

Towards Self Sufficiency in Cotton

by

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Introduction: The Indian Union continues to import annually, about six to seven lakh bales of long staple cotton to meet her internal demand. The requirement of cotton in the coming years will largely depend on the per capita consumption of cloth by the ever growing population. The other factors contributing to the demand for cotton are the exports of cloth and the extra-factory consumption within the country.

Estimated Requirements of Cotton in the First and Second Five Year Plan Periods: To meet the growing internal demand and as to aim at an exportable surplus, it is proposed to increase the production of long staple cotton in the country by stages. Accordingly, the target of cotton production was fixed for the Indian Union at 42.29 lakh bales of lint by the end of the First Five Year Plan and at 65 lakh bales, by the end of the Second Five Year Plan, showing an increase of 53.7% over that of the First Plan target.

The basis for fixing the targets of cotton production for the country under the First and Second Five Year Plans were worked out on the following basis taking into account the population, consumption of cloth and possible exports (Appendix I).

Share of Madras State: The targetted production of 65 lakh bales of lint at the end of the Second Five Year Plan (1960—'61) is split up according to the potentialities for cotton development and increased production available in the various states of the the Union. Accordingly, the share of Madras State is fixed at 4.5 lakh bales at the end of the Second Five Year Plan. Proposals to increase this target to six lakh bales of lint are under examination of the State Government to fall in line with the Government of India who have estimated our requirements of 72 lakh bales by the Third Plan period.

Potentialities of increasing cotton production: Production of cotton could be increased by (a) extension of area and (b) intensive cultivation to increase the yield per unit area.

A stage has already been reached when further expansion of area under cotton would not be possible owing to the limited availability of land and the necessity for increasing the production under food crops. However, the cotton acreage could be increased to a small extent by the reclamation of cultivable waste lands, by adopting suitable crop rotation in the tracts served by irrigation projects and by the utilisation of rice-fallows during summer where they are left uncultivated.

The most important trend in the increase of production is the increase in yield of cotton per acre. As it may not be possible to increase the area indefinitely, our aim should be to concentrate in adopting measures which give higher yield per unit area. Inter-cropping cotton with other crops, use of improved seed, application of fertilizers, adoption of improved agricultural practices, irrigation and contour bunding offer potentialities for increasing production per unit area.

Methods of step up cotton production in Madras State : The target of production of 4.5 lakh bales fixed for Madras State at the end of the Second Five Year Plan is proposed to be achieved by adopting the various measures of cotton improvement, based on the potentialities available in the State, as indicated below :

1. **Reclamation of cultivable waste lands :** It is estimated that 1,917,143 acres of cultivable lands are lying waste (Season and Crop Report 1956-'57) in Madras State. These are being slowly reclaimed by the use of tractors and bull-dozers. Further, with the completion of irrigation projects, new areas are to be brought under cropping, where cotton will be a crop in the rotation. Taking the yield of lint at 75 lb. per acre for the rainfed cotton and 200 lb. for the irrigated cotton, we can estimate the additional production of one third of bale for every new acre brought under cotton.

Moco, a perennial cotton would be successfully grown in home steads, waste lands, vacant uncropped spaces and as hedges in permanent gardens and in areas where the labour is scarce to take up intensive cultivation. Its staple length is 15/16 of an inch and is found suitable for hand spinning. If its cultivation is taken up extensively in house compound, in vacant sites and waste lands, the produce would meet the demand of *Khadi* industry and other extra-factory consumption.

2. **Replacement of other crops :** This includes the replacement of crops like *Tennai*, *Varagu* and *Horse-gram* etc., by a more remunerative crop like cotton. With the completion of irrigation projects like Lower Bhavani Project, Amaravathi and Krishnagiri Reservoir Projects the cultivation of minor millets has given place to other useful and more profit yielding crops including cotton.

In areas where rice is planted under garden land conditions, cultivation of cotton is found to be more paying in seasons of poor rainfall. MCO. 1 cotton could be profitably grown when the water supply in the tanks and wells would not be sufficient to maintain a rice crop. For every acre of paddy cultivated we can raise a three acre crop of cotton with better success and greater profit. About half a bale of lint will accrue per acre, by such a replacement.

3. **Double cropping:** Immense scope exists for successfully utilising rice-fallows of single cropped wet lands in the Cauvery delta, tank and canal-fed regions of the State possessing good under-ground water supply and where the conditions for ripening and harvest of cotton crop will be congenial. The experiments conducted for the past one decade have clearly demonstrated that the short duration P. 216 F cotton with a cropping period of five months could be profitably cultivated as an off-seasonal crop in rice-fallows. Its cultivation in rice-fallows yields, on an average 200 to 250 lbs. lint per acre resulting in a net profit of Rs. 180/- per acre. The cultivation of cotton does not have any deleterious effect on the succeeding paddy crop. On the other hand, the plant residues of cotton help to augment the supply of green matter to the paddy crop. Here is an opportunity for the rice farmers of Tanjore, Tiruchirapalli, South Arcot, North Arcot and Chingleput districts to grow cotton as an off-seasonal crop to enrich themselves and to add to national wealth of the country.

4. **Inter-cropping:** This includes cropping of cotton as a mixture with ragi, groundnut and pulses, under both irrigated and rainfed conditions. The extra yield depends largely on the proportion of cotton to other crops and whether irrigated or rain grown. The inter-cropping of cotton is estimated to yield on an average, about 50 lb lint per acre.

The advantage of mixed cropping have been widely recognised. The cultivators of our State fully realise the importance of mixed and inter-cropping. A major area in Madras State is being cropped continuously to groundnut on the same land without any rotation while a minor area is being sown mixed with other crops like redgram, gingelly, castor, cotton or millets. A cotton crop will suit such mixed cropping, since the feeding zones of the shallow rooted groundnut and the deep rooted cotton are at different soil depths and no competitive or depressed effects have been noticed. Cotton can be sown mixed with groundnut in the proportion of 1 to 10 or 12.

In mixed cropping of ragi and cotton practised largely in South Arcot district, they are planted simultaneously in the months of August or September. Ragi seedlings are transplanted in beds while the seeds of Uganda cotton are dibbled in both beds and on the sides or ridges at regular spacings. Sometimes, it is also usual to broadcast the cotton seeds, form beds and transplant ragi seedlings at the time of irrigating the beds. There is no difference between the two methods except in the ultimate seed rates. Hand dibbling requires about 6 lb of cotton seed while broadcasting needs double this quantity. The ragi crop which outgrows cotton rapidly is harvested by January when a hoeing and earthing up is given to cotton. The cotton crop responds well and yields a good harvest by the end of March.

In the districts of South and North Arcot, cotton seeds are dibbled in the standing crop of ragi at the time of first hoeing and irrigated. After the harvest of ragi, the cotton crop pulls up, giving good yields.

In the coastal districts of South Arcot and Chingleput, there is a practice to inter-cropping of MCU. 1 cotton in casuarina plantations. Cotton is also inter-cropped with chillies and onions in irrigated areas.

Mixed cropping with cotton is not only the most remunerative practice, but is also an effective insurance against the vagaries of monsoon and risks from damage by pests and diseases.

5. Use of improved seed: The seed plays an important part in crop production. It improves the quality of the produce and increases the yield. The advantages of growing improved strains are well known. The ryots are benefitted not only by the increased outturn, but also by the higher price offered to their produce, on account of its higher ginning percentage and superior qualities. Large quantities of pure seeds of the recommended variety are made available in sealed bags, from the seed multiplication and distribution schemes run in the State for each of the strains.

At present, about 65% of the total area under cotton is covered by improved variety and the aim is to saturate the entire area. The additional production by the use of improved strains is estimated to be, on an average, 16 lb of lint per acre. By co-ordinating the Cotton Extension and the Cotton Seed Multiplication and Distribution schemes, it is expected that besides the spread of improved seed, the purity of the strain is also ensured.

6. Application of fertilizers: This is another potential measure, by which the yield could be increased to an extent of 40 lb lint per acre. The cultivators of Madras State have become increasingly fertilizer minded. The fertilizer is recommended only in areas with an annual rainfall of over 30 inches and for the crop raised under irrigation.

A basal dressing of five tons of farm yard manure is recommended for rainfed cottons in areas with less than 30 inches of rainfall. In areas receiving more than 30 inches of rainfall, application of 150 lb of standard mixture I per acre is recommended.

For irrigated cottons, application of 40 lb Nitrogen at the time of maximum flowering over a basal dressing of 15 lbs. P_2O_5 & 12 lbs K_2O and 5 tons of farm yard manure is recommended. This could also be modified by the application of 350 to 450 lb of standard mixture No II.

In the Lower Bhavani project area where MCU. 1 cotton is normally expected to be planted over an area of one lakh of acres, the yield is low, due to the shallow and porous nature of the soils with low water holding

capacity. The soils are of low fertility status being deficient in all the plant nutrients. Their tilth and fertility status can be built up by growing a suitable leguminous green manure crop and by the application of large quantity of compost and other organic manures.

7. Plant protection measures: The loss in cotton crop is estimated to range from 5 to 25% due to pests and diseases, depending on the severity and time of incidence. Boll-worms, stem-weevil, jassids, aphids and leaf-rollers among insect pests and black-arm among the diseases are the major problems in our State. Control of these pests and diseases by plant protection measures are the best means, to keep them under check. All the pests affecting cotton viz., jassids, boll-worms, aphids, mites and leaf-rollers are easily controlled by the use of "Folidol" "Endrex" and B. H. C. compounds. Treating the cotton seeds before sowing with "organo" mercuric compounds like "agrosan" controls the primary infection of black-arm disease.

8. Improved agricultural practices: Correct crop rotation, field sanitation, optimum time of sowing, line sowing, proper spacing, use of improved agricultural implements, clean pickings, and proper storing of kapas would result in clean and better grade of cotton, besides, giving the optimum conditions to get the maximum. The cost of cultivation is considerably reduced.

9. Contour bunding: Contour bunding is advocated in dry areas to prevent soil erosion. It is expected that by the adoption of this measure, yield would increase by about 25 lb of lint per acre. Since more than half the area under cotton in Madras State is rainfed, the problem of preventing soil erosion and conservation of soil moisture assume an important status. In such areas the production of cotton is increased on account of better utilisation of the rain water.

10. Irrigation: The importance of irrigation to step up production of crops has been well recognised and a large number of irrigation schemes are in operation. In a crop like, cotton, irrigation offers tremendous potentiality for growing long staple American cottons, besides increasing the yield of the existing variety, so urgently needed to-day.

Conclusion: Cultivation of cotton in Madras State is peculiar in that cotton is sown during almost all the months of the year in one part of the state or other, being conditioned, mainly by seasonal rains at sowing and harvest or by availability of water for irrigation. It is not unusual to find cotton being grown in different seasons under both rainfed and irrigated conditions in one and the same district. In any national drive for self sufficiency, the gaps in supply have to be made up either through increase in yield per acre or through rise in planted area. The different measures suggested, will go a long way to step up cotton production and result in an exportable surplus.

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APPENDIX I

The estimated requirements of cotton at the end of the First and Second Five Year Plans.

Plan period	Population (millions)	Per capita consumption of cloth (yards)	Total consumption of cloth for domestic use (million yards)	Export of cloth (million yards)	Cotton required for producing the cloth at col. 4 & 5 @ 3.6 yards per lb. (lakh bales)	Export of cotton (lakh bales)	Extra-Factory consumption (lakh bales)	Import of cotton (lakh bales)	Net requirements of cotton (col. 6+7+8-9) lakh bales.
1	2	3	4	5	6	7	8	9	10
I Plan : (1951-'56)	381	14	5334	805	43.40	6.12	2.70	6.10	46.12
II Plan : (1956-'61)	410	17.5	7175	1000	58.07	6.00	2.70	6.00	60.77

Age of Seedlings Experiment in Ragi.

by

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Introduction: Ragi (*Eleusine coracana* Gaertn) is one of the three major millets cultivated in Madras State occupying an area of about 10 lakhs of acres in the districts of Salem, Coimbatore, Ramanathapuram, Mathurai, Tirunelveli, Chingleput, South Arcot and Tiruchirapally. Over 60 percent of the area is grown under irrigated conditions in gardenlands. The crop is first sown in nursery and latter on transplanted in the main field. The period the plants are allowed to remain in the nursery varies with the duration of the varieties grown. Generally the ryots allow a week in the nursery for every month's duration of the crop. The care of the nursery being easy and economical, the maximum period that the seedlings can remain in the nursery without adversely affecting the ultimate yield of the crop is of significance to the cultivators.

Materials and Methods: To find out the optimum number of days, the seedlings have to remain in the nursery prior to transplanting so as to obtain the highest yield and also to determine the maximum period the seedlings may be allowed to remain in the nursery without any adverse effect on the ultimate yield of the crop, an experiment was laid out at the Millet Breeding Station, Coimbatore during the years 1954-55 and 1955-56. with the three strains viz., Co. 1. (120 days), Co. 2. (110 days). and Co. 7. (100 days) representing the long, medium and short duration varieties that are under spread in Madras State. Sowing of the three strains was done in the nursery on the same date and transplanting the seedlings was done 20, 25, 30, 35, 40 and 45 days after sowing. The planting was done in randomised plots replicated four times with 9" x 9" spacing. The harvest was taken up as and when the crop reached maturity.

Results: The yield data is presented in table I.

TABLE NO. I.

Age of seedlings (in days)	Serial No.	Strain No.	1954 Acre yield of grain in lb.	1955 Acre yield of grain in lb.	Average
20th day	1	Co. 1	1367	2000	1683
	2	Co. 2	1683	4667	3175
	3	Co. 7	1889	3889	2869
Average			1646	3519	2582

TABLE No. I. (Contd.)

Age of seedlings (in days)	Serial No.	Strain No.	1954 Acre yield of grain in lb.	1955 Acre yield of grain in lb.	Average
25th day	4	Co. 1	1367	4056	2711
	5	Co. 2	1711	3889	2800
	6	Co. 7	1722	3778	2750
Average			1600	3908	2754
30th day	7	Co. 1	1628	3778	2703
	8	Co. 2	2083	4056	3069
	9	Co. 7	2407	3056	2731
Average			2039	3630	2834
35th day	10	Co. 1	1417	3667	2542
	11	Co. 2	1683	3056	2369
	12	Co. 7	1833	3778	2805
Average			1644	3500	2572
40th day	13	Co. 1	1028	3111	2069
	14	Co. 2	1906	2667	2786
	15	Co. 7	1306	2222	1764
Average			1413	2667	2206
45th day	16	Co. 1	1294	1986	1640
	17	Co. 2	1139	1944	1542
	18	Co. 7	750	1556	1153
Average			1061	1829	1445
Critical Difference			399.4	833	
Whether differences are significant or not by "Z" test (P=0.05)			Yes.	Yes.	

From the data presented above it may be observed that in both the years of trial there is a trend towards considerable reduction in yield of grain in the case of all the three strains, when the seedlings are kept for more than 40 days in the nursery. In the case of Co. 1, which is of longer duration, planting 20 days after sowing resulted in poor yield in both the years while there is no appreciable reduction in yields in the case of Co. 2, and Co. 7, strains, even upto the 40th day. From these observations it may be concluded that planting of short and medium duration strains viz., Co. 2, and Co. 7, can be done from the 20th day

onwards upto the 35th day. For long duration strain Co. 1, planting should be done only after the 25th day as earlier planting affects the yield of grain adversely. In short, there is a considerable reduction in yield both in grain and straw in all the three strains when they are planted after 35 days. The maximum reduction in height and yield of straw is more marked in the case of the short duration strain Co. 7, than the other two strains. The seedlings that remain in the nursery longer than the optimum period are not fit for transplanting. Elongation of nodes of the seedlings in the nursery is characteristic of over aged seedlings. Nodes start to elongate 35 days after sowing in short and medium duration strains and 40 days in the longer duration strain. When these seedlings are transplanted, the vegetative growth is poor and soon after establishing they put forth very small earheads and tiller freely. The tillers are reduced in size and bear small earheads. The poor yield obtained when over aged seedlings are transplanted may thus be attributed, to sub-normal growth after transplanting.

Summary: Ragi unlike the other millets is mainly a transplanted crop in gardenlands in the Madras State. In a study to determine the optimum age at which ragi seedlings should be transplanted, it is observed that planting of short duration and medium duration strains viz., Co. 7 and Co. 2 can be done from the 20th day onwards upto the 35th day, whilst in the long duration strain viz., Co. 1 planting should be done only after the 25th day. Further it is found that the strain Co. 1 when planted after the 25th day, recorded the maximum yield of both grain and straw. As regards the medium and short duration strains viz., Co. 2 and Co. 7 there is appreciable reduction not only in the yield of grain but also in the yield of straw when the seedlings are planted after the 35th day.

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Announcement

The last date for the receipt of the articles for the various College Day and Conference awards has been extended upto 15-7-1960.

Secretary,
M. A. S. U.