variables in Factor I and one variable each in Factor II and Factor III.

There were 6 variables having significant loadings on Factor I. They were family status (0.59340), occupational status (0.89288), social participation status (0.69461), communication status (0.71583), farm power status (0.68186) and material status (0.86190). This first factor accounted for 47.2 per cent of the total variation. These characters have direct bearing on the extent of participation.

Farm status (-0.72175) had significant factor loading on Factor II on extent of participation. The second factor accounted for 16 per cent of the total variation.

Educational status with a loading of 0.75223 accounted for 11.3 per cent of total variation as third factor. The first factor with variables family status, occupational status, social participation status, communication status, farm power status and material status was termed as "Economic factor". The second factor with variable farm status was termed as "Physical factor". The third factor with educational status was termed as "Personal factor".

It may be concluded from the study that occupational status, material status and farm status were the important factors influencing the extent of participation.

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Effect of population density and nitrogen levels on the efficiencies of soil and fertiliser nitrogen, yield and uptake of rice in inceptisols of western zone

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Abstract : Field experiments were conducted in *Typic Ustropepts* (Irugur series) of western zone of Tamil Nadu during 1998 - 99 and 1999 - 2000 to study the influence of population density and nitrogen levels for various yield targets on the efficiencies of soil (Cs) and fertiliser nitrogen (Cf) as well as yield and uptake of rice. The results revealed that there was a significant increase in the efficiencies of soil and fertiliser nitrogen under 80 hills m^{-2} as compared to 66 hill m^{-2} population density. Irrespective of the population densities, N levels for various yield targets had significant influence on Cf. In all the experiments application of higher doses of nitrogen (for 8 t ha^{-1} yield target) with 80 hills m^{-2} population density recorded significantly higher yields of rice and N uptake. (***Key words*** *: Rice, Typic Ustropepts, Plant population and N levels, Soil efficiency, Fertiliser efficiency).*

Among cereals, rice possess maximum yield potential under ideal conditions. But on farmer's fields, only 12-15 per cent of this potential is realised in India. Inadequate plant population, inefficient utilisation of applied fertilisers, especially N, are some of the important factors that severely impede the overall rice production. Hence the present investigation was planned to find out the effect of population densities and varying N levels on the efficiencies of soil and fertiliser N, yield and uptake of N in rice in Inceptisols of western zone of Tamil Nadu.

Materials and Methods

Field experiments were conducted in five farmer's holdings during 1998-99 and 1999-2000 in Irugur soil series of Erode district. The experiments were laid out in split plot design with four

Table 1. Initial soil characteristics of the experimental sites

S. No.	Location	% Clay & Texture	Organic Carbon (g kg^{-1})	CEC (c mol (p+)kg^{-1})	Depth	$KMnO_4$-N	Olsen-P	NH_4OAc-K
						---------- (kg ha^{-1}) ----------		
1.	P. Vellalapalayam Gobi taluk	27.8 Scl	4.1	20.8	Moderate	228	19.7	220
2.	Pallapalayam Perundurai taluk	15.3 Sl	3.0	9.8	Shallow	194	10.8	118
3.	Kugalur Gobi taluk	28.1 Scl	5.1	19.9	Moderate	179	60.0	680
4.	Arachalur Erode taluk	23.4 Scl	3.8	17.8	Moderate	154	22.0	380
5.	Periasemur Erode taluk	16.8 Sl	4.0	11.4	Shallow	168	51.0	240

Table 2. Experimental details and doses of fertiliser N applied (kg ha^{-1})

S. No.	Location	Season and Variety	Fertilizer doses applied (kg ha^{-1})		
			N1	N2	N3
1.	P. Vellalapalayam Gobi taluk	*Kharif* '98 ADT 36	108	160	212
2.	Pallapalayam Perundurai taluk	*Rabi* '98 ASD 19	139	191	243
3.	Kugalur Gobi taluk	*Rabi* '99 ADT 39	155	207	259
4.	Arachalur Erode taluk	*Rabi* '99 ADT 39	174	226	278
5.	Periasemur Erode taluk	*Rabi* '99 ADT 39	162	214	266

Table 3. Efficiencies of soil (Cs) and fertiliser nitrogen (Cf) as influenced by population density

S. No.	Location	66 hills m^{-2}		80 hills m^{-2}	
		Cs(%)	Cf(%)	Cs(%)	Cf(%)
1.	P. Vellalapalayam	28.30	34.65	30.12	37.18
2.	Pallapalayam	24.25	31.68	27.30	34.12
3.	Kugalur	29.00	34.80	30.18	37.31
4.	Arachalur	27.65	33.68	28.80	35.89
5.	Periasemur	24.30	32.28	27.62	34.25
	Mean	26.70	33.44	28.80	35.75

Table 4. Efficiency of fertiliser nitrogen (Cf) as influenced by N level and population density (%)

S. No.	Location	66 hills m^{-2}			80 hills m^{-2}		
		N_1	N_2	N_3	N_1	N_2	N_3
1.	P. Vellalapalayam	36.55	35.10	32.30	39.26	38.56	33.72
2.	Pallapalayam	33.46	32.18	29.40	36.76	35.29	30.31
3.	Kugalur	36.97	35.48	31.95	39.31	38.66	33.96
4.	Arachalur	35.75	34.66	30.63	37.92	36.76	32.99
5.	Periasemur	34.15	33.29	29.70	36.85	35.44	30.46
	Mean	35.38	34.14	30.80	38.02	36.94	32.29

Table 5. Influence of population density and nitrogen levels on grain yield of rice (kg ha^{-1})

a) Location : P. Vellalapalayam

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	5716	6028	5872
S2	6806	7025	6916
S3	7290	7415	7353
M-MEAN	6604	6823	6713

	SE_d	CD (0.05)
M	14.4	46
S	19.2	42
S at M	17.1	59

b) Location : Pallapalayam

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	5690	6040	5865
S2	6684	6969	6827
S3	7080	7320	7200
M-MEAN	6485	6776	6631

	SE_d	CD (0.05)
M	22.6	72
S	19.9	43
S at M	28.1	61

c) Location : Kugalur

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	5711	6100	5906
S2	6696	7110	6903
S3	7047	7420	7234
M-MEAN	6485	6877	6681

	SE_d	CD (0.05)
M	25.1	80
S	29.1	63
S at M	41.1	90

d) Location : Arachalur

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	5809	6091	5950
S2	6797	7107	6952
S3	7165	7383	7274
M-MEAN	6590	6860	6725

	SE_d	CD (0.05)
M	33.3	106
S	27.9	61
S at M	39.5	86

e) Location : Periasemur

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	5632	5980	5806
S2	6428	6630	6529
S3	6959	7008	6984
M-MEAN	6340	6539	6440

	SE_d	CD (0.05)
M	16.3	52
S	16.4	36
S at M	23.2	51

Table 6. Influence of population density and nitrogen levels on nitrogen uptake by rice (kg ha^{-1})

a) Location : P. Vellalapalayam

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	104	111	108
S2	121	130	126
S3	133	140	137
M-MEAN	119	127	123
	SE_d	CD (0.05)	
M	0.24	0.8	
S	0.69	1.5	
S at M	0.98	2.1	

b) Location : Pallapalayam

	MAIN (M)		S-MEAN
	M1	M2	
	99	104	102
	114	121	117
	124	126	125
	113	117	115
	SE_d	CD (0.05)	
	0.20	0.7	
	0.22	0.5	
	0.31	0.7	

c) Location : Kugalur

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	108	114	111
S2	125	133	129
S3	134	141	137
M-MEAN	122	129	126
	SE_d	CD (0.05)	
M	0.45	1.4	
S	0.16	0.3	
S at M	0.56	1.2	

d) Location : Arachalur

	MAIN (M)		S-MEAN
	M1	M2	
	105	110	108
	121	127	124
	128	137	132
	118	125	121
	SE_d	CD (0.05)	
	037	1.1	
	0.37	0.8	
	0.53	1.1	

e) Location : Periasemur

SUB (S)	MAIN (M)		S-MEAN
	M1	M2	
S1	96	106	101
S2	112	122	117
S3	119	127	123
M-MEAN	109	119	114

	SE_d	CD (0.05)
M	0.18	0.3
S	0.25	0.5
S at M	0.35	0.8

replications. Two population densities (66 hills m^{-2} & 80 hills m^{-2}) in the main plots and three N levels (FN for 6, 7 and 8 tha^{-1} yield targets of rice based on STCR recommendation) in the subplots were maintained. The experimental soils were sandy loam to sandy clay loam in texture, red non-calcareous, neutral pH and non-saline. The initial soil characteristics and the experimental details with N doses applied are furnished in Table 1 and 2. P_2O_5 and K_2O were applied as per existing STCR recommendation. All the improved package of practices were followed for raising the crop.

In all the locations the crops were grown to maturity and harvested. Yields of grain and straw were recorded. Grain and straw samples were analysed for their N content (Piper, 1966) and total N uptake was computed. Using the data on initial $KMnO_4$-N, grain yield, FN level applied and total N uptake, the efficiencies of soil (Cs) and fertiliser N (Cf) were computed by STCR method (Velayutham *et al.* 1985).

Results and Discussion

Influence of population densities on Efficiencies of soil fertiliser nitrogen

The effect of increased population on Cs and Cf was studied. The mean Cs was 26.70 and 28.80 per cent for 66 and 80 hills m^{-2} respectively. The mean Cf for 66 and 80 hills m^{-2} was 33.34 and 35.75 per cent respectively. Statistical analysis of the data using paired 't' test revealed that there was a

significant increase in the efficiencies of soil and fertiliser nitrogen under 80 hills m^{-2} as compared to 66 hills m^{-2} population level (Table 3).

Influence of N levels on Cf under varying population levels

The influence of different levels of N on Cf was studied. The mean Cf ranged from 30.80 to 35.38 per cent for different levels of N with 66 hills m^{-2} and 32.29 to 38.02 per cent of different level of N with 80 hills m^{-2} respectively. The results revealed that at each population level, the increase in N level decreased the Cf which was statistically significant (Table 4).

Grain and straw yield and N uptake by rice

The mean yields of grain and uptake of N by rice are furnished in Tables 5 and 6. The statistical analysis of the data clearly revealed that in all the experimental sites, application of higher doses of N (for 8 t ha^{-1} yield target of rice) with a plant population of 80 hills m^{-2} recorded significantly higher grain and straw yields as well as N uptake. This might be due to the better utilisation of added nitrogen. The better root proliferation under higher population density might have resulted in higher N uptake and consequent increase in the efficient utilisation of added N (Paraye *et al.* 1996 and Verma *et al.* 1988).

From the study it could be concluded that whenever we aim for higher yield target of rice the population density may be increased to 80 hill m^{-1} for short / medium duration rice varieties in light textured Irugur soil series so as to increase the efficiency of added fertiliser nitrogen.

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Influence of larval density as stress factor for rearing of CSR hybrid silkworms

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Abstract : Newly evolved productive bivoltine hybrid CSR2 x CSR5 rearing was conducted with different larval densities ranging from 50 larvae / sq.ft to 100 larvae / sq.ft in fifth instar. The cocoon character, cocoon yield and disease incidence was recorded with optimum rearing conditions as well as in the presence of 1 per cent infectious source (Flacherie and Grasserie). The results revealed that the cocoon characters were significantly improved and diseases incidence were reduced under low densityrearing (50 & 60 larvae/ sq.ft). However, there was no significant difference between 50 & 60 larvae/sq.ft. treatments with regard to spread of flacherie and grasserie. (***Key Words** : Cocoon characters, Disease incidence, Disease spread, Flacherie, Grasserie, Larval density).*

Adequate rearing space has an impact on the vigorous growth of the silkworms. The space available for larva appeared to be more important than the quantity of food (Rapusas and Gabriel, 1976). Therefor, it is essential that the larval density in the rearing bed should be regulated and sufficient rearing