.7T-0.77SN FP_2O_5=2.00T-4.29 SP FK_2O=3.35T-0.33SK	50-60	Jalgaon,Akola,Aurangabad, Jalna, Osmanabad, Parbhani, Latur Aurangabad, Buldhana, Solapur, Yeotmal , Satara and Sangli
Finger milled Nagli (Nagil RAU-8)	Typic Haplusterts	FN=4.42T-0.225SN FP_2O_5=2.97T-1.32 SP FK_2O=1.21T-0.024SK	12-18	Nasik, Nandurbar, Kolhapur, Pune, Gadchiroil and Bhandara
Fodder Maize Summer (African tall)	Typic Haplusterts	FN=6.49T-0.56SN FP_2O_5=1.51T-0.73 SP FK_2O=2.45T-0.13SK	40-50	Kolhapur, Satara, Sangli Pune, Ahmednagar, Nasik and Solapur
Cotton (RHR-5-253)	Typic Haplusterts	FN=13.1T-0.75SN FP_2O_5=6.83T-2.84 SP FK_2O=8.57T-0.18SK	20-24	Jalgaon, Akola Buldana, Ameavati, Nanded Latur, Washim Pune, Parbhani, Yeotmal Ahmednagar, Satara Sangli Solapur,and Kolhapur
Groundnut (Phule Pragati JL-24)	Typic Haplusterts	FN=4.16T-0.37SN FP_2O_5=4.96T-4.36 SP FK_2O=3.14T-0.16SK	20-25	Jalgaon, Dhule,Akola ,Latur, Aurangabad,Jalna Parbhani Buldhana, Nanded Pune,Wardha, Yeotmal Satara Sangli, Kolhapur and Ahmednagar,
Groundnut (Summer SB-IX)	Typic Haplusterts	FN=4.18T-0.40SN FP_2O_5=8.23T-6.15 SP FK_2O=3.22T-0.10SK	25-30	Ahmednagar, Pune, Satara, Sangil,Kolhapur, Nasik, Jalgaon, Thane, Raigad, Ratnagiri,Sindhudurg, Wardha, Nagpur, Buldhana, Gadchiroli and Chandrapur
Soybean (JS-335)	Typic Haplusterts	FN=6.86T-0.68SN FP_2O_5=6.17T-4.46 SP FK_2O=3.96T-0.13SK	25	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Sunflower (SS-56)	Typic Haplusterts	FN=13.94T-0.61SN FP_2O_5=7.18T-6.82 SP FK_2O=4.82T-0.12SK	16-18	Ahmednagar Dhule, Nandurbar Jalna, Aurangabad , Nanded, Parbhani, Satara, Sangil,and Pune

Pigeonpea (ICPL-87)	Typic Haplusterts	FN=5.61T-0.54SN FP_2O_5=5.72T-4.73 SP FK_2O=6.33T-0.17SK	16-20	Jalgaon,Ahmednagar,Aurangabad Jalna, Parbhani, Pune Nanded, Akola,Satara,Sangil,and Kolhapur
Green gram (S-8)	Typic Haplusterts	FN=4.56T-0.18SN FP_2O_5=12.51T-7.61 SP FK_2O=3.53T-0.05SK	10-12	Jalgaon, Akola Buldhana, Amravati,Nanded Wardha, Yeotmal, Satara, Sangil,and Dhule,
Chickpea (Vishal)	Typic Haplusterts	FN=5.25T-0.46SN FP_2O_5=3.87T-2.77 SP FK_2O=1.29T-0.04SK	20-25	AmravatiJalgaon,Pune Nasik Nanded Aurangabad, Beed,Jalna Akola, Buldhana,Wardha, Yeotmal, Satara,Sangil,and Kolhapur
Okra (Arka anamika)	Typic Haplusterts	FN=16.86T-0.45SN FP_2O_5=10.31T-2.36 SP FK_2O=11.60T-0.15SK	12-15 t ha^{-1}	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Brinjal (Krishna)	Typic Haplustert	FN=4.82T-0.53SN FP_2O_5=3.14T-7.32 SP FK_2O=3.21T-0.13SK	50-60 t ha^{-1}	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Cabbage (Gloden acre)	Typic Haplusterts	FN=8.28T-0.21SN FP_2O_5=4.72T-2.34 SP FK_2O=6.68T-0.19SK	30-40 t ha^{-1}	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Cauliflower (Namdhari No.90)	Typic Haplusterts	FN=6.83T-0.35SN FP_2O_5=4.25T-2.21 SP FK_2O=3.90T-0.08SK	25 t ha^{-1}	Ahmednagar, Nasik, Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Potato (Khufri Jyoti)	Typic Ustorthent	FN=1.549T-0.40SN FP_2O_5=0.906T-5.53 SP FK_2O=1.315T-0.17SK	175 t ha^{-1}	Pune Ahmednagar,Aurangabad and Nasik
Tomato (Dhanshree)	Typic Ustorthent	FN =5.33T-0.46 SN FP_2O_5=3.88T-4.16 SP FK_2O=5.16T-0.25 SK	30 t ha^{-1}	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Turmeric (Kharif-Salem)	Typic Haplustert	FN=11.10T-1.78SN FP_2O_5=4.54T-7.55 SP FK_2O=5.40T-0.545SK	70	Kolhapur, Sangil and Satara
Chilli (Phule Jyoti)	Typic Haplustert	FN=50.23T-0.54SN FP_2O_5=27.09T-3.17 SP FK_2O=36.48T-0.30SK	7 t ha^{-1}	Ahmednagar,Nasik Pune, Satara, Sangil,Kolhapur, Solapur and Dhule
Onion (N-2-4-1)	Typic Haplusterts	FN=5.40T-0.54SN FP_2O_5=4.00T-4.32 SP FK_2O=3.10T-0.13SK	25-30	Nasik Ahmednagar, Pune, Satara Dhule, Solapur Jalgaon Aurangabad, Beed and Latur
Himachal Pradesh				

Crop/Variety	Soil	Prescription Equation	Target Range (q/ha)	Applicable District
Rice	Alfisol, Entisol,Inceptisol	FN=5.46T-0.32SN FP_2O_5=2.50T-2.67 SP FK_2O=2.82T-0.68SK (Mid hills wet temperate zone)	40	Kangra, Kullu, and Shimla
Rice	Alfsol, Entisol,Inceptisol	FN=5.90T-0.43SN FP_2O_5=3.22T-3.29 SP FK_2O=3.14T-0.71SK (Sub montane low hills sub tropical zone)	40	Una, Bilaspur, Hamirpur and part of Kangra and Sirmaur
Chhattisgarh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice (Improved dwarf R-269 Ruchi)	Inceptisol	FN=3.73T-0.55SN FP_2O_5=1.45T-5.61 SP FK_2O= SK 250 kg ha^{-1}	40-60	Raipur, Durg, Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice IR-36	Alfisol	FN=5.88T-0.88SN FP_2O_5=107T-4.13 SP FK_2O= SK250 kg ha^{-1}	40-60	Raipur Durg, , Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice (R-269 Ruchi)	Vertisol	FN=4.95T-0.62SN FP_2O_5=130T-2.56 SP FK_2O= SK 250 kg ha^{-1}	40-60	Raipur Durg, , Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice (Safari-17 Local Tall)	Vertisol	FN=3.97T-0.53SN FP_2O_5=120T-2.69SP FK_2O= SK 250 kg ha^{-1}	35-55	Raipur Durg, , Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice (Mahamaya)	Inceptisol	FN=4.82T-1.114SN FP_2O_5=106.3T-2.79SP FK_2O= SK 250 kg ha^{-1}	40-60	Raipur, Raigharh,Durg, Rajnandgaon, Mahasamund, Dhamtari, Bilaspur and korba
Rice (Mahamaya)	Vertisol	FN=3.64T-0.87SN FP_2O_5=103.8T-2.85SP FK_2O=SK250 kg ha^{-1}	40-60	Raipur,Raigharh,Durg, Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice with FYM (Mahamaya)	Inceptisol	FN=3.88T-0.578SN FP_2O_5=129T-2.24SP FK_2O=SK250 kg ha^{-1}	40-60	Raipur Durg, , Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice without FYM (Mahamaya)	Inceptisol	FN=3.93T-0.489SN FP_2O_5=110T-2.11SP FK_2O=SK 250 kg ha^{-1}	40-60	Raipur Durg, , Rajnandgaon, Mahasamund, Dhamtari and Bilaspur

Wheat (Swati)	Inceptisol	FN=6.99T-0.41SN FP_2O_5=115T-3.45SP FK_2O=SK 250 kg ha^{-1}	15-25	Raipur Durg, Mahasamund Bilaspur, , Raigarh Janjgir, Dhamtari
Maize (Pro-agro 4640)	Vertisol	FN=3.97T-0.465SN FP_2O_5=358T-13.5SP FK_2O= SK 250 kg ha^{-1}	50-70	Raipur , Rajnandgaon Kawardha Durg,
Mustard (Pusa bold)	Vertisol	FN=9.18T-0.256SN FP_2O_5=188T-2.79SP FK_2O=SK 250 kg ha^{-1}	12-20	Raipur Durg,, Rajnandgaon Bilaspur, and Kawardha
Potato (JH-222)	Vertisol	FN=1.67T-0.36SN FP_2O=0.54T-2.27 SP FK_2O= SK 250 kg ha^{-1}	120-200	Raipur Durg,, Bilaspur,
Okra (Parbhani)	Inceptisol	FN=1.99T-0.299SN FP_2O=190T-3.31 SP FK_2O= SK 250 kg ha^{-1}	100-150	Raipur Raigarh, Mahasamund, Dhamtari and Bilaspur,
Delhi and Uttar Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice	Typic Haplustept (Alluvial)	FN=4.93T-0.47SN FP_2O_5=4.48T-7.82 SP FK_2O=2.31T-0.21SK	50-60	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Wheat	Typic Haplustept (Alluvial)	FN=5.31T-0.51SN FP_2O_5=3.45T-5.55 SP FK_2O=2.75T-0.32SK	50-60	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Maize	Typic Haplustept (Alluvial)	FN=6.61T-0.52SN FP_2O_5=4.77T-5.13 SP FK_2O=2.75T-0.24SK	30-40	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Barley	Typic Haplustept (Alluvial)	FN=3.69T-0.64SN FP_2O_5=2.93T-5.24 SP FK_2O=2.22T-0.31SK	40-50	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr,

				Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Pearlmillet	Typic Haplustept (Alluvial)	FN=6.97T-0.38SN FP_2O_5=5.73T-4.81 SP FK_2O=3.92T-0.28SK	25-30	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Mustard	Typic Haplustept (Alluvial)	FN=7.41T-0.44SN FP_2O_5=6.22T-3.41 SP FK_2O=6.21T-0.39SK	20-25	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Soybean	Typic Haplustept (Alluvial)	FN=6.60T-0.35SN FP_2O_5=6.05T-3.19 SP FK_2O=3.86T-0.21SK	20-25	Gautam Budhanagar, Ghaziabad Bagpat, Meerut, Mujjafarnagar, Saharanpur, Buland, Shahr, Aligarh, Maha,Mayanagar, Etah, Agra, Etawah, Mainpuri, Shikohabad, Agra, Mathura, Jhansi, Ferozabad, Jalaun
Bihar				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat	Young alluvium (Calcareous Soil)	FN =5.95T-0.43 SN FP_2O_5=3.03T-1.34SP FK_2O=3.16T-0.73SK (with only inorganic fertilizers : N,P&K)	30-45	East Champaran, Wast Champaran, Siwan Saran Sitamarhi, Shivhar,Muzaffarpur, Vaishali ,Samastipur, Gopalganj, Begusarai, Part of Khagaria
Wheat	Young alluvium (Calcareous Soil)	FN =605T-0.03 SN FP_2O_5=4.27T-3.39SP FK_2O=10.02T-3.30SK F Zn = 0.38T-7.14 S Zn (with only inorganic fertilizers : N,P,K&Zn)	30-40	East Champaran, Wast Champaran, Siwan Saran Sitamarhi
Wheat	Recent Alluvium, Non Calcareous, Non-Saline Soil	FN =5.05T-0.40 SN FP_2O_5=3.0T-2.11SP FK_2O=2.10T-0.15SK (without only inorganic fertilizers : N,P&K)	30-40	Purnea, Katihar Supaul ,Madheoura, Araia, Kishanganj, Prt of Khagaria Darbhanga Madhubani
Wheat	Old Alluvium, light Textured soil	FN =5.20T-0.36 SN FP_2O_5=2.93T-2.15S P FK_2O=2.25T-0.25SK	30-40	Sheikhpura, Mungher, Bhagalpur, Banka, Jamui and Lakhi Sarai

		(with only inorganic fertilizers : N,P&K)		
Wheat	Old Alluvium, Heavy textured soil	FN =4.06T-0.23 SN FP_2O_5=2.03T-1.46 SP FK_2O=1.69T-0.16 SK (with only inorganic fertilizers : N,P&K)	40-50	Rohtas, Bhopur, Buxar, Bhabhua, Arwal ,Patna, Nalanda, Nawadah Jehanabad, Aurangabad and Gaya
Sugar Cane main	Young Alluvium, Calcareous	FN =0.236 T-0.27 SN FP_2O_5=0.113T-1.59 SP FK_2O=0.101T-0.25 SK	t/ha 75-100	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar, Muzaffarpur, Vaishali, Samastipur, Gopalganj, Begusarai, Part of Khagaria
Sugarcane ratoon	Young Alluvium, Calcareous Soil	FN =0.261 T-0.29 SN FP_2O_5=0.120T-1.50 SP FK_2O=0.108T-0.19 SK	t/ha 75-100	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar, Muzaffarpur, Vaishali, Samastipur, Gopalganj, Begusarai, Part of Khagaria
Jharkhand				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat	Red Loam Soil	FN =4.84 T-0.36 SN FP_2O_5=2.94T-1.63 SP FK_2O=2.01T-0.16 SK	25-30	Jharkhand state having red loam/laterite soil
Tamil Nadu				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Maize –CO-1	Mixed black (Perianaickenpalayam series)	FN =4.60 T-0.55 SN FP_2O_5=2.25T-1.80 SP FK_2O=5.16T-0.49 SK	50	Coimbatore , Tiruchirappalli and Salem
Ragi (CO 11)	Red-Sandy loam (Somayanur series)	FN =4.94 T-0.55 SN FP_2O_5=1.36T-0.96 SP FK_2O=4.20T-0.46 SK	40	Coimbatore , Tirupur, Dindigul Madurai Namakkal Theni and Salem
Blackgram (ADT 3)	Mixed black calcareous(Perianacken palayamseries)	FN =10.84 T-0.39 SN FP_2O_5=7.23T-1.00 SP FK_2O=5.20T-0.04 SK	9	Coimbatore , Tiruppur,Salem and Trichy
Gingelly (TMV 4)	Black Alluvium(Adanur series)	FN =13.07 T-0.46 SN FP_2O_5=6.3T-1.79 SP FK_2O=12.8T-0.47 SK	10	Thanjavur,Tiruvarur, Nagapattinam, Trichy Karur, and Cuddalore
Chilli (CO 1)	Red-Sandy clay loam	FN =8.29 T-0.32 SN FP_2O_5=7.13T-5.24 SP FK_2O=5.86T-0.15 SK	20	Coimbatore , Tiruppur ,Erode Salem, Dindigul Namakkal Madurai ,Virudhunagar and

				Pudukottai
West Bengal				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat(UP-262)	Inceptisol	FN =12.88 T-0.80 SN FP_2O_5=2.15T-0.23 SP FK_2O=4.65T-0.29 SK	25-30	Nadia, Burdwan and Murshidabad
Wheat (PBW-343)	Inceptisol	FN =3.03 T-18 SN FP_2O_5=1.35T-0.23 SP FK_2O=2.15T-0.29 SK FN =12.88 T-0.80 SN FP_2O_5=2.15T-0.23 SP FK_2O=4.65T-0.29 SK	45-50	Nadia, Burdwan and Murshidabad
Haryana				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Paddy (PR 106)	Sierozem (Inceptisols/Entisols)	FN =3.70T-1.10 SN FP_2O_5=1.35T-2.66 SP	65-75	All districts of Haryana
Wheat (WH542)	Sierozem (Inceptisols/Entisols)	FN =5.65T-1.34 SN FP_2O_5=1.91T-2.19 SP	45-55	All districts of Haryana
Durum Wheat (WH896)	Sierozem (Inceptisols/Entisols)	FN =6.08T-1.19 SN FP_2O_5=2.58T-3.68 SP	35-45	All districts of Haryana
Mazie (Vijay composite)	Sierozem (Inceptisols/Entisols)	FN =4.93T-1.03 SN FP_2O_5=1.95T-3.54 SP	40-50	All districts of Haryana
Sorghum fodder (HC 171	Sierozem (Inceptisols/Entisols)	FN =0.46T-1.27 SN FP_2O_5=0.16T-3.59 SP	400-600	All districts of Haryana
Oat fodder (HFO114)	Sierozem (Inceptisols/Entisols)	FN =0.50T-1.09 SN FP_2O_5=0.13T-1.50 SP	400-500	All districts of Haryana
Cotton (H 777)	Sierozem (Inceptisols/Entisols)	FN =10.91T-1.09 SN FP_2O_5=3.02T-1.73 SP	16-22	All districts of Haryana
Raya (RH 8113)	Sierozem (Inceptisols/Entisols)	FN =9.76T-0.81 SN FP_2O_5=4.12T-2.03 SP	16-20	Mohindergarh, Faridabad, Mewat, Jhajjar Rewari, Bhiwani, Hisar, Sirsa, Faridabad and Jind
Orissa				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range**	**Applicable District**

			(q/ha)	
Rice (cv.Lalat)	Fine, mixed, hyperthermic Vertic Haplustept	FN =8.4 T-1.4 SN FP_2O_5=5.0T-3.1 SP FK_2O=6.6T-1.5 SK	40-50	Khurda, Puri, Nayagarh, Cuttack, Dhenkanal, Sambalpur, Bargarh Jharsududa and Sundargarh
Bhindi Lady's finger (cv.BB.O.2)	Fine, mixed, hyperthermic Vertic Haplustept	FN =6.8 T-1.8 SN FP_2O_5=2.2T-1.9 SP FK_2O=4.7T-2.1 SK	50-70	Khurda, Puri, Nayagarh, Cuttack, Dhenkanal, Sambalpur, Bargarh Jharsududa and Sundargarh
Brinjal (cv. Utkal Anushree)	Fine, mixed, hyperthermic Vertic Haplustept	FN =1.0 T-0.3 SN FP_2O_5=0.7T-1.6 SP FK_2O=4.7T-0.7 SK	200-250	Khurda, Puri, Nayagarh, Cuttack, Dhenkanal, Sambalpur, Bargarh Jharsududa and Sundargarh
Potato (cv. Ashoka)	Fine, mixed, hyperthermic Vertic Haplustept	FN =1.8 T-1.1 SN FP_2O_5=0.5T-1.8 SP FK_2O=1.1T-1.3 SK	250-300	Khurda, Puri, Nayagarh, Cuttack, Dhenkanal, Sambalpur, Bargarh Jharsududa and Sundargarh
Pumpkin (cv. Guamal)	Fine, mixed, hyperthermic Vertic Haplustept	FN =4.9 T-1.2 SN FP_2O_5=2.7T-2.7 SP FK_2O=2.0T-0.5 SK	50-70	Khurda, Puri, Nayagarh, Cuttack, Dhenkanal, Sambalpur, Bargarh Jharsududa and Sundargarh
Rajasthan				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat (Raj.-1482)	Alluvial soils (Adsar and Khiran series)	FN=8.54 T-0.63 SN FP_2O_5=6.93T-3.72SP FK_2O=7.21T-0.55 SK	25-30	All districts of Rajasthan
Mustaed (T-59)	Alluvial soils (Bhamatsar and Khiran series)	FN =27.25 T-0.969 SN FP_2O_5=22.11T-5.69 SP FK_2O=21.54T-0.59 SK	8-10	Bikaner
Mothbean (RMO-40)	Alluvial soils (Bhamatsar and Khiran series)	FN =8.61 T-0.29 SN FP_2O_5=8.91T-1.66SP FK_2O=17.58T-0.53SK	8-10	Bikaner
Guar (RGC-986)	Alluvial soils (Bhamatsar and Khiran series)	FN =5.38 T-0.46 SN FP_2O_5=5.07T-2.46SP FK_2O=4.86T-0.34 SK	15-18	Bikaner
Madhya Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice (IR-8, IT-1991,Patel-85,	Shallow Medium black and Deep	FN =4.25 T-0.45 SN FP_2O_5=3.55T-4.89SP	30-45	Bhopal Dhar, Jabalpur, Indore, Khandwa, Khargone, Mandsaur,

Kranti,Sugandha , IR-36, JR 201)	black soils	FK_2O=2.1T-0.18 SK		Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain
Wheat (Narmada4,Kalyan. Sona, Lok-1 Shera, GW 272)	Shallow Medium black and Deep black soils	FN =4.40 T-0.40 SN FP_2O_5=4.00T-4.58 SP FK_2O=2.53T-0.16 SK	30-60	Bhopal Dhar, Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Rewa, Satna, Sagar, Sehore, Ujjain
Maize (Chandan Makka-3, composite JCM-323)	Shallow Medium black and Deep black soils	FN =4.40 T-0.23 SN FP_2O_5=2.38T-1.40 SP FK_2O=2.07T-0.08 SK	30-60	Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Sehore, Ujjain
Cotton (JKH-1 and Hybrid Cotton)	Shallow Medium black and Deep black soils	FN =11.33 T-0.59 SN FP_2O_5=6.45T-4.4 SP FK_2O=4.71T-0.14 SK	15-20	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Sehore, Ujjain
Sugarcane (CO-1307)	Shallow Medium black and Deep black soils	FN =5.71 T-1.66 SN FP_2O_5=2.28T-11.73 SP FK_2O=1.6T-0.53 SK	120-150	Jabalpur, Indore, Khandwa, Khargone, Narsinghpur, Powarkheda, Sehore, Bhopal
Mustard (Pusa bold ,Aghani)	Alluvial	FN =12.5 T-0.44 SN FP_2O_5=4.6T-1.5 SP FK_2O=6.5T-0.19 SK	12-20	Gwalior, Jabalpurand Gird region
Sunflower (JSF-1)	Medium black	FN =9.11 T-0.45 SN FP_2O_5=6.27T-2.19 SP FK_2O=9.27T-0.38 SK	15-18	Bhopal Dhar, Jabalpur, Indore, Khandwa, Khargone, Narsinghpur, and Ujjain
Niger (Ootakamund)	Shallow Medium black and Deep black soils	FN =11.8 T-0.17 SN FP_2O_5=11.17T-3.52 SP FK_2O=10.52T-0.16 SK	3-6	Jabalpur, Chindwara
Arhar (JA-3, ICPL-No.148, Asha)	Medium black and Deep black	FN =4.87 T-0.37 SN FP_2O_5=5.34T-3.47 SP FK_2O=3.61T-0.16 SK	15-25	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain
Urad (T-9)	Shallow, Medium black and Deep black	FN =7.82 T-0.39 SN FP_2O_5=5.36T-2.62 SP FK_2O=10.83T-0.44 SK	12.15	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain
Gram (JP-74, JG-62, JG-315, JG-322)	Medium black and Deep black	FN =3.73 T-0.18 SN FP_2O_5=5.0T-2.5 SP FK_2O=3.8T-0.17 SK	20-35	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain
Kerala				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Banana (Nendran Banana)	Laterite	FN =83.49 T-7.69 SN FP_2O_5=19.34T-34.93 SP	20-30 t ha^{-1}	Districts of Kerala

		FK_2O=121.18T-5.38 SK		
Ginger (Maran)	Laterite	FN =7.80 T-0.37 SN FP_2O_5=2.80T-0.64 SP FK_2O=10.60T-0.83 SK	15-25 t ha^{-1}	Districts of Kerala
Turmeric (Kanthy)	Laterite	FN =4.70 T-0.63 SN FP_2O_5=1.77T-4.48 SP FK_2O=10.49T-0.45 SK	20-30 t ha^{-1}	Districts of Kerala
Sweet Potato (Varun)	Laterite	FN =3.04 T-0.27 SN FP_2O_5=1.27T-2.85 SP FK_2O=8.60T-0.93 SK	7.5-15 t ha^{-1}	Districts of Kerala
Cassava (Tapioca M 4)	Laterite	FN =12.10 T-0.74 SN FP_2O_5=05.04T-2.02 SP FK_2O=11.93T-1.10 SK	35 t ha^{-1}	Districts of Kerala
Cucumber (Mudicode local)	Laterite	FN =3.24 T-0.095 SN FP_2O_5=1.64T-1.332 SP FK_2O=3.16T-0.068 SK	20-30 t ha^{-1}	Districts of Kerala
Salad Cucumber (AAUC-2)	Laterite	FN =6.10 T-0.31 SN FP_2O_5=0.60T-1.38 SP FK_2O=1.30T-0.06 SK	20-30 t ha^{-1}	Districts of Kerala
Ash Gourd (KAU Lokal)	Laterite	FN =15.79 T-0.16 SN FP_2O_5=3.77T-0.90 SP FK_2O=8.31T-0.024 SK	15-30 t ha^{-1}	Districts of Kerala

- **Fertilizer prescription equation under integrated plant nutrient supply system**

In this technology, the fertilizer nutrient doses are adjusted not only to that contributed from soil but also from various organic sources like FYM, green manure, compost crop residues and bio-fertilizers like Azospirillum and Phosphobacteria. As the present requiment of chemical fertilizers is 32 million tonnes and only 22 million tonnes of chemical fertilizers are being used, a shortage of 10 million tonnes is occurring and hence combined use of chemical fertilizers along with organics becomes inevitable. In addition to this, addition of organics will help in sustaining the soil productivity and maintaining the soil health by way of improvement of soil physical, chemical and biological properties.

Methodology of IPNS using STCR calibration

It is same as described in previous section. Apart from determination of nutrient requirement (NR) in kg q^{-1} of economic produce, per cent availability of soil available nutrients (CS) as measured by soil tests, and per cent availability of the fertilizer nutrients (CF), and contribution from organic nutrients (CO) were also computed using following equation:

Contribution of N or P_2O_5 or K_2O from Organics (CO)= [Total uptake of N or P_2O_5 or K_2O in organic plots in kg/ha STV of N or P x 2.29 or K x 1.21 in organic plots in kg/ha x mean Cs of N or P_2O_5 or K_2O] / [Amount of N or P2O5 or K2O added as organics in kg/ha]

The calculated parameters are transformed into the fertilizer adjustment equation as given below.

F = T x NR/ CF – CS x STV/ CF - CO x M/ CF

Where,

F = Fertilizer dose of N, P_2O_5 or K_2O in kg ha^{-1}

T = Yield target in q ha^{-1}

NR = Nutrient requirement of N, P_2O_5 (P x 2.29) or K_2O (K x 1.21) in 100 /kg for economic produce.

CS = Contribution from soil nutrients in fraction

CF = Contribution from fertilizer nutrients in fraction

CO = Contribution from organic nutrients in fraction

STV = Soil available nutrients [N, P_2O_5 (P x 2.29) or K_2O (K x 1.21)] determined through soil analysis

M = Nutrient content in organic matter [N, P_2O_5 (P x 2.29) or K_2O (K x 1.21)] determined through organic matter analysis × FYM

Different centres of AICRP on STCR developed fertilizer and manure prescription equations with IPNS approach for different crops.

Andhra Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice (NLR - 9672)	Sandy clay loam	N=3.43T-1.45SN-0.70 ON FP_2O_5=1.30T-4.83SP-0.43 OP FK_2O=1.93T-0.56SK-0.104 OK FN=3.43T-1.45SN-0.65 ON** FP_2O_5=1.30T-4.83SP-0.38 OP** FK_2O=1.93T-0.56SK-0.14 OK**	80	Nellore, Ongole,Chittoor and Cuddapah
Rice (MTV - 5182)	Vertisol (clay)	FN=3.36T-0.33SN-0.74F ON FP_2O_5=2.53T-4.53SP-0.81 OP FK_2O=1.42T-0.12SK-0.15 OK FN=3.36T-0.33SN-1.62ON** FP_2O_5=2.53T-4.53SP-1.30 OP** FK_2O=1.42T-0.12SK-1.09 OK**	60	Kurnool, Ongole and Cuddapah
Rice (Tella hamsa)	Sandy clay loam (Tropaque	FN=4.20T-0.55SN-0.74 ON FP_2O_5=2.7T-2.67SP-0.81 OP FK_2O=2.22T-0.21SK-0.15 OK	70	Ranga Reddy and Mahaboobnagar

	pt)	FN=4.20T-0.55SN-1.62 ON** FP_2O_5=2.7T-2.67SP-1.30 OP** FK_2O=2.22T-0.21SK-1.09 OK**		
Rice	Vertisols	FN=3.79T-0.50SN-0.43ON FP_2O_5=3.19T-3.17SP-0.34 OP FK_2O=1.60T-0.19SK-0.24 OK FN=3.79T-0.50SN-0.94 ON** FP_2O_5=3.19T-3.17SP-1.38 OP** FK_2O=1.60T-0.19SK-1.38 OK**	60	Nizamabad Ranga Reddy and Mahaboobnagar
Rice (MTU - 2067)	Alluvial	FN=2.30T-0.32SN-0.74 ON FP_2O_5=1.91T-1.90SP-0.36 OP FK_2O=2.27T-0.27SK-0.29 OK FN=2.30T-0.32SN-0.57 ON** FP_2O_5=1.91T-1.90SP-2.43 OP** FK_2O=2.27T-0.27SK-1.35 OK**	70	East Godavari
Rice (Pothana)	Vertisol	FN=4.75T-0.75SN-0.76 ON FP_2O_5=2.75T-4.20SP-0.34 OP FK_2O=1.99T-0.15SK-0.34 OK FN=4.75T-0.75SN-1.45 ON** FP_2O_5=2.75T-4.20SP-2.51 OP** FK_2O=1.99T-0.15SK-1.31 OK**	60	Warangal and Karimnagar
Rainfed Jowar (CHS-9)	Alfisol (Sandy Loam)	FN=7.29T-0.82SN-0.38 ON FP_2O_5=4.30T-1.53SP-0.19 OP FK_2O=5.10T-0.39SK-0.17 OK	20-25	Mahaboobnagar Ranga Reddy and Kurnool
Sugarcane (87A-298)	Sandy clay loam (Alluvial)	FN=3.43T-1.45SN-0.70 ON FP_2O_5=1.30T-4.83SP-0.43 OP FK_2O=1.93T-0.56SK-0.03 OK	125-150 (t/ha)	Nellore Ongole Chittoor and Cuddapah
Colocassia (KCS-2)	Alluvial soil	FN=12.11T-0.53SN-0.32 ON FP_2O_5=6.70T-1.84SP-0.36 OP FK_2O=14.45T-0.64SK-0.075OK	20-25 (t/ha)	Nellore
Tomato (Pusa rabi)	Alfisol	FN=15.48T-2.28SN-0.681ON FP_2O_5=1.78T-1.14SP-0.383OP FK_2O=6.82T-1.02SK-0.082 OK	15-20 (t/ha)	Ranga Reddy and Mahabubnagar
Onion (Nasic Red)	Alfisols	FN=0.745T-0.38SN-0.23 ON FP_2O_5=1.15T-2.59SP-0.830 OP FK_2O=1.08T-0.31SK-1.410 OK FN=0.745T-0.38SN-0.469 ON*** FP_2O_5=1.15T-2.59SP-0.75 OP*** FK_2O=1.08T-0.31SK-0.98 OK***	150-200	Ranga Reddy and Rajendranagar
Onion (Nasic Red)	Alfisol	FN=0.83T-0.30SN-0.34 ON FP_2O_5=0.96T-1.76SP-0.66 OP FK_2O=1.86T-0.75SK-0.77 OK FN=0.83T-0.30SN-0.55 ON*** FP_2O_5=0.96T-1.76SP-0.78 OP*** FK_2O=1.86T-0.75SK-0.93 OK***	200	Ranga Reddy, Nellore and Ongole
Muskmelon (Maduras)	Alfisol (Red soil)	FN=2.02T-0.31SN-0.06 ON*** FP_2O_5=0.53T-0.97SP-0.07 OP*** FK_2O=0.77T-0.06SK-0.09 OK***	65-80	Hyderabad
Foxtail millet (Krishnadevara	Vertisol (Black soil)	FN=16.16T-2.60SN-0.18 ON*** FP_2O_5=4.10T-0.97SP-0.07 OP***	18-20	Hyderabad

ya)		FK_2O=4.87T-0.14SK-0.10 OK***		
Soybean (JS-335)	Inceptisol (Sandy clay loam)	FN=15.91T-2.11SN-0.63 ON*** FP_2O_5=7.54T-4.37SP-0.27 OP*** FK_2O=12.16T-0.85SK-1.12 OK***	22-28	Hyderabad
Senna (CIMAP collection)	Alfisol (Sandy loam)	FN=40.981T-0.53 SN-0.33 ON*** FP_2O_5=5.98T-0.57 SP-0.13 OP*** FK_2O=12.33T-0.08 SK-0.35 OK***	4.5-6.0	Hyderabad
**Green manure; ***Vermicompost				
Maharashtra				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Soybean (JS-335)	Typic Haplustert	FN=3.97T-0.39 SN-0.09ON FP_2O_5=4.14T-2.95 SP-1.5 OP FK_2O=3.47T-0.11 SK-0.27 OK	25	Ahmednagar,Nasik Pune, Satara, Sangli,Kolhapur, Solapur and Dhule
Okra (Arka anamika)	Typic Haplustert	FN=15.54T-0.39SN-0.45ON FP_2O_5=9.61T-2.21SP-1.45 OP FK_2O=11.06T-0.14SK-1.46 OK	12 (t/ha)	Ahmednagar,Nasik Pune, Satara, Sangli,Kolhapur, Solapur and Dhule
Cauliflower (Namdhari No.90)	Typic Haplustert	FN=6.0T-0.30SN-1.44 ON FP_2O_5=3.92T-2.20SP-1.20 OP FK_2O=3.07T-0.06SK-1.12 OK	25 (t/ha)	Ahmednagar,Nasik Pune, Satara, Sangli,Kolhapur, Solapur and Dhule
Potato (Khufri Jyoti)	Typic Ustorthent	FN=1.207T-0.315SN-0.81 ON FP_2O_5=0.878T-5.35SP-0.71OP FK_2O=1.180T-1.156SK-0.76 OK	175	Pune Ahmednagar,Aurangabad and Nasik
Potato (Dhanshree)	Typic Ustorthent	FN=4.13T-0.43SN-1.13 ON FP_2O_5=2.5T-2.78SP-0.57 OP FK_2O=3.44T-0.22SK-0.76OK	30 (t/ha)	Ahmednagar,Nasik Pune, Satara, Sangli,Kolhapur, Solapur and Dhule
Turmeric (Salem)	Typic Haplustert	FN=6.45T-0.88 SN-2.55 ON FP_2O_5=4.03T-6.48 SP-0.59 OP FK_2O=4.52T-0.45 SK-1.40 OK	70	Kolhapur, Sangli and Satara
Chilli (Phule Jyoti)	Typic Haplustert	FN=37.25T-0.40 SN-3.38 ON FP_2O_5=25.40T-2.97 SP-1.88 OP FK_2O=34.00T-0.26 SK-1.66 OK	7 (t/ha)	Ahmednagar,Nasik Pune, Satara, Sangli,Kolhapur, Solapur and Dhule
Himachal Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat	Alfisol, Entisol,Inceptisol	FN=5.27T-0.25 SN-1.06 ON FP_2O_5=4.13T-0.38 SP-0.98 OP FK_2O=2.87T-0.15 SK-0.55 OK	40	Kangra,Sirmour, Mandi, Kullu, and Shimla
Soybean	Alfisol, Entisol,Inc	FN=6.32T-0.25 SN-0.85 ON FP_2O_5=4.40T-0.34 SP-0.66 OP	2 (t/ha)	Kangra,Sirmour, Mandi, Kullu, and

	eptisol	FK_2O=4.05T-0.23 SK-0.80 OK		Shimla
Turmeric (Palam Pitamber)	Alfisol	FN=2.51T-0.54 SN-0.15 ON FP_2O_5=0.80T-0.82 SP-0.11 OP FK_2O=4.82T-1.76 SK-0.42 OK	80	Kangara
Frenchbean (Laxmi)	Alfisol	FN=2.15T-0.37 SN-0.56 ON FP_2O_5=1.69T-4.34 SP-0.53 OP FK_2O=1.78T-0.63 SK-0.51 OK	90	Kangra
Onion (Nasik red)	Alfisol	FN=3.24T-0.77SN-0.58 ON FP_2O_5=0.81T-1.37SP-0.07 OP FK_2O=1.25T-0.40SK-0.23 OK	120	Kangra
Pea (PB 89)	Alfisol	FN=3.38T-0.79 SN-0.06 ON FP_2O_5=1.04T-0.66 SP-0.04 OP FK_2O=2.11T-0.45 SK-0.02 OK	70	Kangra
Garlic (GHC-1)	Alfisol	FN=5.67T-0.38 SN-0.14 ON FP_2O_5=1.38T-0.52 SP-0.26 OP FK_2O=1.87T-0.15 SK-0.13 OK	70	Kangra
Karnataka				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Rice (Rasi)	Red	F.N.=4.703T-274.865SN-0.00141ON F.P_2O_5=1.636T-0.2563SP-0.00077OP F.K_2O=2.306T-0.494SK-0.0014 OK	20 (q/acre)	Zone-6 (IPNS) Mandya and Mysore
Groundnut (TMV-2)	Red	F.N.=3.38T-0.53SN-0.000334 ON F.P_2O_5=5.85T-1.063SP-0.000332 OP F.K_2O=4.24T-0.533SK-0.000423 OK	180-300 (kg/acre)	Zone-5 (IPNS) Banglore, Kolar, Mandya and Tumkur
Soybean (Improved varieties)	Red Sandy loam	F.N.=3.5T-0.268SN-0.00313 ON F.P_2O_5=5.72T-0.504SP-0.00667 OP F.K_2O=7.02T-0.475SK-0.004533 OK	10 (q/acre)	Bangalore
Brinjal (Arka Ananda)	Red Sandy loam	F.N.=0.808007T-0.54204SN-0.00113 ON F.P_2O_5=0.28433T-0.51037SP-0.00113 OP F.K_2O=0.21128T-0.16118SK-0.00036 OK	40 (t/ha)	Bangalore
Carrot (New Karoda)	Red Sandy loam	F.N.=1.045288T-0.394455SN-0.227 ON F.P_2O_5=0.494327T-0.434055SP-0.144 OP F.K_2O=0.870453T-0.657043SK-0.5065 OK	200 (q/ha)	Bangalore
Chhattisgarh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**

Rice (Indira-9)	Vertisol	FN=3.65T-(0.489SN+5.12tFYM) FP_2O_5=129-(16710-244T)$^{1/2}$-(2.89SP+3.0 tFYM) FK_2O=No K if SK>250 kg ha^{-1}	35-55	Raipur Durg, Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Rice (Indira-9)	Inceptisol	FN=4.58T-(0.677 SN+6.02tFYM) FP_2O_5=91-(8313-147T)$^{1/2}$-(3.13SP+3.26 tFYM) FK_2O=No K if SK>250 kg ha^{-1}	35-55	Raipur Durg, Rajnandgaon, Mahasamund, Dhamtari and Bilaspur
Hybrid rice (Pro agro-6444)	Inceptisol	FN=478-(228364-2500T)$^{1/2}$-0.542SN-5.85tFYM FP_2O_5=227-(51609-588T)$^{1/2}$-4.72SP-3.69 tFYM	50-80	Raipur Durg, Bilaspur, Janjgir, Raigarh , Mahasamund and Dhamtari
Hybrid rice (Indira Sona)	Inceptisol	FN=5.18T-0.88SN-0.79 ON FP_2O_5=1.48T-2.50 SP -0.45 OP FK_2O=2.13T-0.24SK -0.11 OK	50-75	Raipur Durg,Rajanadgaon, Kawardha Bilaspur and Dhamtari
Hybrid rice (Indira Sona)	Vertisol	FN=6.02T-1.05SN-0.85 ON FP_2O_5=1.48T-2.51 SP -0.34 OP FK_2O=2.53T-0.20SK -0.09 OK	50-75	Raipur Durg,Rajanadgaon, Kawardha and Bilaspur
Rice (MTU-1010)	Vertisol	FN=4.38T-0.23SN-0.20 ON FP_2O_5=1.11T-0.66SP-0.08 OP FK_2O=1.29T-0.04SK -0.02 OK	30-40	Raipur Durg,Rajnandgaon Bilaspur, Kawardha Janjgir, Jashpur, Mahasamund, Dhamtari and Kanker
Sugarcane (Co- JN-14186)	Vertisol	FN=0.59T-1.12SN-0.88 ON FP_2O_5=0.13T-3.46 SP -0.37 OP FK_2O=0.15T-0.13SK -0.15 OK	500-1000	Raipur Durg,Rajnandgaon Bilaspur and Kawardha
Sunflower (Jwalamukhi)	Vertisol	FN=9.09T-(0.45 SN+4.6tFYM) FP_2O_5=2010-(4040100-16666T)$^{1/2}$-(2.75SP+4.2 tFYM) FK_2O=No if SK>250 kg ha^{-1}	15-25	Raipur Durg,Rajnandgaon Bilaspur and Kawardha
Sunflower (Jwalamukhi)	Inceptisol	FN=13.97T-(0.68 SN+6.34tFYM) FP_2O_5=183-(33620-1429T)$^{1/2}$-(3.1SP+4.98tFYM) FK_2O=No Ki f SK>250 kg ha^{-1}	15-25	Raipur Raigarh, Durg,Mahasamund, Dhamtari and Bilaspur
Sunflower (JSF-1)	Vertisol	FN=14.55T-(0.62SN+5.56tFYM) FP_2O_5=133-(17689-1000T)$^{1/2}$-(2.70SP+4.34tFYM) FK_2O=No Ki f SK>250 kg ha^{-1}	10-16	Raipur Durg,Rajnandgaon Kawardha and Bilaspur
Chickpea (Vijay)	Vertisol	FN=5.37T-2.80SN-0.24ON FP_2O_5=10.03T-7.28SP-1.06 OP FK_2O=21.37T-0.65SK -0.61 OK	8-16	Raipur Durg,Rajnandgaon Kawardha and

				Bilaspur
Cauliflower (Sungro Pusi)	Vertisol	FN=1.44T-0.29SN-0.09 ON FP_2O_5=0.37T-0.74 SP -0.05 OP FK_2O=0.57T-0.05SK -0.02 OK	100-150	Raipur Durg and Bilaspur,
Brinjal (Mukta kesi)	Inceptisol	FN=1.30T-(0.55SN+4.86tFYM) FP_2O_5=115-(13254.6-58.5T)$^{1/2}$-(2.99SP+6.25tFYM) FK_2O=No K if SK>250 kg ha^{-1}	150-225	Raipur Raigarh, Mahasamund, Dhamtari Bilaspur
Delhi and Uttar Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat	Typic Haplustept (Alluvial)	FN=3.85T-0.41SN-1.64 ON FP_2O_5=2.78T-4.12SP -1.72 OP FK_2O=2.04T-0.29SK -0.88 OK	50-60	Gautam Budhanagar, Ghaziabad, Bagpat,Meerut,Mujjafarnagar,Saharanpur, Buland Shahr,Aligarh,Maha Mayanagar,Etah,Agra,Etawah,Mainpuri,Shikohabad,Agra,Mathura,Jhansi,Ferozabad and Jalaun
Maize	Typic Haplustept (Alluvial)	FN=5.02T-0.35SN-1.82 ON FP_2O_5=3.93T-3.62SP -2.29 OP FK_2O=2.25T-0.17SK -1.00OK	30-40	Districts of UP
Pearlmillet	Typic Haplustept (Alluvial)	FN=5.35T-0.29SN-2.23 ON FP_2O_5=4.72T-3.29 SP -2.48 OP FK_2O=2.88T-0.17SK -1.35 OK	25-30	Delhi state and adjoining soil-agro-climatic areas of UP
Mustard	Typic Haplustept (Alluvial)	FN=6.64T-0.38SN-1.72 ON FP_2O_5=6.10T-4.02 SP -2.43 OP FK_2O=3.84T-0.24SK -1.21 OK	20-25	Delhi state and adjoining soil-agro-climatic areas of UP
Soybean	Typic Haplustept (Alluvial)	FN=6.43T-0.34SN-1.33 ON FP_2O_5=5.36T-2.83 SP -2.92 OP FK_2O=3.50T-0.19SK -0.88 OK	20-25	Delhi state and adjoining soil-agro-climatic areas of UP
Uttarakhand				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**

Maize (Pragati)	Mollisols and Inceptisols	FN=12.56T-1.03N-0.32 ON F P_2O_5 =4.65T-3.6 SP -1.56 OP FK_2O=5.94T-0.59SK -0.93 OK	30-40	U.S.Nagar, Haridwar, Nainital and some parts of Western UP
Mustard (PYS-I)	Mollisols and Inceptisols	F N=15.63T -1.04 SN-1.61 ON F P_2O_5=2.40T-1.03 SP-0.32 OP FK_2O=3.88T-0.16SK-0.40 OK	15-20	U.S.Nagar, Haridwar, Nainital and some parts of Western UP
Onion (Nasik Red)	Mollisols and Inceptisols	F N=0.62T -0.691 SN-2.07 ON F P_2O_5=0.136T-0.45SP-0.598OP FK_2O=0.237T-0.306SK-0.188 OK	300-350	U.S.Nagar, Haridwar, Nainital and some parts of Western UP
Bihar				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat	Young Alluvium Calcareous soil	FN =6.67T-0.43 SN-0.52 ON FP_2O_5=3.84T-3.43SP-0.85 OP FK_2O=3.54T-0.74S K-0.27 OK (Compost)	30-40	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar Muzaffarpur Vaishali Samastipur Gopalganj Begusarai and part of Khagaria
Wheat	Young Alluvium Calcareous soil	FN =5.08T-0.29 SN-0.63 ON FP_2O_5=2.81T-1.50SP-0.79 OP FK_2O=3.41T-0.52S K -0.67 OK (Biogas Slurry)	30-40	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar Muzaffarpur Vaishali Samastipur Gopalganj Begusarai and part of Khagaria
Wheat	Young Alluvium Calcareous soil	FN =5.85T-0.40 SN-0.46 ON FP_2O_5=3.72T-2.02SP-0.44 OP FK_2O=3.96T-0.56S K -0.82 OK (Poultry Manure)	30-40	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar Muzaffarpur Vaishali Samastipur Gopalganj Begusarai and part of Khagaria
Wheat	Young Alluvium Calcareous soil	FN =5.12T-0.36 SN-0.74 ON FP_2O_5=3.42T-4.24SP-1.76 OP FK_2O=2.50T-0.69S K -2.02 OK (Mustard Oil Cake)	30-40	East Champaran, Wast Champaran, Siwan Saran Sitamarhi Shivhar Muzaffarpur Vaishali Samastipur Gopalganj Begusarai and part of Khagaria
Wheat	Old Alluvium	FN =4.92T-0.22 SN-0.51ON FP_2O_5=2.62T-1.18SP-0.77 OP	30-40	East Champaran, Wast Champaran,

	Light Textured soil	FK_2O=3.63T-0.65S K -0.60 OK		Siwan Saran Sitamarhi Shivhar Muzaffarpur Vaishali Samastipur Gopalganj Begusarai and part of Khagaria
Tamil Nadu				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Maize (CO-1)	Mixed black (Perianaickenpalayam series)	FN =5.29 T-0.38 SN-0.78 ON FP_2O_5=2.08T-1.29 SP-0.89 OP FK_2O=5.20T-0.45SK-0.78 OK	50	Salem and Tiruchirappalli
Cotton (MCU 5)	Mixed black (Perianaickenpalayam series)	FN =8.81 T-0.62 SN-0.77 ON FP_2O_5=2.53T-1.36 SP-1.08 OP FK_2O=4.92T-0.25SK-0.77 OK	30	Coimbatore Salem Tiruchirappalli
Cotton (MCU 5)	Red (Irugur series)	FN =5.29 T-0.38 SN-0.78 ON FP_2O_5=2.08T-1.29 SP-0.89 OP FK_2O=5.20T-0.45SK-0.78 OK	30	Coimbatore, Dindigul Erode,Karur,Madurai, Namakkal,Salem Theni and Tiruchirappalli
Sugarcane (COC 671)	Mixed black (Perianaickenpalayam series)	FN =4.17 T-1.09 SN-1.11 ON FP_2O_5=1.01T-2.56 SP-1.01 OP FK_2O=3.44T-0.84SK-1.03 OK	125 (t/ha)	Coimbatore Salem Tiruchirappalli
Sugarcane-(CO6304)	Red (Gadillum series)	FN =4.06 T-0.74 SN-0.87 ON FP_2O_5=0.71T-1.09 SP-0.72 OP FK_2O=2.67T-0.57SK-1.30 OK	125 (t/ha)	Cuddalore
Sugarcane (COC 671)	Red (Irugur series)	FN =3.42 T-0.56 SN-0.93 ON FP_2O_5=1.15T-1.94 SP-0.98 OP FK_2O=3.16T-0.73SK-0.99 OK	100 (t/ha)	Coimbatore, Dindigul Erode,Karur,Madurai, Namakkal,Salem Theni and Tiruchirappalli
Sunflower (Morden)	Mixed black (Perianaickenpalayam series)	FN =9.60 T-0.49 SN-0.68 ON FP_2O_5=4.20T-1.87 SP-0.80 OP FK_2O=9.24T-0.45SK-0.64 OK	15	Coimbatore Salem Tiruchirappalli
Cabbage (Hybrid-Questo)	Irugur series	FN =0.55 T-0.89 SN-0.76 ON FP_2O_5=0.29T-2.75 SP-0.80 OP FK_2O=0.36T-0.31SK-0.56 OK	700	Coimbatore and Dindigul
Onion (CO 4)	Red	FN =0.99 T-0.37 SN-0.58 ON	170	Coimbatore, Dindigul

	(Inceptisol)	FP_2O_5=0.58T-1.43 SP-0.69 OP FK_2O=0.67T-0.25SK-0.44 OK		Erode,Karur,Madurai, Namakkal,Salem Theni and Tiruchirappalli
Hill Wheat (HW 2044)	Laterite (Ooty Series)	FN =7.60 T-0.55 SN-0.92 ON FP_2O_5=3.59T-0.26 SP-0.54 OP FK_2O=3.88T-0.45SK-0.51 OK	40	Nilgiris
Plains wheat (CoW (W) 1)	Mixed black calcareous (Perianaick enpalayam series)	FN =8.83 T-0.71 SN-0.88 ON FP_2O_5=4.52T-1.75 SP-0.95 OP FK_2O=6.05T-0.20SK-0.83 OK	40	Coimbatore, Tirupur,Salem and Trichy
Sorghum (CSH 5)	Red-Sandy loam (Irugur series)	FN =4.86 T-0.53 SN-0.98 ON FP_2O_5=1.63T-0.87 SP-0.90 OP FK_2O=4.56T-0.59SK-0.76 OK	50	Coimbatore,Erode,Dindigul, Tiruppur,Salem Trichy Namakkal, Ariyalur, Karur, Madurai and Theni
Sorghum (CO 24)	Mixed black calcareous (Perianaick enpalayam series)	FN =6.06 T-0.81 SN-0.53 ON FP_2O_5=2.06T-3.14 SP-0.72 OP FK_2O=5.03T-0.47SK-0.66 OK	50	Coimbatore, Tiruppur,Salem and Trichy
Ragi (CO 11)	Mixed black calcareous (Perianaick enpalayam series)	FN =4.35 T-0.37 SN-0.98 ON FP_2O_5=1.18T-1.03 SP-0.80 OP FK_2O=2.68T-0.14SK-0.40 OK	40	Coimbatore, Tiruppur,Salem and Trichy
Groundnut (POL 2)	Red Sandy loam (Irugur series)	FN =6.54 T-0.56 SN-0.69 ON FP_2O_5=3.80T-3.32 SP-0.77 OP FK_2O=8.35T-0.65SK-0.87 OK	25	Erode, Dindigul Coimbatore, Tiruppur,Salem Namakkal,Trichy Ariyalur, Karur, Madurai and Theni
Bhendi (Arka Anamica)	Mixed black calcareous (Perianaick enpalayam series)	FN =1.15 T-0.46 SN-0.81 ON FP_2O_5=0.52T-1.31 SP-0.87 OP FK_2O=1.77T-0.64SK-0.91 OK	150	Coimbatore, Tiruppur,Salem and Trichy
Cauliflower (Hybrid Pawas)	Red Sandy loam (Irugur series)	FN =0.93 T-0.79 SN-0.63 ON FP_2O_5=0.44T-1.74 SP-0.85 OP FK_2O=0.44T-0.18SK-0.46 OK	400	Erode, Dindigul Coimbatore, Tiruppur,Salem Namakkal Trichy Ariyalur, Karur,

				Madurai and Theni
Potato (Kufri Thenmalai)	Laterite (Ooty Series)	FN =0.70 T-0.24 SN-0.41 ON FP_2O_5=1.44T-0.55 SP-0.95 OP FK_2O=0.72T-0.25SK-0.39 OK	400	Nilgiris, Dindigul
Carrot (Kuruda Super)	Laterite (Ooty Series)	FN =0.48 T-0.17 SN-0.33 ON FP_2O_5=1.11 T-1.17 SP-0.31 OP FK_2O=0.83T-0.40SK-0.43 OK	400	Nilgiris, Dindigul
Beetroot (Ruby Queen)	Red Sandy Clay loam (Palathurai series)	FN =0.64 T-0.65 SN-0.96 ON FP_2O_5=0.52T-1.58 SP-0.92 OP FK_2O=0.61T-0.27SK-0.92 OK	500	Coimbatore, Tirupur,Dindigul Salem Namakkal & Madurai
Radish (Pusa Chetki long)	Red Sandy Clay loam (Palathurai series)	FN =0.69 T-0.74 SN-1.03 ON FP_2O_5=0.28T-1.35 SP-1.15 OP FK_2O=0.43T-0.21SK-0.64 OK	500	Coimbatore, Tirupur,Dindigul Salem Namakkal & Madurai
Tapioca (H 226)	Red Sandy loam (Thulukkanur series)	FN =5.60 T-0.61 SN-0.81 ON FP_2O_5=3.53T-1.80 SP-0.53 OP FK_2O=9.42T-0.67SK-0.70 OK	50 (t/ha)	Salem, Namakkal Trichy, Ariyalur, Karur, Madurai, Theni and Erode
Turmeric (BSR 2)	Red Sandy loam (Irugur series)	FN =1.11 T-0.83 SN-0.98 ON FP_2O_5=0.57T-5.21 SP-1.02 OP FK_2O=0.83T-0.50SK-0.61 OK	350	Erode, Dindigul Coimbatore, Tiruppur, Salem Namakkal Trichy, Ariyalur Karur, Madurai and Theni
Ashwagandha (JA 20)	Mixed black calcareous (Perianaickenpalayam series)	FN =24.77 T-0.61 SN-0.74 ON FP_2O_5=18.33T-2.68 SP-0.84 OP FK_2O=18.12T-0.21SK-0.59 OK	9	Coimbatore, Tiruppur, Salem and Trichy
West Bengal				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Boro rice (IET-4786)	Inceptisol	FN =2.75 T-0.63 SN-0.035 ON FP=0.48T-0.54 SP-0.07 OP FK=1.24T-0.62SK-024 OK	5-5.5 (t/ha)	Nadia,Burdwan and Murshidabad
Cabbage (Green express)	Inceptisol	FN =4.65 T-0.76 SN-0.75 ON FP_2O_5=0.93T-1.14 SP-0.48 OP FK_2O=4.79T-1.78SK -1.22 OK	70-80 (t/ha)	Nadia,Burdwan and Murshidabad
Haryana				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**

Wheat (WH711)	Sierozem (Inceptisols /Entisols)	FN =5.22T-1.04 SN-0.12 ON FP_2O_5=2.38T-4.06 SP-0.14 OP	45-55	Districts of Haryana
Durum Wheat (WH912)	Sierozem (Inceptisols /Entisols)	FN =5.57T-1.04 SN-0.15 ON FP_2O_5=2.12T-2.68 SP-0.16 OP	40-50	Districts of Haryana
Barley (BH 393)	Sierozem (Inceptisols /Entisols)	FN=4.88T-0.98SN-0.15 ON FP_2O_5=2.35T-3.80 SP-0.16 OP	35-45	Districts of Haryana
Bajra (HHH 94)	Sierozem (Inceptisols /Entisols)	FN=10.00T-1.43SN-0.13 ON FP_2O_5=3.75T-4.46 SP-0.15 OP	20-30	Districts of Haryana
Raya (Luxmi))	Sierozem (Inceptisols /Entisols)	FN=10.61T-0.95SN-0.12 ON FP_2O_5=4.73T-3.00 SP-0.10 OP	18-22	Districts of Haryana
Bt Cotton (MRC 6304)	Sierozem (Inceptisols /Entisols)	FN=14.48T-2.17SN-0.18 ON FP_2O_5=4.54T-4.78 SP-0.14 OP FK_2O=7.49T-0.63SK -0.10 OK	25-35	Bhiwani,Hisar, Sirsa, Fatehabad and Jind
Rajasthan				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Wheat (Raj.-3077)	Alluvial soils (Adsar and Khiran series)	FN=7.87 T-0.76 SN-0.50 ON FP_2O_5=3.04T-1.50S P -0.45 OP FK_2O=4.07T-0.26 S K-0.53 OK	25-30	Bikaner
Groundnut (M-13)	Alluvial soils (Bhamatsar and Khiran series)	FN=1.82 T-0.26 SN-0.18 ON FP_2O_5=2.08T-1.48S P -0.60 OP FK_2O=2.43T-0.22S K-0.33 OK	35-40	Bikaner
Clusterbean vegetable (M-83)	Alluvial soils (Bhamatsar and Khiran series)	FN =11.40 T-1.22 SN-3.35 ON FP_2O_5=6.60T-1.91S P -184 OP FK_2O=9.22T-0.90SK-2.75 OK	20-25	All districts of Rajasthan
Cumin (RZ-209)	Alluvial soils (Bhamatsar and Khiran series)	FN =15.82 T-0.40 SN -0.76 ON FP_2O_5=9.91T-0.68S P -1.20 OP FK_2O=10.07T-0.16SK-0.84 OK	8-10	All districts of Rajasthan
Isabgol (RI-89)	Alluvial soils	FN =9.35 T-0.33 SN -0.65 ON FP_2O_5=6.53T-0.76S P -0.86 OP	10-12	All districts of Rajasthan

	(Adsar and Khiran series)	FK_2O=6.95T-0.13SK-0.47 OK		
Fennel (RF-125)	Alluvial soils (Adsar and Khiran series)	FN =8.93 T-0.61 SN -1.52 ON FP_2O_5=3.95T-0.94S P -1.36 OP FK_2O=4.37T-0.17SK-0.72 OK	25-30	All districts of Rajasthan
Bajra (HHB-67)	Alluvial soils (Adsar and Khiran series)	FN =7.03 T-0.40 SN -0.62 ON FP_2O_5=9.26T-2.01S P -1.09 OP FK_2O=7.76T-0.24SK-0.72 OK	12-15	Bikaner
Egg plant (F1 hybrid Kanhaya)	Alluvial soils (Adsar and Khiran series)	FN =2.28 T-3.31 SN -2.15 ON FP_2O_5=1.63T-7.76S P -3.29 OP FK_2O=1.16T-0.82SK-1.16 OK	12-15	Bikaner,Churu and Jaiselmer
Cotton (Bt)	Alluvial soils (Adsar and Khiran series)	FN =15.84 T-1.91 SN -2.77 ON FP_2O_5=2.87T-1.76S P -1.67 OP FK_2O=4.82T-0.47SK-0.84 OK	35-40	Bikaner
Okra (Arka Anamica)	Alluvial soils (Adsar and Khiran series)	FN =3.27 T-0.83 SN -0.45 ON FP_2O_5=1.27T-0.85S P -0.41 OP FK_2O=2.46T-0.37SK-0.26 OK	65-80	Bikaner
Madhya Pradesh				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Lentil (JL-1)	Shallow, Medium black and Deep black	FN =5.84 T-0.159 SN-0.270 ON FP_2O_5=2.10T-0.658 SP-0.789 OP FK_2O=4.40T-0.094 SK-0.774 K	10-15	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur, Narsinghpur, Powarkheda, Sagar, Sehore, Ujjain
Pea (JP-885)	Shallow, Medium black and Deep black	FN =7.54 T-0.76 SN-01.04 ON FP_2O_5=3.88T-1.51 SP-1.48 OP FK_2O=6.38T-0.24 SK-0.667 K	15-25	Jabalpur, Indore, Khandwa, Khargone, Narsinghpur, Powarkheda, Sehore, Ujjain
Garlic (G-323)	Shallow, Medium black and Deep black	FN =7.45 T-0.67 SN-0.80 ON FP_2O_5=2.73T-0.655 SP-1.5 OP FK_2O=5.74T-0.28 SK-0.51 OK	40-50	Bhopal Dhar Jabalpur, Indore, Khandwa, Khargone, Mandsaur,

				Narsinghpur, Powarkheda,Rewa, Satna Sagar, Sehore, Ujjain
Kerala				
Crop/Variety	**Soil**	**Prescription Equation**	**Target Range (q/ha)**	**Applicable District**
Sweet Potato (Varun)	Laterite	F N =3.04 T-0.27 SN-0.20ON FP_2O_5=1.27T-2.85 SP-0.62OP FK_2O=8.60T-0.93 SK-0.42OK	30-50 (t/ha)	All districts of Kerala
Ash Gourd (KAU local)	Laterite	F N =15.79 T-0.16 SN-0.33ON FP_2O_5=3.77T-0.90 SP-0.10OP FK_2O=8.31T-0.024 SK-0.11OK	10-20 (t/ha)	All districts of Kerala

- **Use of Targeted Yield Equation and Development of Prediction Equation for Cropping Sequence**

Nutrient availability in the soil after the harvest of a crop is much influenced by the initial soil nutrient status, the amount of fertilizer nutrients added and the nature of the crop raised. But recently, the monoculture is replaced by cropping sequence approach. To apply soil test based fertilizer recommendations, the soils are to be tested after each crop, which is not practicable. Hence it has become necessary to predict the soil test values after the harvest of the crop. It is done by developing post-harvest soil test value prediction equations making use of the initial soil test values, applied fertilizer doses and the yields obtained or uptake of nutrients following the methodology outline by Ramamoorthy and coworkers in 1971. The post-harvest soil test values were taken as dependent variable and a function of the pre-sowing soil test values and the related parameters as yield/uptake and fertilizer nutrient doses. The functional relationship is as follows:

Prediction Equation for Cropping Sequence: The method of calculation for prediction of post harvest soil test values for cropping sequences is given below for use by each center:

YP/H = f (F, IS, yield/nutrient uptake)

Where, YP/H is the post harvest soil test value, F is the applied fertilizer nutrient and IS is the initial soil test value. The mathematical form is

YP/H = a + b1F + b2 IS + b3 yield/uptake

Where, a is the absolute constant and b1, b2 and b3 are the respective regression coefficients. Prediction equations for post-harvest soil test values were developed from initial soil test values, fertilizer doses applied and yield of crops/uptake of nutrients to

obtain a basis for prescribing the fertilizer amounts for the crops succeeding the first crop in the cropping sequence.

During last fifteen year, the different centres of AICRP on STCR developed prediction equation by using the targeted yield equation for different cropping sequence like rice-rice, rice-maize, rice-wheat, maize-tomato, maize-wheat, potato-yellow sarson, paddy-ragi, maize-Bt. Cotton, wheat-groundnut, okra-wheat, paddy-chick pea, soybean-wheat, rice-pumpkin, bajra-wheat, cotton-maize and soybean-onion. The predicted values can be utilized for recommending the fertilizer doses for succeeding crop thus eliminating the need of soil test after each crop. This provides the way for giving the fertilizer recommendations for whole cropping sequence based on initial soil test values. For example, in Potato– Yellow Sarson cropping sequence:

Potato (Kufri Jyoti)

PHN = 104.94 + 0.28 FN – 0.041 SN – 0.11 Y (R^2 = 0.35**)

PHP = -2.74 + 0.091 FP + 0.84 SP + 0.013 Y (R^2 = 0.78**)

PHK = 31.28 + 0.71 FK + 0.45 SK – 0.17 Y (R^2 = 0.70**)

Yellow Sarson (PYS-I)

PHN = 107.91 + 0.36 FN – 0.08 SN – 0.79 Y (R^2 = 0.72**)

PHP = 23.19 + 0.26 FP + 0.011 SP + 0.24 Y (R^2 = 0.70**)

PHK = 153.25 + 0.42 FK + 0.02 SK – 0.54 Y (R^2 = 0.56**)

- During last five year plan (XI Plan), AICRP (STCR) conducted 130 field demonstrations on oilseed crops and 150 field demonstrations on other crops on farmers' fields in different states to popularize STCR based fertilizer and manure recommendations to different crops.

- During last five year plan (XI Plan), AICRP on STCR conducted 170 on-farm trials to validate fertilizer and manure prescription equations to different crops.

Economic Analysis of Fertilizer Doses Associated with Different yield Targets

An appraisal of the effect of nutrients (NPK) applied on crop yield and benefit: cost ratios (BCR), both under (NPK) alone and under IPNS for15 agricultural and horticultural crops is furnished in the input output prices used in these analyses were: Produce prices:-- Paddy (rough rice) and wheat grain Rs 12,000/t, rice straw Rs. 1,200/t wheat straw Rs.500/t, maize grain Rs. 8,000/t maize straw Rs. 500/t, cotton Rs. 25,000/t onion Rs. 9,000t, okra (Bhendi) Rs. 10.000/t cabbage Rs. 3500/t, potato Rs. 7000/t carrot Rs. 5,000/t, beetroot Rs. 3300/t. radish Rs. 3,000/t, tomato Rs. 3,300/t and *Ashwagandha* Rs. 82,000/t Input prices –Rs. 11.76/kg N through urea, Rs 47.63/kg P_2O_5 through SSP and Rs. 28.00/kg K_2O through MOP, 250/T for FYM and Rs 750/t for vermicompost. Economic analysis of the data showed that out of 66 crop x target combinations, the BCR was between 1and 2 in 35 % cases and between 2.1 and 3.0 in 62% cases. In 3% cases BCR was above 3.Irrespective of the crops, higher yield has been recorded at higher yield targets over lower target coupled with higher net return and BCR. As in the case

of yield, wherever three targets (low, medium and high) were tried, the BCR was relatively higher between low and medium target levels then between medium and high target levels both under NPK alone and IPNS. Again, irrespective of the crops and yield targets, yield increase was higher with IPNS then under NPK applied through fertilizers alone. In the regard, farmers can choose the desired yield targets according to their investment capabilities and availability of organic manures but would generally benefit form adopting an appropriate IPNS package as apart form contributing nutrients, organic manures also improve soil physical conditions. At present, the soil test based recommendations are relatively on a stronger footing when these involve only fertilizers as compared to IPNS. This is because there are several issues concerning the nutrient which need to be sorted out as illustrated using STCR information form Andhra Pradesh. One of the outstanding problems is that while the composition of fertilizers is fairly standard, that of organic manures can vary several fold even within the same location or form lot to lot.


Happy faermers with produce in FLDs conducted under AICRP (STCR)

Crop	Yield target and Treatments	Fertilizer Doses (kg/ha) N	P_2O_5	K_2O	Yield (t/ha)	Fertilizer Cost Rs./ha	BCR
Rice – Flooded (TNAU Farm, Coimbatore)	6 t ha^{-1} NPK fertilizer	137	56	23	6.01	4922	1.52
	7 t ha^{-1} NPK fertilizer	172	56	23	6.94	5286	1.74
	7 t ha^{-1} IPNS package*	118	36	23	7.11	3746	1.75
Rice – SRI (TNAU Farm, Coimbatore & Farmer's fields, Coimbatore Dt.)	7 t ha^{-1} NPK from fertilizer	173	62	74	6.68	7059	1.92
	8 t ha^{-1} NPK from fertilizer	222	83	99	7.65	9336	2.10
	9 t ha^{-1} NPK from fertilizer	271	100	100	8.18	10775	2.18
	7 t ha^{-1} IPNS package*	133	39	39	6.94	4514	1.97
	8 t ha^{-1} IPNS package*	182	60	67	7.94	6874	2.15
	9 t ha^{-1} IPNS package*	232	80	95	8.34	9199	2.16
Wheat – Hill Farmer's fields, Kalrayan foothills, Salem Dt. and Kolli foothills, Namakal Dt.).	3.5 t ha^{-1} NPK from fertilizer	156	111	41	3.55	8269	1.54
	4.0 t ha^{-1} NPK from fertilizer	194	129	59	4.07	10077	1.66
	3.5 t ha^{-1} IPNS package*	109	100	28	3.63	6828	1.49
	4.0 t ha^{-1} IPNS package*	147	117	37	4.16	8337	1.62
Wheat – Plains	3 t ha^{-1} NPK from fertilizer	119	91	51	2.90	7161	1.33

(Farmer's fields, Coimbatore Dt.)	4 t ha^{-1}NPK from fertilizer	196	110	72	3.93	9560	1.66
	3 t ha^{-1}IPNS package*	65	74	37	2.98	5325	1.31
	4 t ha^{-1}IPNS package*	152	105	55	4.05	8328	1.61
Maize – Hybrid (Farmer's fields, Coimbatore and Dindigul Dts.)	9 t ha^{-1}NPK from fertilizer	244	98	82	8.97	9833	2.04
	10 t ha^{-1}NPK from fertilizer	290	124	97	10.09	12032	2.17
	11 t ha^{-1}NPK from fertilizer	329	139	113	10.33	13653	2.13
	9 t ha^{-1}IPNS package*	202	78	52	9.23	7546	2.05
	10 t ha^{-1}IPNS package*	249	104	69	10.5	9813	2.21
	11 t ha^{-1}IPNS package*	289	119	86	10.59	11474	2.14
Rain fed Bt Cotton (Farmer's fields, Perambalur Dt.)	2.8 t ha^{-1}NPK from fertilizer	103	71	74	2.67	6665	1.46
	3.2 t ha^{-1}NPK from fertilizer	123	81	89	3.07	7796	1.64
	2.8 t ha^{-1}IPNS package*	78	51	48	2.84	4690	1.51
	3.2 t ha^{-1}IPNS package*	99	67	64	3.24	6147	1.68
Onion (Farmer's fields, Coimbatore Dt.)	17 t ha^{-1}NPK from fertilizer	89	18	26	17.24	2632	2.34
	20 t ha^{-1}NPK from fertilizer	117	33	31	18.75	3816	2.50
	17 t ha^{-1}IPNS package*	37	14	14	17.72	1494	2.33
	20 t ha^{-1}IPNS package*	71	34	32	19.48	3350	2.50
Okra (Bhendi) (Farmer's fields, Coimbatore Dt.)	15 t ha^{-1}NPK from fertilizer	78	45	15	15.5	3480	2.01
	17 t ha^{-1}NPK from fertilizer	97	54	15	16.59	4133	2.14
	15 t ha^{-1}IPNS package*	51	30	8	15.95	2253	2.10
	17 t ha^{-1}IPNS package*	70	39	8	17.36	2905	2.18
Cabbage (Farmer's fields, Coimbatore Dt.)	60 t ha^{-1}NPK from fertilizer	139	64	23	59.90	5327	2.43
	70 t ha^{-1}NPK from fertilizer	194	93	41	70.50	7859	2.78
	60 t ha^{-1}IPNS package*	109	49	15	61.00	4036	2.44
	70 t ha^{-1}IPNS package*	164	78	29	71.80	6456	2.79
Potato (Farmer's fields, Nilgiris Dt.)	30 t ha^{-1}NPK from fertilizer	105	306	59	27.60	17460	1.85
	40 t ha^{-1}NPK from fertilizer	175	446	131	38.80	26967	2.38
	30 t ha^{-1}IPNS package*	98	297	55	29.20	16837	1.94
	40 t ha^{-1}IPNS package*	168	437	127	40.40	26344	2.46
Carrot (Farmer's fields, Nilgiris Dt.)	40 t ha^{-1}NPK from fertilizer	125	145	39	40.90	9468	2.45
	50 t ha^{-1}NPK from fertilizer	173	256	66	52.50	16075	2.92
	60 t ha^{-1}NPK from fertilizer	221	367	127	59.90	23634	3.07
	40 t ha^{-1}IPNS package*	117	139	36	43.30	9004	2.54
	50 t ha^{-1}IPNS package*	165	250	64	53.70	15639	2.92
	60 t ha^{-1}IPNS package*	213	361	120	62.60	23058	3.15
Beetroot (Farmer's fields, Coimbatore	40 t ha^{-1}NPK from fertilizer	99	134	80	39.50	9786	2.37
	50 t ha^{-1}NPK from fertilizer	163	186	131	49.98	14443	2.77
and Dindigul Dts.)	40 t ha^{-1}IPNS package*	59	113	54	40.48	7588	2.37
	50 t ha^{-1}IPNS package*	123	165	99	51.37	12077	2.78
Radish (Farmer's fields, Coimbatore and Dindigul Dts.)	40 t ha^{-1}NPK from fertilizer	112	50	71	37.20	5686	2.23
	50 t ha^{-1}NPK from fertilizer	181	78	114	48.80	9035	2.74
	40 t ha^{-1}IPNS package*	67	24	52	38.40	3387	2.24
	50 t ha^{-1}IPNS package*	136	52	87	50.60	6512	2.78
Tomato (Farmer's fields, Coimbatore and Dindigul Dts.)	70 t ha^{-1}NPK from fertilizer	164	135	148	70.90	12502	2.47
	80 t ha^{-1}NPK from fertilizer	209	177	188	80.80	16152	2.71
	90 t ha^{-1}NPK from fertilizer	254	219	228	88.30	19801	2.86
	70 t ha^{-1}IPNS package*	120	113	113	72.20	9957	2.50

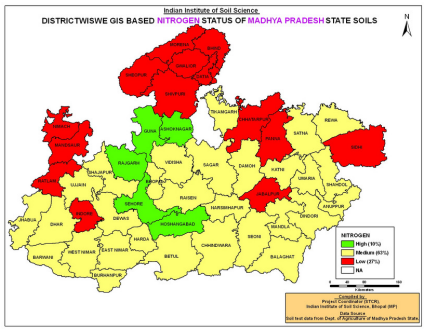
	80 t ha^{-1}IPNS package*	165	155	153	81.30	13606	2.71
	90 t ha^{-1}IPNS package*	210	197	193	89.50	17256	2.88
Ashwagandha (Farmer's fields, Salem Dt.)	0.7 t ha^{-1}NPK from fertilizer	49	74	66	0.671	5949	1.31
	0.9 t ha^{-1}NPK from fertilizer	79	109	77	0.871	8276	1.24
	0.7 t ha^{-1}IPNS package*	20	51	40	0.696	3784	1.28
	0.9 t ha^{-1}IPNS package*	59	87	68	0.905	6741	1.19

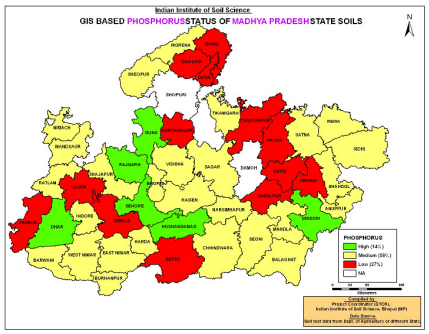
IPNS package*: For Sl. Nos 1-9 and 14 - 15, FYM was applied @12.5 t/ha For Sl. Nos. 10-13, Vermicompost was applied @ 5 t/ha.

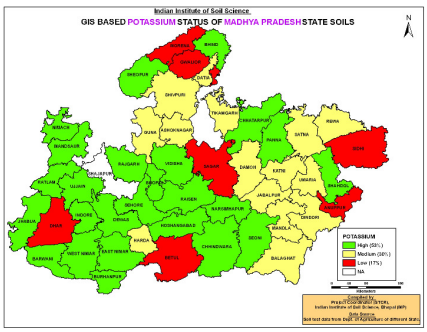
Software/data base developed

Online fertilser recommendation system: AICRP on STCR in collaboration with National Informatics Centre (NIC), Pune has developed Decision Support System for on-line fertilizer recommendation to different crops grown in various states using the fertilizer prescription equation developed by different centres. On-line fertilizer recommendation system has been completed for 10 states namely; Maharashtra, Andhra Pradesh, Karnataka, Chhattisgarh, Kerala, Orissa, Himachal Pradesh, West Bengal, Jharkhand and Tamil Nadu. This on-line fertilizer recommendation system has been uploaded on STCR website (http://www.stcr.gov.in). Farmers and other end users can get a STCR based fertilizer recommendations to different crops by feeding the soil test values and target yield.

GIS based Soil Fertility Maps of Different States: The soil fertility data on N, P and K index values at district level for the states of Andhra Pradesh, Maharashtra, Chhattisgarh, MP, West Bengal, Haryana, Orissa, HP, Karnataka, Punjab and Tamil Nadu has been developed in MS-Access. From the attribute database, the different thematic layers were reclassified to generate various thematic maps on N, P and K index values (IVs). The calculated soil test values were incorporated into the developed fertility maps to prescribe nutrients for targeted yields. GIS-based nutrient index maps of N, P, K of Madhya Pradesh is shown below:







Resource generation

Resourece generation during XI Plan period is given below:

Name of the STCR centre	Year					
	2007-08	2008-09	2009-10	2010-11	2011-12	Total
OUAT, Bhubaneswar	47,480	48,920	1,08,400	51,640	57,260	313,700
ANGRAU, Hyderabad	81,721	1,15,940	58,080	1,00,945	2,83,300	639,986
CRIJAF, Barrackpore	5,676	8,771	16,391	10,700	5,847	47,385
UAS, Bangalore	42,916	46,544	51,424	53,964	48,489	243,337
BCKVV, Kalyani	13,872	14,325.00	18,663	1,05,014	58,035	209,909
IGKV, Raipur*	-	-	21,280	-	1,44,704	165,984
Total	191,665	234,500	274,238	322,263	597,635	1,620,301

*Resource generation under IGKV, Revolving Fund run by STCR, scientists on production and supply of low cost rapid soil testing kit for balance fertilizer application linked with STCR technology.

Impact of the Research

Financial returns vary from soil to soil, crop to crop and location to location. However, FLDs confirmed an increase in benefit cost ratios through STCR technology over control/ farmer' practices/ application of general recommended dose which may be clearly demonstrated by the following summary table:

Crop	Location/AER	Soil type	Fertilizer doses (kg N-P_2O_5-K_2O/ha) and Response ratios (RR) in terms of kg grain/kg nutrients applied			
			Generally recommended dose		STCR based dose for indicated yield target, t/ha	
			Fertilizer dose	RR	Fertilizer dose	RR
Rice	Jabalpur/10 Hot sub-humid	Medium black	GRD: 80-70-40	8.47	STCR Target: 3.5 Dose: 76-66-0	11.13
Rice	Coimbatore/ 8.1, Hot dry semi-arid	Alfisol (Red)	GRD: 120-38-38	16.5	STCR Target: 7 Dose: 185-51-19 IPNS Target: 7 Dose: 150-67-10+ GM @ 6.25 t/ha And Azospirillum @ 2 kg/ha	17.0 19.7
Rice	Narsinghpur, MP	black	GRD: 80-70-40	11.45**	STCR Target: 4 Dose: 91-74-0	19.07**

Rice	Pantnagar, Uttarakhand/ 14.5 Warm Humid/ perhumid	Mollisol (tarai)	GRD: 120-40-40	8.5	STCR Target: 4.0 Dose: 94-36-0	16.15
Wheat	Jabalpur, MP/10 Hot sub-humid	Medium black	GRD: 100-60-30	14.77**	STCR Target: 4.0 Dose: 59-57-28	41.01**
Wheat	Palampur, HP/14.3 Warm Humid To per humid transitional	Hill Soil (Podzolic)	GRD: 120-60-30	3.52	STCR Target: 4.0 Dose:176-187-75	6.95
Wheat	Pantnagar, Uttarakhand/ 14.5 Warm Humid/ perhumid	Mollisol (tarai)	GRD: 120.60-40	10.68	STCR Target: 4.0 Dose:104-60-57	11.31
Finger millet	Kolhapur, Maharashtra Rainfed Submontain zone	Black	GRD: 60-30-0	10.1	STCR Target: 1.6 Dose:45-34-17	10.9
Maize	Palampur, HP/14.3 Warm Humid To per humid transitional	Hill Soil (Podzolic)	GRD: 120-60-40	7.14	STCR Target: 4.0 Dose:189-0-73	8.91
Chickpea	Durg, Chattisgarh/ 11 Hot/moist/ Dry sub humid transitional	Black	GRD: 20-50-20	2.76	STCR Target: 1.2 Dose:20-0-0	7.90
Chickpea	Jabalpur/10 Hot sub-humid	Medium black	GRD: 20-60-20	9.00	STCR Target: 1.5 Dose: 22-36-0	12.76
Blackgram	Jabalpur/10 Hot sub-humid	Medium black	GRD: 20-50-20	0.361**	STCR Target: 1.2 Dose: 25-35-0	0.46**
Groundnut	Kakapalayam Red TN/8.1, Hot soil dry semi-arid	Red soil	GRD: 18-36-54	6.7	STCR Target: 2.5 Dose 50-43-72 IPNS Target: 2.5 Dose: 15-25-32 With 12.5 t/ha FYM	6.9 7.4
Groundnut	Tumkur, Karnataka		GRD: 25-75-38	5.50	STCR Target: 2.0 Dose: 16-144-53	6.20
Linseed	Jabalpur,	Medium	GRD: 60-40-20	5.21	STCR Target: 2.0	8.29

	MP/10 Hot sub-humid	black			Dose:89-51-19	
Mustard	Jabalpur, MP/10 Hot sub-humid	Medium black	GRD: 50-30-20	4.38	STCR Target: 1.6 Dose: 68-42-16	5.44
Mustard	Jabalpur/10 Hot sub-humid	Medium black	GRD: 50-30-20	2.29	STCR Target: 2.0 Dose: 88-46-35	2.34
Mustard	New Delhi/ 4.1 Hot Semi-arid	Alluvial soils	GRD: 80-40-40	7.8 [1]	STCR Target: 2.5 Dose: 90-43-48	8.6 [1]
Safflower	Bangalore, Karnataka/ 8.2 Hot moist Semi-arid	Black soil	GRD: 38-50-25	5.78	STCR Target: 1.5 Dose: 54-0-13	10.9
Soybean	Durg, Chattisgarh/ 11 Hot/moist/ Dry sub humid transitional	Black	GRD: 20-50-20	15.0	STCR Target: 2.0 Dose: 20-35-0	20.1
Soybean	Jabalpur, MP/10 Hot sub-humid	Medium black	GRD: 20-80-20	8.28	STCR Target: 2.5 Dose: 15-52-0	13.77
Safflower	Jabalpur, MP/10 Hot sub-humid	Medium black	GRD: 80-40-25	4.31	STCR Target: 2.0 Dose: 197-27.4-0	5.10
Okra (*Bhendi*)	Suradevana-pur, Banga-lore/8.2 Hot moist semi-aird	Red	GRD: 125-62.5-62.5	17.88	STCR Target: 8 Dose: 91-74-56	24.25
Brinjal	Rahuri, Maharashtra/ 6.1 Hot dry semi-arid	Medium deep black	GRD: 150-75-75	73.3	STCR Target: 5 Dose: 140-20-110	124.9
Cabbage	Rahuri, Maharashtra/ 6.1 Hot dry semi-arid	Medium deep black	GRD: 180-80-60	6.88	STCR Target: 3.5 Dose: 256-129-193	5.33
Chilli	Thirumalay-ampalayam, Madukarai Block. Coimbatore, TN/8.1, Hot dry semi-arid	Red	GRD: 75-35-35	3.7	STCR Target: 2 Dose: 108-62-68	4.1

IPNS = Integrated Plant Nutrient Supply: STCR =Soil Test Crop Response; * Higher yield obtained with lesser fertilizer dose than farmers' practice;** Response ratio calculated over farmers' practice; 1 Average of two demonstrations; 2 Average of four demonstrations;

Crop	Yield (kg ha^{-1})		Benefit cost ratio	
	Farmers practice	STCR- IPNS recommended practice	Farmers practice	STCR- IPNS recommended practice
Rice	5800	6850	6.8	17.8
Maize	4015	4600	8.2	12.5
Sunflower	1020	1490	4.2	10.5
Cotton	2753	2837	22.7	37.1
Wheat	3600	5000	4.5	4.7
Bajra	2280	3000	2.7	3.1

Also the average response ratios (kg grain/kg nutrients) obtained by the STCR technology vis-à-vis farmer's practice showed a striking improvement as evidenced by the following table:

Crop	Farmer's practice	STCR- IPNS recommended practice
Rice	11.4	16.8
Wheat	10.3	14.2
Maize	12.7	17.7
Mustard	8.0	8.2
Raya	4.8	7.6
Groundnut	5.1	6.8
Soybean	9.6	12.2
Chickpea	6.1	9.4

Recently AICRP (STCR) also conducted demonstrations in tribal farmers' field under TSP wherein STCR recomendations proved superior.

For further info, contact:

Pradip Dey, Ph.D.
Project Coordinator
All India Coordinated Project on Soil Test Crop Response (AICRP-STCR)
Indian Institute of Soil Science
Nabibagh, Berasia Road
Bhopal-462038
Madhya Pradesh
India
Phone: +91-755-2733314
Fax: +91-755-2733310
Alternate e-mail: pradipdey@yahoo.com
Web: www.stcr.gov.in