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Manures — in relation to cotton production in Madras State

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The place of manures and fertilisers in a system of integrated crop production needs hardly to be emphasised. In Madras, cotton is grown over 1·6 million acres annually, and as a cash crop plays a vital role in the economy of the farmer. The need for augmenting cotton yields is obvious, especially due to short production of raw cotton needed for the country and the high cash return assured to growers due to attractive price levels.

The major cotton growing regions in the Madras State may be grouped under (1) the rainfed black soils of Southern Districts, (2) irrigated red soils of Central and Southern Districts, (3) arid black soils of Ceded districts, (4) rainfed black soils of the Circars and (5) irrigated black soils under the Tungabadhra Project in the Ceded districts. The Agricultural Research Stations representing these tracts in which cotton manurial trials have been conducted in the past are as follows :

Name of cotton zone	Station	Soil type	Mean annual rainfall	Preceeding cereal	Cotton irrigated or rainfed
1. Tinnies	Koilpatti	Black loam	31″	Cumbu	Rainfed
2. Cambodia	Coimbatore	Loamy	27″	Sorghum	Irrigated
	Palur.	Alluvial	51″	Ragi	Irrigated
3. Westerns	Hagari	Black soil	20″	Sorghum	Rainfed
4. Northerns	Nandyal	Clay loam	28″	Sorghum	Rainfed
5. Cocanadas	Guntur	Heavy black soil	32″	Sorghum	Rainfed
6. New area (Tungabadhra Project).	Siruguppa	Deep black soil	25″	Sorghum	Irrigated

The results of past trials at these stations may be summarised as follows :

1. Koilpatti : Experiments conducted at this station have conclusively established that rainfed Tinnies cotton responds to the direct application of nitrogenous manures, whether organic or inorganic. The application of 2 cwt. of Ammonium Sulphate and 1 cwt. of Superphosphate or 500 lb. of groundnut cake and 1 cwt. of Superphosphate per acre were found to increase the yield of kapas by 41% and 35% respectively, over the 'no manure' control yield of 410 lbs. kapas per acre.

It was also observed that an application of 1,000 lb. of Neem cake per acre resulted in an yield increase of 47% over no manure, that gave 440 lb. kapas per acre.

2. Coimbatore: In recent experiments conducted since 1944-'45 good response for manuring was obtained in 2 out of 3 seasons, An application of 75 lb. Nitrogen in the form of ammonium sulphate or groundnut cake, along with 30 lb. of phosphoric acid was found to increase the yields by 30% over the 'no manure' control which gave 840 lb. kapas per acre. In another year 90 lb. Nitrogen in the form of ammonium sulphate or groundnut cake gave an yield increase of 22% over the 'no manure' control which recorded 440 lb. kapas per acre.

In rainfed Karunganni, experiments to compare the effects of Nitrogen in the form of ammonium sulphate or groundnut cake at different doses with and without phosphoric acid did not give significant results.

3. Palur: In the trials conducted at the Agricultural Research Station, Palur on irrigated cotton, no definite indications were obtained, possibly due to flower shedding resulting from contabescent anthers.

4. Hagari: The results of manurial experiments with ammonium sulphate, superphosphate and groundnut cake, conducted at different periods have not given consistent results. In years of deficit rainfall, even depressing effects on yield have been apprehended.

5. Nandyal: At this station, the experiments conducted in the early thirties indicated that the direct application of 2 cwt, of ammonium sulphate and 1 cwt. of superphosphate had no response from cotton. On the other hand, the indirect application of similar quantities to previous *jonna* was attended with 25% increase over control in the kapas yield of succeeding cotton. The control treatment of cotton which was raised in 'no manure' plot cropped with *jonna*, gave 225 lb. of kapas per acre.

6. Guntur: The application of grouudnut cake and ammonium sulphate at doses upto 60 lb. Nitrogen did not give any significant results in two season' trials at this station. The addition of phosphoric acid also as one of the variants in the third year did not give significant results.

7. Siruguppa: At this station, which represents the irrigated black soils of the Tungabadhra Project area, consistently good response was obtained for applications upto 80 lb. Nitrogen per acre in the form of organic manures like groundnut cake and farmyard manure and green manure, or inorganic fertilisers like ammonium sulphate.

The above results show that irrigated cotton under the future Tungabadhra Project area and rainfed cotton in Tinnies area offer the greatest scope for intensifying production through manuring. The results of the past trials at Coimbatore and Palur representing the irrigated Cambodia area of the South have not been conclusive. Further trials with a wider range of doses and at more centres representative of the tract need to be undertaken for making useful recommendations. In these experiments, the question of cumulative effects of the manures have also to be examined.

It appears as if no benefit is likely to be obtained by manuring cotton grown as rainfed crop, in areas receiving about 20" of rain. Thus, the Westerns area will not lend itself for intensifying production through manuring. The Cocanadas and Northerns area would appear to offer less scope for manuring than the Tinnies tract.

The review (Panse *etal* 1949) of the results of the co-ordinated manurial trials on rainfed cotton in India including those at Koilpatti, Guntur, Nandyal and Coimbatore in Madras shows that there is no difference in response between ammonium sulphate and groundnut cake as sources of Nitrogen, except under conditions of high fertility, and presumably for large quantities of Nitrogen, when ammonium sulphate was found to give a somewhat higher increase in yield. The method of application made no difference in the case of ammonium sulphate which may be broadcast. Under conditions of high fertility and for large applications, groundnut cake was better when drilled. The rate of increase in yield per unit quantity of nitrogen was found to increase with increasing fertility of the soil.

A set of co-ordinated manurial trials with superphosphate at different levels, in combination and without Nitrogen have been proposed to be conducted at Coimbatore on irrigated Cambodia and at Koilpatti on rainfed Tinnies. These experiments and the contemplated manurial trials on irrigated Cambodia at Coimbatore, Avanashi, Salem, Lower Bhavani, Palur and Siruguppa outlined by the Government Agricultural Chemist, which may take into account the cumulative effects also, should ultimately provide the solution for augmenting cotton yields through adequate mannring.

Summary:

Manuring of crops has been recognised to be an important method for increasing crop production. Next only to food in importance, the need for augmenting cotton yields through manuring is obvious due to acute shortage of raw cotton in the country.

In Madras the results of past trials on cotton at the different Agricultural Research Stations have shown that rainfed Tinnies in the Southern districts, Irrigated Cambodia in the Central and Southern districts and Irrigated American Cottons under the Tungabadhra Project would offer the greatest scope for intensifying production through adequate manuring.

The need for future experiments at different centres representative of the tracts, with wider range of doses and taking into account cumulative effects also, is indicated.

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