

Optimum Requirements of Nitrogen, Method and Time of Application for Paddy Crop Under Manimutha Project Area in Tirunelveli District

by

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Introduction : The completion of the Manimuthar Project in Tirunelveli District has raised the importance of rice crop in the taluks of Nanguneri, Tiruchendur and portions of Ambasamudram Taluk. Areas which have been erstwhile dependent on rain or tanks have now come under assured irrigation and with the main change, the fertilizer application practice has gained importance. Innumerable trials conducted throughout India and elsewhere have clearly brought out the need for fertiliser application in rice fields. Ramiah *et al* (1952) stated that in India on an average, an increased yield of 334 to 556 kg of grain was obtained from one hectare when 22 to 35 kg. of N was added as top dressing. Fertiliser trials on paddy conducted by Indian Council of Agricultural Research (1953-'56) have shown that the response in Madras State has been of the order of 150 kg. grain per hectare at a level of 9 kg. N per hectare and 200 kg. grain per hectare at 18 kg. N per hectare. Ghose *et al* (1956) found that the rate of response varied considerably from place to place and at different levels of nitrogen. Ghose *et al* (1956) at Central Rice Research Institute, Cuttack reported that both surface application at planting and pellet deep placement 3 to 4 weeks after planting have given higher yield responses than the customary surface application. An experiment was conducted at the Model Agronomic Centre, Melaseval in Tirunelveli district to find out the optimum requirements of nitrogen, methods of application and time of application. The results obtained during four seasons (*Samba* seasons 1962-63 and 1963-'64 and summer seasons 1963-'64 and 1964-'65) are presented in this article.

Material and Methods : The experiment in a randomised block design was conducted in sandy loam soil with a pH of 8.5. The paddy strain Co. 29 was raised in summer season while ASD. 5 was grown during *samba* season. The size of the individual plot was 8.5 m x 4.5 m. and a spacing of 25 cm. x 15 cm. was adopted. Three levels of nitrogen and four methods of application were included as detailed below.

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Levels of Nitrogen :

- n. 1 — 33 kg. N per hectare as Ammonium sulphate
- n. 2 — 50 kg. N per hectare as Ammonium sulphate
- n. 3 — 66 kg. N per hectare as Ammonium sulphate

A basal dressing of 33 kg. P₂O₅ per hectare as superphosphate was applied to all the plots.

Method and time of application of Ammonium sulphate :

- m. 1 — Broadcasting the entire quantity at the time of last ploughing and incorporating into the soil (sub-surface application)
- m. 2 — Broadcasting the entire quantity at planting
- m. 3 — Broadcasting half the quantity at planting and the remaining half the quantity a month after planting
- m. 4 — Application of the entire quantity in the form of pellets near the root zone at a depth of two inches three weeks after planting

Results and Discussion : The results during *samba* season 1962-63 and 1963-64 indicate that 50 kg. nitrogen per hectare as ammonium sulphate was found to be economical regarding the level of nitrogen. Regarding the methods, the treatment m₃ *i. e.*, broadcasting half the quantity at planting, the remaining half the quantity a month after planting was found to be better than the rest. Increased yields of 23 per cent and 31.3 per cent in the treatment m₃ (split doses) were obtained during 1962-63 and 1963-64 *samba* season, respectively. However in 1963-64 *samba* season an increased yield of 1253 kg. with an additional profit of Rs. 383/- was obtained per hectare by pellet application of 50 kg. nitrogen per hectare three weeks after planting.

In the summer season 1963-64, among the four methods tried, m₄ (pellet application three weeks after planting) proved better than others. But levels of nitrogen were not significant individually. However, 33 kg. nitrogen per hectare was found to be economical. There was an increase in yield by 24.7 per cent over the control in the pellet application. During 1964-65 summer season, the results were not statistically significant. Yet m₄ (pellet) application and m₁ (single dose before last puddle) gave increased returns of 38 per cent and 36 per cent over control, respectively.

The pooled results for *samba* seasons (1962-63 and 1963-64) and summer seasons (1963-64 and 1964-65) are given in table 1 and 2.

TABLE 1. *Samba Season (Pooled) (Yield in kg/ha.)*

Levels of N	Methods of application				
	m ₁	m ₂	m ₃	m ₄	Mean
n ₁	3328	3108	3166	2818	3355
Profit (Rs.)	913	819	1047	870	913
n ₂	3445	3181	3699	2818	3511
Profit (Rs.)	933	814	1029	870	947
n ₃	3528	3536	3582	3715	3562
Profit (Rs.)	929	953	941	1000	909
Mean	3437	3292	3644	3550	3476
Profit (Rs.)	925	862	1006	860	923

TABLE 2. *Summer Season (Pooled) (Yield in kg/ha.)*

Levels of N	Methods of application				
	m ₁	m ₂	m ₃	m ₄	Mean
n ₁	3153	2855	2825	3318	3039
Profit (Rs.)	738	717	705	869	757
n ₂	3194	3112	3014	3137	3101
Profit (Rs.)	824	796	742	764	781
n ₃	3017	2959	3161	3101	3117
Profit (Rs.)	747	698	781	716	735
Mean	3121	2917	3000	3185	3009
Profit (Rs.)	770	737	743	783	758

During *samba* seasons the pooled analysis revealed that the treatmental differences were significant. Further splitting of variances showed significance for nitrogen levels and methods and not for the interaction. Among nitrogen levels there was no significant difference between n₃ and n₂ but both were superior to n₁. Among methods m₄, *i. e.*, broadcast application of half the quantity at planting and the other half one month later, was significantly superior to the other treatments.

The pooled analysis of summer seasons showed significance for control *versus* rest while none of the other effects were significant. No conclusion could therefore be drawn from the results. Among nitrogen

levels n_2 (50 kg. N per hectare) and n_3 (66 kg. N per hectare) gave better results than n_1 (33 kg. per hectare) in 1963-64 while in 1964-65. n_1 gave better yield than n_2 and n_3 . Among the different methods, however, m_1 (pellet application) gave better yield than other methods in both the years.

Conclusion: (1) The application of ammonium sulphate increases rice yield. (2) The optimum dose of nitrogen for the Manimuthar project area was found to be 50 kg. N per hectare for *samba* season and 33 kg. per hectare for summer season. (3) Broadcasting half the quantity at planting and the remaining half a month after planting was found to be the best for *samba* season while application of the entire quantity in the form of pellets near the root zone at a depth of two inches three weeks after planting and broadcasting the entire quantity at the time of last ploughing and incorporating into the soil were found to be equally good for summer season.

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Flow of Credit for Agricultural Development

by

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Introduction: Agriculture is the main economic sector providing the homestead, employment and income to the majority of the population in India. The main problem confronting such a vital sector is according to Leduc (1963), how to enable a peasant agricultural economy to finance the investments required for the desired development and to raise the working capital necessary for the annual crop cycle. Cited (Anon, 1904), by The Committee on Co-operation in Madras (1940) "One of the most difficult problems with which the small agriculturist is everywhere confronted is to obtain the money which is necessary for his operations at a reasonable rate

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