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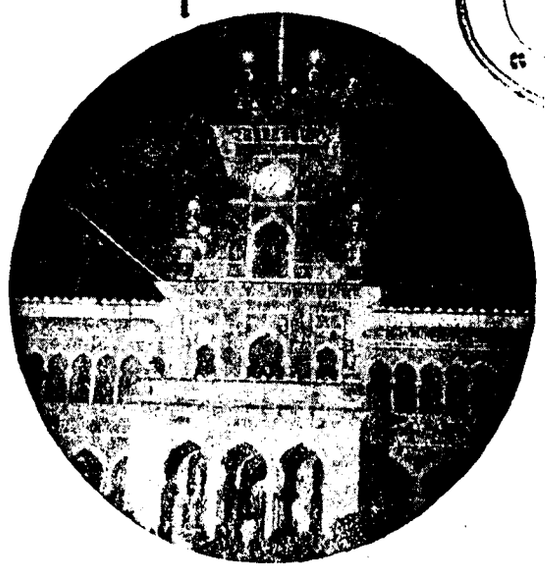

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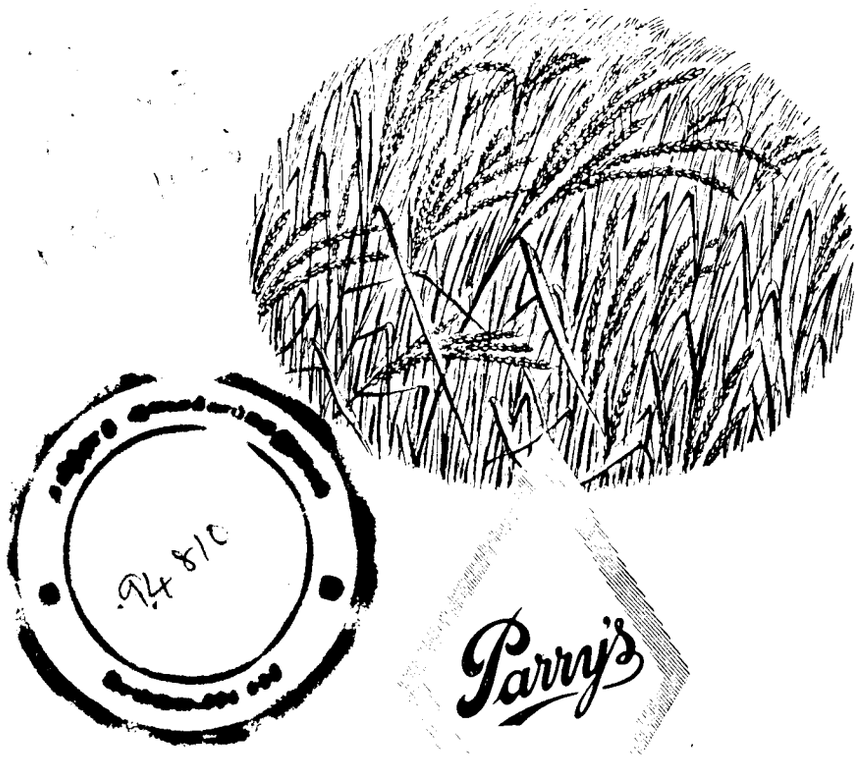


Parry's

FERTILISERS

BALANCED FERTILISER MIXTURES FOR ALL CROPS

EAST INDIA DISTILLERIES AND SUGAR FACTORIES

FERTILISER DEPARTMENT

DARE HOUSE :: MADRAS-1

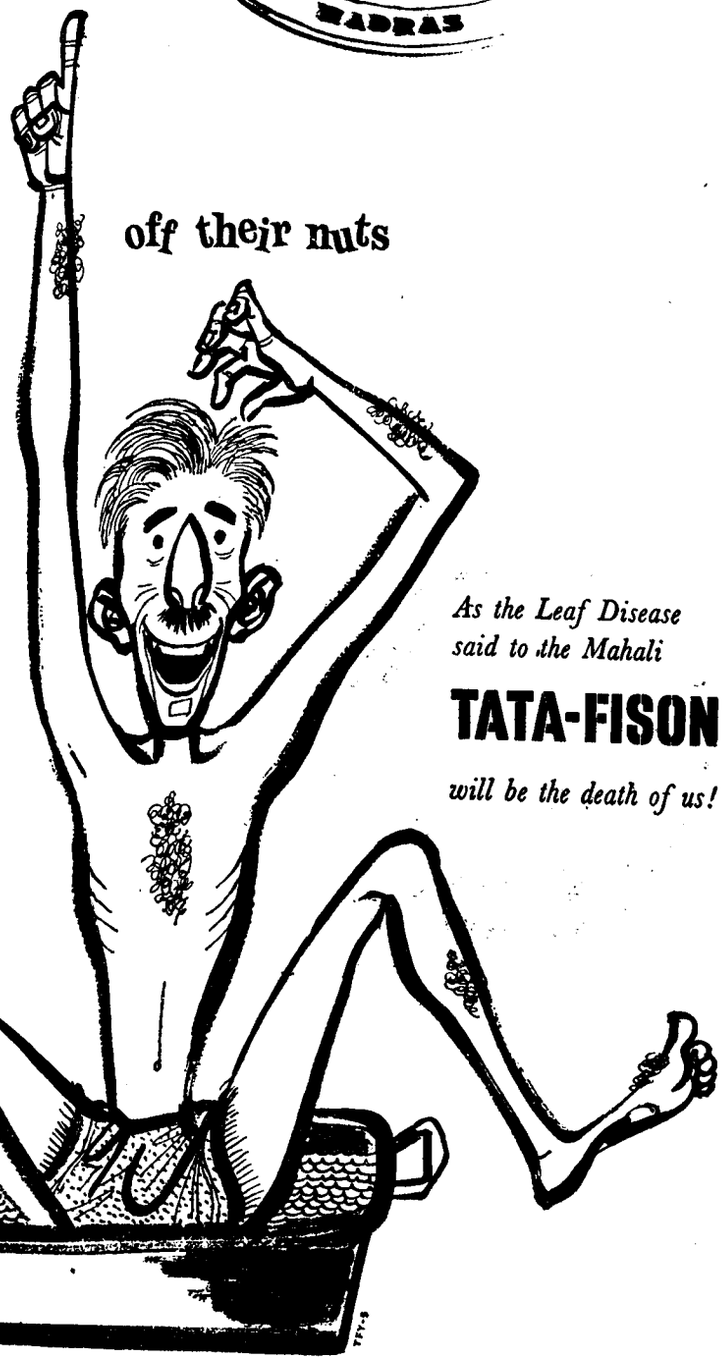
G. P F/25

Eureka! (*said Tata*).
Don't be nutty,
it's *Areca* (*said Fison*).
I've found signs of Mahali
in the grove (*said Tata*).
Just the job for BLITOX 50.
We'd better start
spraying now (*said Fison*),
before the monsoon
breaks, as there'll have
to be a second appli-
cation six weeks later.

TATA-FISON

The Government of Kerala, using **BLITOX 50**, *is successfully controlling fungal diseases common to coconut palms.* **BLITOX 50** *protects many other crops including Bananas, Groundnuts, Coffee, Cotton, Paddy, Rubber, Tobacco and Tea. Nuts!* (*say Tata and Fison*) *It's easy with* **BLITOX 50**

off their nuts



As the Leaf Disease said to the Mahali

TATA-FISON

will be the death of us!

Special Announcements

V. C. VELLINGIRI GOUNDER GOLD MEDAL

FOR

THE BEST RESEARCH WORKER OF THE MADRAS STATE DEPARTMENT OF AGRICULTURE, FOR THE FASLI YEAR 1957—'58.

81

1. The above prize will be annually awarded during the College Day and Conference.
2. The prize will be in the form of a gold medal and will be awarded to only members of the Madras Agricultural Students' Union and Madras State Agricultural Department.
3. The award is based on Publications of original Research in any branch of Agricultural Science issued during the fasli year 1957—'58.
4. The prize will be awarded only once to an individual.
5. Four sets of the candidates' contributions should be sent to the Secretary, Madras Agricultural Students' Union, Lawley Road P. O., by Registered Post, or delivered in person.
6. The last date for receipt of papers is *5—8—1958* and papers received after this date will not be considered.

COLLEGE DAY SYMPOSIUM

41st College Day & Conference - 1958

The following subject has been tentatively proposed for the Symposium for the ensuing College Day & Conference, which is expected to be held in the first week of September 1958.

"THE ROLE OF THE AGRICULTURAL DEPARTMENT IN COMMUNITY DEVELOPMENT AND NATIONAL EXTENSION SERVICES".

The intending contributors are requested to send their papers to the Secretary, Madras Agricultural Students' Union, Lawley Road P. O., on or before *15—8—1958*, in *quadruplicate*.

C. M. BHAKTHAVATHSALU,
Secretary.

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JUBILEE SHIELD FOR CHEMISTRY

The Golden Jubilee rolling shield of the Chemistry Section to be awarded during the College Day and Conference to the best scientific workers in the field of Agricultural Chemistry.

Rules and conditions for the award:

(1) The shield will be awarded to the best scientific worker in the field of Agricultural Chemistry. All Scientific workers and Research Students of the Chemistry Section at the Agricultural College and Research Institute, Coimbatore as well as in the Department of Agriculture, Madras State will be eligible for the award.

(2) The shield is a rolling one and will be awarded at the time of the Annual College Day and Conference of the Agricultural College and Research Institute every year.

(3) A committee to adjudge the best worker for the award shall comprise.

  (1) The Principal (Chairman — Ex-Officio)

  (2) The Government Agricultural Chemist (Ex-Officio)

  (3) A senior officer of the Research Council elected by Research Council.

(4) The award will be made to the worker adjudged as the best on the basis of the reports or papers containing either (i) an account of original research in which the author's share is the maximum or (ii) a critical discussion or analysis of any subject related to agricultural chemistry, throwing new light on or adding new knowledge to the subject.

(5) A certifiate will also be awarded to the winner of the rolling shield.

(6) The shield shall be returned to the Government Agricultural Chemist after the award for keeping in safe custody.

(7) The award will not be made more than once to the same person.

(8) The power to modify the rules to suit any situation that may arise at any time rests with the Government.

Papers and reports etc. for the award are invited on or before the 15th August 1958 by the undersigned.

A. Mariakulandai,
Government Agricultural Chemist.

Lawley Road P. O.

SRI V. V. KALISWAMI GOUNDER

We acknowledge with profound thanks the receipt of a generous donation of Rs. 1,000/- from Sri V. V. Kaliswami Gounder, son of Late lamented Sri V. C. Vellingiri Gounder of Vellaikinar. He hails from a family of enterprising agriculturists and like his philanthropic predecessors has come forward to promote the cause of Agricultural research and education. We are glad to announce that the interest accruing from this donation and that of his uncle Sri V. C. Palaniswami Gounder has been earmarked for the award of **"Vellingiri Gounder Gold Medal"** every year, for the best research worker of the State Department of Agriculture.

Madras agric. J., **45** : (6) 211—222, 1958

Cost and Economics of Bench Terracing

by

S. NARAYANASWAMY and C. R. SHANMUGHAM

Introduction : Bench terracing is the process by which a series of platforms is constructed across the slope of a land, at suitable interval separated by "risers" or nearly vertical cut faces. These, in effect, break up the long slope into a set of steps or platforms; and as such function effectively as a measure to control erosion and conserve soil and moisture. This method is generally adopted for irrigated fields situated on sloping terrain; elsewhere in hilly country, on slopes steeper than 15% where area avilable for cultivation is scarce and soil conditions are favourable and where it is economical to have these measures for soil conservation.

While advocating adoption of bench terracing among the ryots according to its suitability to local conditions, it will be necessary not only to appraise the ryots of the advantages, constructional details and specifications of such work but also to furnish them with its estimated cost and economics. Normally ryots would like to know the cost of terracing per acre so that they can work out the economics of such a measure and decide whether such land improvement is worthwhile from the economic point of view as well. An accurate estimate is possible only after an elaborate contour and topographical survey of an area. But it is not practicable to conduct such survey for the entire area, especially when it involves large tracts, before launching extensive propaganda among ryots. It is the aim of this paper, therefore to lay down ready methods of estimating cost of bench terracing per acre.

Factors Involved : The actual cost of bench terracing depends primarily upon the following factors :

1. Conditions of soil and sub-soil;
2. Land surface including vegetation cover on it, undulations, depressions, mounds, etc.,

Sri S. Narayanaswamy, is the Assistant Soil Conservation Officer (Engineering), Government of India Soil Conservation Research, Demonstration and Training Centre, Ootacamund, The Nilgiris.

Sri C. R. Shanmugham, is the Assistant Agricultural Engineer, State Soil Conservation Scheme, Ootacamund.

3. Slope of the area ;
4. Specifications of bench terrace on deviation of its alignment ; and
5. Terrace outlets.

The principal item that affects cost of bench terraces per acre is the total quantity of earth work involved and the rate.

The cost of earth work per unit depends upon the type of soil, its compactness, nature of land surface, vegetation cover on it and local rates of wages for the labourers. It also depends upon whether the work is executed with manual labour or by utilising earth moving implements and machinery like tractors, bull dozers, scrapers, graders, etc. The available horse power of the machinery, type and size of implements as also the efficiency of operators or workers determine the out turn of work per unit time and thereby the cost per unit work.

The quantity of earth work involved per acre depends upon the physical undulations of land, presence of depressions requiring filling in, mounds requiring additional excavation due to deviation in alignment there, type and specifications of bench terraces proposed and slope of the area. Physical conditions of land and slope of the terrain are rarely uniform and therefore it would be necessary to consider the average or predominent slope for computation of total earth work.

The cost of terrace outlets adds to the ultimate cost of bench terracing per acre. The type and specifications of the outlet and the number required per acre will determine such additional cost per acre. The total number of outlets per acre depends upon the critical length of bench terrace and the vulnerable points requiring safe drainage of excess water. From the experience gained under conditions in the Nilgiris (South India), it is found economical and effective to drain the excess water from bench terraces towards what are called " vertical drains " which are the natural downhill drainage channels or where they are too far apart, through earthen channels excavated with suitable cross sections and protected by close growing and soil binding grasses or if necessary by stone pitching. Along these channels, drop pits or silt traps of suitable size are provided at regular intervals so that the velocity of water is reduced to prevent it from attaining high erosive power. Wherever the area drained is large and the volume and rate of flow of excess water is great, stone paving along bottom and sides of channels may have to be adopted in place of grass planting.

The cost of construction of such channel can be worked out as per local rates and if the approximate total length of such channel per acre is known, the cost of outlet per acre can be easily calculated. A ready method to estimate the length of channel outlet per acre is worked out later.

Computation of Earth Work For Bench Terracing : As already explained, among other factors the type and specifications of bench terrace have great influence on the cost of work per acre; and therefore they need close consideration to determine the approximate cost of terracing. The following are the various items to be considered to arrive at cost.

(i) Critical length, number of outlets and total length per acre,
(ii) Vertical interval,
(iii) Net width of terrace; and
(iv) Cross sectional area of cutting.

(a) *Critical length and number of terrace outlets per acre :* Under similar conditions, the longer the bench terrace the greater will be the area drained and thereby the greater the rate and volume of run-off. Beyond a certain length called the critical length, the volume of excess water will attain erosive power to cause soil erosion on the terrace itself. This critical length and the number of outlets required depend upon amount, intensity and incidence of rainfall, soil characteristics, width of terrace, longitudinal gradient, crops to be grown etc.

Assuming 'N' as the number of terrace outlets theoretically needed per acre each of which receiving excess water from the terraces on both sides and ' K ' as the critical length of terrace, then

$$'N' = \frac{L}{2K} \qquad \text{(1)}$$

were ' L ' is the total length of terrace per acre.

(b) *Total length of terrace per acre :* Total length of terrace per acre is an important factor affecting total earth work involved per acre and thereby the cost. The slope of the land and vertical interval adopted to suit local conditions determine this length. For convenience in calculating the length of terrace per acre, the following equation is worked out.

Let 'L' be the total length of terrace per acre, 'D' the vertical interval and 'S' the slope of land in feet per 100 feet (See fig. 1),

then $L = \frac{* \ 43560}{\text{Horizonal spacing of terrace in feet}}$

* (1 acre = 43560 Sq. ft.)

Horizontal spacing of terrace for 'S' ft. percentage slope ... = 100 feet.

Horizontal spacing of terrace for 'D' feet vertical interval ... = $\frac{100 \ D}{S}$ feet.

Therefore ... $L = \frac{435{\cdot}6 \ S}{D}$ ——— (2)

Vertical Interval: Selection of a suitable vertical interval between terraces has to be made considering the soil conditions, crops grown, tillage convenience for economic agriculture and minimum possible disturbance to the top productive soil. Therefore, no hard and fast rule can be laid down in this regard for blanket application in all conditions. Lakshmipathi and Narayanaswami 1956 have worked out an equation for the Nilgiris conditions by which it is possible to arrive at either the vertical interval or the net width of bench terrace when one of them is fixed according to local conditions. This equation which has been worked out for a batter of 1 to 1 for the riser, runs as follows :

$D = \frac{Ws}{100-S}$, where 'W' is net width of terrace and 'D' is vertical interval ——— (3)

For harder soil conditions, it should be possible to provide a batter of to 1 to 1 for the embankment with nearly vertical cutting below. As such the average batter for the riser will be $\frac{1}{2}$ to 1 For this batter, the equation can be derived as follows (See Fig. 2)

$W + \frac{D}{2} = \frac{100 \ D}{S}$ were 'D' is the vertical interval.

Therefore $D = \frac{2 \ Ws}{(200-S)}$ ——— (4)

Net width of terrace: From equations (3) and (4) it is possible to derive the net width of terrace when the batter provided for riser is 1 to 1 and $\frac{1}{2}$ to 1 respectively as follows :

For batter 1 to 1 of riser :

$W = \frac{D \ (100-S)}{S}$ ——— (5)

For batter $\frac{1}{2}$ to 1 of riser :

$W = \frac{D \ (200-S)}{2 \ S}$ ——— (6)

Cross sectional area of cutting: As shown in figure 1 or 2, bench terraces can be economically constructed by the process of balanced cutting (half cutting and half embankment), where earth work excavated on the upper half of slope is deposited on the lower half to conform to the required specification of the terrace. The cross sectional area of cutting depends upon the vertical interval of bench terrace and the corresponding net width of terrace which in turn depends on the slope of land. As could be seen in figure 1 or 2, the hatched triangular portion denotes the cross sectional area of excavation. The recommended process of construction of terrace being half cutting and half embankment, the base of this triangle is $\frac{W}{2}$, whereas the height is $\frac{D}{2}$.

Therefore Cross sectional area of cutting = $\frac{1}{2} \times \frac{W}{2} \times \frac{D}{2}$

i. e., C. S. = $\frac{W \ D}{8}$ ——— (7)

The lead for earth work thus depends upon the width of terrace, it being $\frac{W}{2}$.

Earth work per acre: The major item affecting cost of construction of bench terrace is the earth work involved. To this, the cost of establishing grasses or constructing stone retaining walls along vertical face of terrace, disposal drain and other works like diversion channels, gully control, stream protection etc., will have to be added on to obtain the total cost of bench terracing and other protective works proposed in the area.

Bench terraces can be constructed with either constant vertical interval or uniform net width available for cultivation. The former method is easy for execution whereas the latter will help minimising disturbance of productive soil.

(a) *Bench terrace with constant vertical interval :* Let 'E' be the total quantity of earth work expressed in terms of units required per acre, each unit being 1000 cft. Then $E = \frac{\text{Length of terrace per acre} \times \text{C. S. area of cutting in S. ft.}}{1000}$

Substituting values of 'L' and C. S. area in equations 2 & 7,

$E = \frac{435{\cdot}6 \ S}{D} \times \frac{W \ D}{8} \times \frac{1}{1000}$ where 'W' and 'D' are in Ft.

i. e., = 0·05445 WS ——— (8)

Substituting value of 'W' given in equations (5) and (6) respectively,

$$E \text{ (V. I.) (for batter 1 to 1 of riser)} = \frac{0{\cdot}05445\ D\ (100-S)}{S} \times S$$

$$= 5{\cdot}445\ D - 0{\cdot}05445\ DS \quad \text{——————} \quad (9)$$

$$E \text{ (V. I.) (for batter } \tfrac{1}{2} \text{ to 1 of riser)} = \frac{0{\cdot}05445\ D\ (200-S)}{2S} \times S$$

$$= 5{\cdot}445\ D - 0{\cdot}02723\ DS \quad \text{——————} \quad (10)$$

From the equations (9) and (10) above, the value of 'E' in units of 1000 cft can be worked out for any constant value of 'D' the slope of land 'E' in feet per 100 feet being known. It could be seen that for a constant vertical interval, the greater the slope the lesser will be the quantity of earth work $\left\{\frac{dE}{dS}\right.$ is negative in equations (9) and (10) above). Hence the cost of bench terracing with any constant vertical interval per acre will decrease with increase in slope. The graphs shown in figure (3) will illustrate this point.

Bench terraces with constant width : As worked out earlier in equation (8), E (w) = 0·05445 WS which denotes that the earth work involved in construction of bench terraces with constant width, depends upon the width selected (w) and slope. From the above equation it should be possible to calculate the total earth work involved in units of 1000 cft per acre for any constant width obtained. It could be seen also from this equation that for constant width of bench terrace, the greater the slope, the greater will be the quantity of earth work (E) and thereby the cost per acre $\left\{\frac{dE}{dS}\right.$ is positive) - Vide graph in Figure 4

Terrace outlet : As mentioned earlier the number of outlets needed per acre depends upon the critical length of terrace and vulnerable points requiring drainage. If the approximate length of vertical drains (i. e. transverse channels to dispose excess water) per acre is known, the cost of its construction can be worked out as per local rates per unit length.

Let 'l' be the approximate length of vertical drain per acre -

Then, $l = N \times$ Horizonal spacing of terrace,
where N is the No. of outlets per acre.

Substituting value of N in equation (1),

$$l = \frac{L}{2K} \times \frac{100\ D}{S}$$

Substituting value of 'L' in equation (2),

$$1 = \frac{435{\cdot}6\ S}{2DK} \times \frac{100\ D}{S}$$

$$\text{i. e. } 1 = \frac{21780}{K} \quad \text{——————} \quad (11)$$

In this equation the critical lenth of bench terrace i. e., 'K' will have to be determined taking into consideration the local factor, if possible by actual experimentation.

Economics of bench terracing : Equations (8), (9) and (10) and graphs in Figures (3) and (4) will show that bench terracing is a fairly costly measure for conserving soil and moisture. While recommending such measure therefore, it is important to take into account its economics and effectiveness in the appropriate land use. The cost of land, its productive capacity, crops grown and area lost for cultivation due to bench terracing are the important aspects requiring careful study. If the land to be tackled is cheap, badly eroded, very steep and the soil condition is such that it does not recouperate rapidly, it would not be advisable or economical to bench terrace it for cultivation, as the disturbed soil will render the land unproductive for a long period to come and cultivation, uneconomical. Such areas could be best put under pastures or forests.

Even though the conditions of soil are favourable and the degree of erosion is not severe, it should be further examined if the crops grown and the subsequent increase in yield expected after effective conservation of soil and moisture will be sustained as to fetch economic return which will not only offset the heavy initial layout on such works but also improve the economic status of the cultivator.

Next aspect but not the least to be considered carefully is the area lost for cultivation due to bench terracing. If by terracing considerable portion of land is lost, the net yield of crops may get adversely reduced and affect the agricultural economy of the cultivator. The principal factors affecting this loss in area is the batter or back slope provided for risers of bench terraces and the slope of land. Assuming a batter of 1 to 1 for the risers it could be seen, as shown below, that the percentage area lost due to terracing is more or less the same as the percentage of slope of land.

Net area available for cultivation after bench terracing 1 acre of land } (L W) Sq. ft,

where 'L' is the total length of terrace in feet per acre and 'W' the net width of terrace available for cultivation in feet.

Substituting value of 'L' and 'W' from equations 2 and 5 respectively, this will be $\frac{435{\cdot}6\,S}{D} \times \frac{D\,(100-S)}{S}$ Sq. ft.

i. e. percentage of area available for cultivation, after terracing $= \frac{435{\cdot}6\,S}{D} \times \frac{D\,(100-S)}{S} \times \frac{100}{43560} = (100-S)$

Therefore percentage of area lost due to terracing = S which is the slope of land in % ——————— (12)

Similarly for a batter of $\frac{1}{2}$ to 1 of riser, it can be shown that the percentage of area lost due to terracing is $\frac{S}{2}$ % ——————— (13)

Summary: Bench terracing has been recognised as a suitable mechanical measure of conserving soil and moisture, though its adoption is restricted to irrigated lands and elsewhere on steep slopes where soil conditions are good and land suitable for cultivation is scarce and its economics permit such a measure. Since the farmers would require not only the constructional details of such bench terraces but also the cost of construction of such terraces, the following equations have been derived for ready use in calculating approximate cost of construction of bench terraces with terrace outlets. For other items of work proposed in the area, a lump sum provision on a pro-rata basis may be assumed based on local conditions after personal inspection of the area.

S. No.	Description of work	Equation applicable: Batter 1 to 1 of riser of Bench Terrace	Equation No.	Batter $\frac{1}{2}$ to 1 of riser of Bench Terrace	Equation No.
1	2	3	4	5	6
1.	Total length of terrace per acre (L)	$L = \frac{435{\cdot}6\,S}{D}$	2	$L = \frac{435{\cdot}6\,S}{D}$	2
2.	Vertical interval (D)	$D = \frac{WS}{(100-S)}$	3	$D = \frac{2\,WS}{(200-S)}$	4
3.	Net width of terrace (W)	$W = \frac{D\,(100-S)}{S}$	5	$W = \frac{D\,(200-S)}{2\,S}$	6
4.	Cross sectional area of cutting (C. S.)	$C.S. = \frac{WD}{8}$	7	$C.S. = \frac{WD}{8}$	7
5.	Earth work in units of 1000 cft. per acre for bench terrace of constrant vertical interval (E. V. I.)	E (V. I) = 5·445 D — 0·05445 DS.	9	E (V. I) = 5·445 D — 0.02723 DS.	10
6.	Earthwork in units of 1000 cft. per acre for bench Terrace of constant width (EW)	E (w) = 0·05445 WS	8	E (w) = 0 05445 WS	8

Continued

S. No.	Description of work	Equation applicable: Batter 1 to 1 of riser of Bench Terrace	Equation No.	Batter $\frac{1}{2}$ to 1 of riser of Bench Terrace	Equation No.
1	2	3	4	5	6
7.	No. of terrace outlet (N)	$N = \frac{L}{2K}$	1	$N = \frac{L}{2K}$	1
8.	Length of vertical drain (Outlet) per acre (l)	$l = \frac{21780}{K}$	11	$l = \frac{21780}{K}$	11
9.	Percentage area lost under terracing	S %	12	$\frac{S}{2}$ %	13

As an illustration, the cost of constructing bench terrace and outlets on sloping lands as actually incurred in a representative area in the Nilgiris and as per calculation using the above equations are worked out in the table furnished below :

S. No.	Description.	
1.	Situation of the land	Marlimund lake area, Survey No. 4492 and 4489
2.	Area bench terraced	5·75 % acres
3.	Slope of the land (S)	32·5 % average
4.	Vertical interval followed	5 feet
5.	Batter or back slope for riser	$\frac{1}{2}$ to 1 average
6.	Average length of terrace followed (K)	300 feet
7.	Mode of execution	Manual labour
8.	Total Earth work - as per actuals	132·712 units
9.	do. as per equation (10) i. e., E (per acre) = 5·445 D — 0·02723 DS	130·50 units
10.	Total length of outlet (disposal drain) — as per actuals	437 ft.
11.	do. do. as per equation (11), i. e. $l = \}$ per acre $= \frac{21780}{K}$	417 ft.
12.	Cross section of disposal drain adopted ...	$\frac{3'-6''+1'-0''}{2} \times 1'-3''$ = 2·81 Sq. ft.
13.	Earthwork for disposal drain as per actuals	1·228 units.
14.	do. do. as per calculation using formulae	1·172 units.

Continued

S. No.	Description	
15.	Total earth work for Bench terracing and outlets (disposal drains) - as per actuals (8+13)	133·94 units.
16.	do. do. as per equations (9 + 14)	131· 672 units.
17.	Cost per unit of 1000 cft of earth work	Rs. 17·00
18.	Total cost of bench terracing and outlet (disposal drains) as per actuals ...	Rs. 2,277/-
19.	do. do. as per calculation	Re. 2,238/-
20.	Average cost per acre of Bench Terracing and outlets-as per actuals	Rs. 396/-
21.	do. do. as per equation	Rs. 389·25

Acknowledgment: The authors are very much grateful to Shri M. S. V. Rama Rao, Director of Soil Conservation, (Engineering), Dr. R. M. Gorrie, F. A. O. Expert and Shri C. P. Bhimayya, Chief Research Officer, Desert Afforestation & Soil Conservation Research Station, Jodhpur for their valuable suggestions and guidance in the preparation of this article. They acknowledge with thanks the services rendered by Shri E. V. James, Draughtsman of this Centre.

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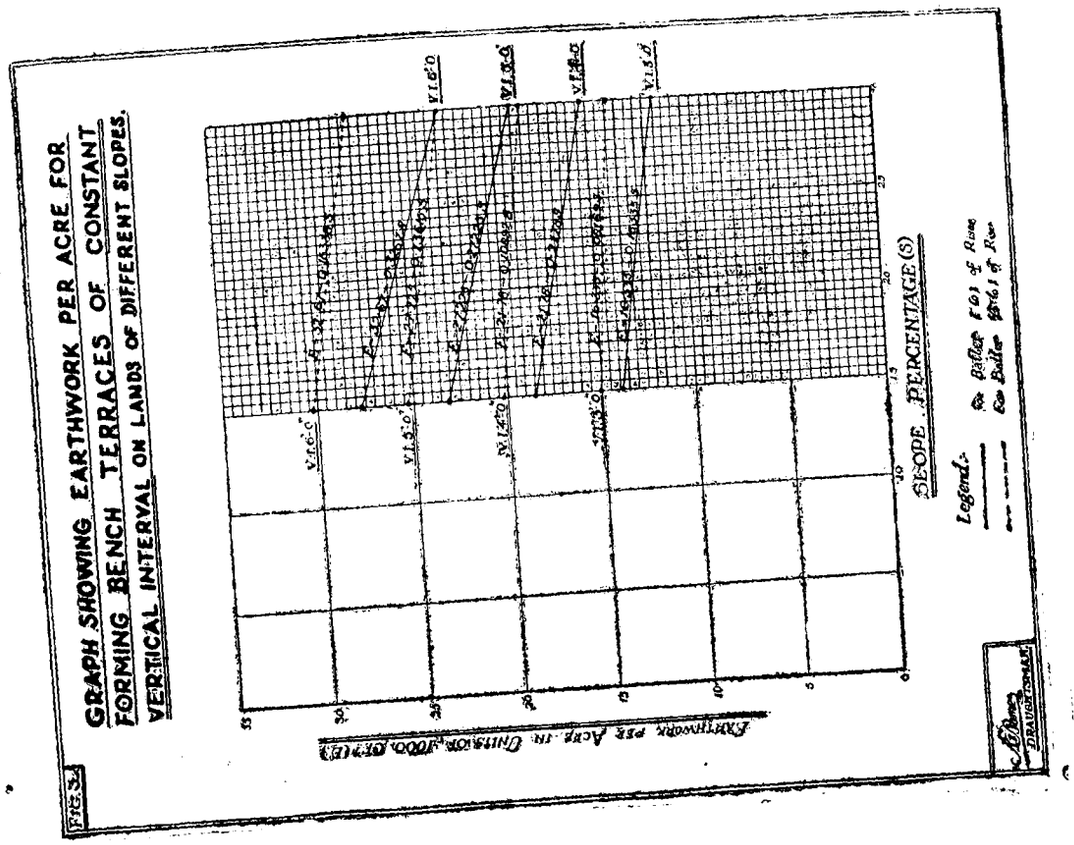

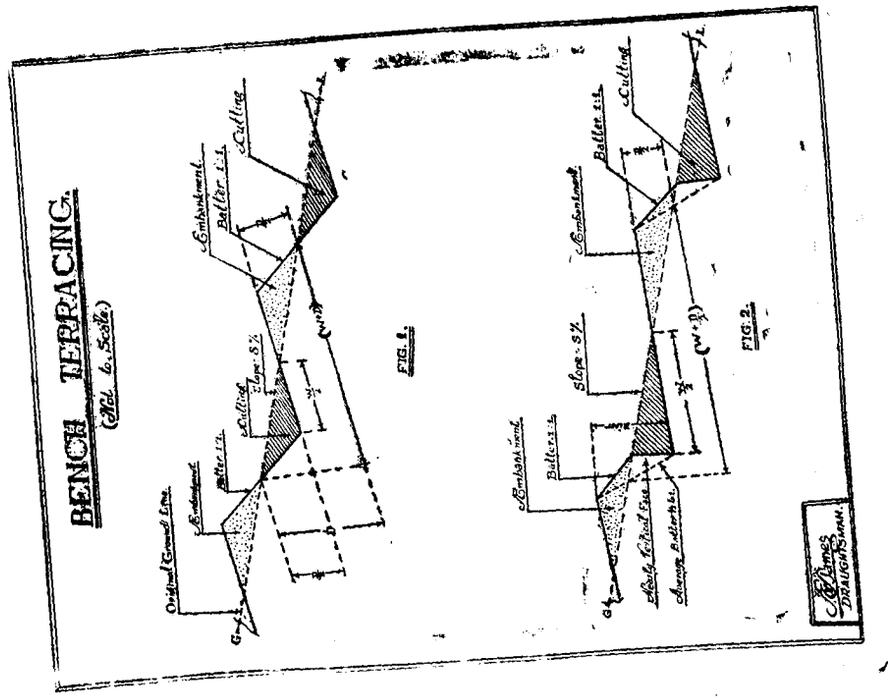

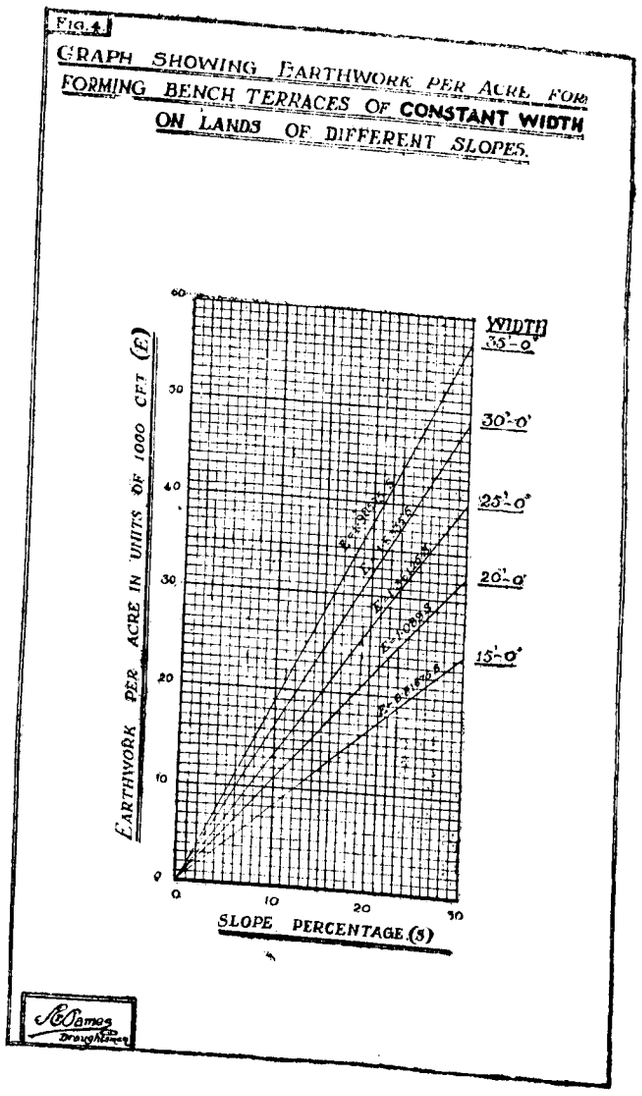

Madras agric. J., **45** : (6) 223—230, 1958

Replications in Field Experiments

by
T. A. GOVINDA IYER,
Agricultural College and Research Institute, Coimbatore.

Introduction : Research workers who have to deal with field trials are often faced with the problem of deciding upon the number of replications that should be adopted for a particular set of treatments. In most cases the number of replications is decided arbitrarily and this leads to a result where even large differences between treatment means fail to attain statistical significane. Any method by which the workers will be enabled to determine the number of replications necessary to render a predetermined difference, of say 10% between the treatments, to be statistically significant, would be very useful. An attempt is made in this paper to evolve such a method, utilising the data that were available from the Paddy Breeding Station, Coimbatore.

As is well known, the test for a significant difference between two treatment means is based on the value of ' t ', where

$$t = \frac{\text{D (difference between the means)}}{\text{standard error of this difference.}}$$

If ' n ' is the number of replications of each treatment and " $\delta 2$" is the expected error mean square as shown by previous experiments, then

$$t = \frac{D}{(\delta / \sqrt{n})\sqrt{2}} = \frac{D}{\delta} \times \frac{\sqrt{n}}{\sqrt{2}}$$

Therefore, $n = \left\{ \frac{t \times \sqrt{2} \times \delta}{D} \right\}^2$

By substituting the approximate values in this equation, D and δ usually as percentages of the general mean, it is possible to calculate the number of replications of each treatment necessary to prove significant any difference greater than D (Patterson 1939).

The value of standard error in an experiment expressed as a percentage of the general mean is called coefficient of variation (C. V.) i. e. the square root of the error mean square expressed as a percentage of the General mean. It is a measure of the experimental error involved in the experiment. A mean of such values from past

experiments is what has been termed 'δ' in the above equation. The method suggested in this paper is therefore to obtain the mean C. V. from past experiments and to test its reliability for the use on hand.

Materials and methods: Yield trials on paddy conducted during the three years 1954 to 1956 at the Paddy Breeding Station, Coimbatore have been used for this study. Forty six trials had been conducted during this period. The plot size, number of paddy varieties, the general mean and the C. V. calculated in each case are tabulated in Appendix I.

The plot size has varied from about 30 to 100 sq. ft. the number of varieties from 3 to 10, and the general mean (expressed as yield per acre) from about 1000 to 4000 lbs. Thus, the normal variations in plot size, variety number and yield level may be considered to be represented in the three years' data dealt with in this paper. The reliability of the mean C. V. has been tested by correlation and regression methods as recommended by Goulden (1952).

Results and Discussion:

I. The arithmetic mean and standard deviation of C. V. and of the other characters are tabulated in Appendix. I.

The C. V. has a mean value of 12·57% and a standard error of 0·85% (standard error is standard diviation divided by the square root of 46). This value of 0·85% is a measure of the variability among *means* of C. V. that would be obtained on repeated sampling with a sample size of 46 experiments at each time. Assuming that such means will be normally distributed, which assumption is usually reasonable, as the sample size is fairly large, one can say that the limits $12{\cdot}57 \pm 2 \times 0{\cdot}85$ would contain true value on an average in 95 out of 100 cases. This also means that a mean C. V. estimated from a set of 46 experiments in the Paddy Breeding Station, Coimbatore has a probability 0·95 to fall within 1·7% on either side of the unknown true C. V. value. All these indicate the fair reliability of the culculated mean C. V. of 12·57% as an estimate of the true unknown value in the Paddy Breeding Station, Coimbatore.

Making use of this mean C. V. value, the number of replications required for an yield trial of strains at the Paddy Breeding Station, Coimbatore may now be calculated from the formula already given.

Thus, $$n = \left\{\frac{t \times \sqrt{2} \times \text{C. V.}}{D}\right\}^2 \quad \text{(A)}.$$

where t — the reading from the 't' table for any desired probability (usually 0.05) and the number of degrees of freedom from which C. V. has been estimated (45 in this instance)

and d — the difference between the varietal means expressed as a percentage of the general mean. It is desired to detect statistical significance in the trial all differences exceeding this value. Let us assume it as 10% of the general mean. This would mean in other words, that the trial is desired to show statistical significance whenever the varietal differences exceed this limit of 10% of the general mean.

By substituting the values in the equation as below we get,

$$n = \left\{\frac{1{\cdot}96 \times 1{\cdot}414 \times 12{\cdot}57}{10}\right\}^2 = 12{\cdot}11.$$

According to the above, 12 would be the number of replications necessary for each strain in future yield trials at the Paddy Breeding Station, Coimbatore, if any difference greater than 10% of the general mean should be significant at the 5% level.

It will be noted from the equation that the lower the value of 'D' that is to say, when a higher level of precision is desired in the trials, a greater number of replications will have to be included. The level of precision, i. e. the value of 'D' must, therefore, be first decided upon and then the value of 'n' is obtained from the equation as illustrated above. If the number of replications estimated turns out to be too large to be adopted in practice, it may be reduced, with corresponding loss of information.

II. It might be noted from the above discussion that the mean C. V. value used should be a reliable estimate of the experimental error, because the number of replications estimated for a given level of precision depends mainly on this valne. The number of experiments averaged for its calculation and their representative character has already been mentioned. The fairly low standard error obtained for the mean C. V. is also a point counting in its favour. It remains to be seen, however, to what extent this mean C. V. has depended on some of the other important controllable field characters, such as plot size, number of varieties and general mean in the experiments considered, so that any adjustment necessary may be made to its value for reliability in its use. Workers elsewhere have found that these characters influence the mean C. V. to varying extent (Arnor & Nissen 1956).

In an attempt to study the nature and extent of dependence of the mean C. V. value on the different plot sizes, variety numbers and the general mean yields involved in the 46 experiments, the following coefficients of correlation (r) have been calculated for the relation between the four variables.

TABLE I.

The Coefficient of correlation (r) for the relationship between C. V. (y)., plot size (X 1), variety number (X 2) and yield level (X3).

	X1	X2	X3
Y	— 0·19	0·30 **	— 0·42 **
X1		— 0·20	0·10
X2			— 0·03

The study indicates that the C. V. has increased significantly with increasing number of varieties in the trial and also with decreasing general mean yield. There is also a trend for increase in C. V. with a decrease in plot size although the 'r' value obtained has not proved significant. A similar non-significant negative association has also been found to exist in the values for plot size and number of varieties. The other pairs of the 'Independent' characters have 'r' values not only non-significant but also very low. The 'r' values in all pairs including the significant values are low. Also none of the various pairs studied indicate any curvilinear trend.

It follows from these that the mean C. V. calculated from past experiments has depended on two of the field attributes, viz., the number of varieties under test and the general mean yield. The degree of dependence is however, small since only low values of 'r' have been obtained, and the data also do not suggest any curvilinear trends. The different plot sizes that were used in the trials and which may be considered to be the usual sizes in practice in such trials do not evidence any significant effect on C. V. meaning thereby that the plot sizes usually adopted at the station do not affect the reliability of the men C. V. obtained. However, the value of 'r' is not much lower than either the 't' value at 5% point or the other significant values calculated. Therefore the combined effect of all the three characters; plot size, number of varieties, and general mean, on C. V. has been estimated by calculating the Multiple correlation coefficient (R).

The multiple correlation coefficient (R) calculated is O. 51 and is highly significant. The corresponding coefficient of multiple determination value of 26% (R^2 expressed as a percentage) brings out clearly that only 26% of the total variation in C. V. values has been accounted for by the concomitant variation of all the three characters studied simultaneously. The combined influence of plot size, number of varieties and general mean on C. V. is thus only 26% of the total unknown influence to which it is subject.

A multiple regression analysis of the data has given the following beta (B) coefficient for the three characters

B	(X1) plot size	1·00
B	(X2) number of varieties	2·74
B	(X3) general mean	4·18

These coefficients are obtained as a product of the partial regression coefficient and the standard deviation and measures the relative importance of the three characters in affecting the multiple correlation. Obviously, the general mean has the most effect, the number of varieties has some effect, while the plot size has the least which may very well be taken as negligible. It follows therefore that these two characters have to be taken into account to adjust the average C. V. before it is used in the equation to estimate replication number, especially when their values are far removed from their mean values. Such an adjusted value (Y) may be easily obtained from the following partial regression equation evolved from the data studied.

$Y = 12{\cdot}57$ plus $0{\cdot}6936\ (X2 - 6) - 0{\cdot}0031\ (X3 - 2542) - (B)$.

The total number of varieties to be tested is X2. X3 is the approximate value of the general mean which the trial may give and which is quite likely to be known from the preliminary trials with the varieties. 'Y' can now be calculated by substituting X2 and X3 in the above equation.

It will be noted from this equation that 'Y' varies from about 10·5 to 14·6 for the number of varieties varying from 3 to 9 if the general mean is kept constant at its mean value 2542. Similarly, 'Y' varies from about 10·8 to 14·0 for the general mean varying from 2000 to 3000, if the number of varieties under test is kept constant at 6. These two ranges of the adjusted C. V. mean fairly overlap the limits set for the mean C. V. for its random variations, viz. $12{\cdot}57 \pm 1{\cdot}7$ (see section I). It follows from these therefore, that no adjustment to the mean C. V. is quite necessary if the number of

varieties and the general mean do not fall outside the limits 6 ± 3 and 2542 ± 500 respectively. If they do so it would be better if the mean C. V. is adjusted with the help of the equation (B).

Conclusion : The procedure to get the number of replications for an yield trial at the Paddy Breeding Station, Coimbatore consists of the following steps :

1. Arrive at approximate value of general mean that the experiment would give either from the records of the preliminary yield trials if available or from experience. Note down also the number of strains under test.
2. Decide upon the level of precision in terms of the difference in varietal mean yields expressed as a percentage of the general mean. This is the value of 'D' in equation (A).
3. If the general mean and the varieties under tests lie only between the limits 2500 ± 500 and 6 ± 3 respectively, adopt the value 12·57 for C. V. in equation (A).
4. If the general mean and the number of varieties fall outside the limits set in step 3, adjust the value of C. V. with the help of the equation (B).
5. Take the value of 't' in equation (A) as 1·96.
6. Substitute the values for 't' C. V. and 'D' in equation (A) and get 'n' the number of replications to be adopted in the trial.

It will be noted from the above that an average value of C. V. estimated from a representative sample of past experiments is to be first obtained for every Research station to enable use of this method for fixing the number of replications for future trials. The sample size should be as large as possible. For a majority of cases it may be adopted as such in the equation (A).

Summary : The average value of C. V. from the past 46 field experiments at the Paddy Breeding Station, Coimbatore has been worked out, its reliability tested and its use to estimate the number of replications required for future trials illustrated. Variations in number of treatment, plot size and general mean considered simulataneously accounted for only 26% of the total variability in the values of C. V. The general mean contributed the highest proportion and is thus the most important of the three factors affecting the mean C. V. A procedure to adjust the mean C. V. for variations in general mean is also suggested.

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Serial No.	Coefficient of variation 'Y'	Plot size Sq. ft. 'X1'	Number of varieties 'X2'	General mean lbs./acre. 'X3'
1.	11·20	100	7	1401
2.	7.80	80	7	2394
3.	13·52	48	3	2289
4.	10·54	80	3	2970
5.	8·50	80	3	2028
6.	24·80	48	7	1585
7.	13·70	32	4	1871
8.	5·30	80	6	3048
9.	12·80	45	6	2190
10.	13·70	50	8	1868
11.	9·20	40	3	2410
12.	10·90	80	3	2788
13.	8·10	80	3	2168
14.	8·60	60	6	1908
15.	16·20	48	7	2006
16.	13.40	48	5	2294
17.	8.70	45	9	3640
18.	17·50	60	9	2604
19.	9·90	80	4	2795
20.	8.10	80	4	2036
21.	13·80	70	8	2367
22.	11·60	104	3	3674
23.	10·20	80	5	3530

Continued

Serial No.	Coefficient of variation 'Y'	Plot size Sq. ft. 'X1'	Number of varieties 'X2'	General mean lbs./acre 'X3'
24.	11·00	80	4	3742
25.	27·70	50	5	1651
26.	15·80	60	6	2425
27.	8·80	56	6	3432
28.	37·70	80	10	1554
29.	15·00	80	7	3870
30.	12·50	70	5	2881
31.	11·30	80	9	3099
32.	8·70	60	9	3519
33.	17·40	71·75	8	1997
34.	9·10	92·25	3	2851
35.	14.20	92·25	4	1274
36.	13·20	92·25	5	2486
37.	10·90	92·25	9	971
38.	9·31	92·25	5	1713
39.	11·50	92·25	4	2888
40.	17·80	92·25	3	1982
41.	9·80	92·25	5	3254
42.	12·80	70·00	9	2666
43.	6·20	82·00	6	3851
44.	6·60	71·75	6	3214
45.	12·70	92·25	4	2725
46.	11·60	71·75	9	3120
Mean	12·57	72·42	5·71	2542
Standard deviation	5·74	18·03	2·16	739·43

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Chilean Nitrate as a Fertilizer for Ragi
(Eleusine coracana)

by

M. RAYAPPA PILLAI and G. PURUSHOTHAMAN

Introduction : Chilean nitrate, according to the Nitrate Corporation of Chile, London, is a natural fertilizer obtained from the mineral deposits of Northern Chile. Its special properties are attributed to the natural blending of plant nutrients. Chilean nitrate contains 16 percent nitrogen in the nitrate form, directly assimilable by the roots of plants. It is most efficient as a top dressing dissolving rapidly into the soil and providing the crop with immediately available nitrogen. The effect is maintained during the entire growing period and is often seen on the subsequent crops. Owing to its natural stability, Chilean nitrate, is unaffected by soil conditions and is not subject to any loss of nitrogen by volatilization. It increases the activities of microorganisms in the soil and therefore has special value where conditions of reduced bacterial action prevail as a result of high temperature. The availability of phosphates in the soil is increased by the use of Chilean nitrate. It also conserves soil calcium and prevents acidification. The supplementary action of sodium improves the vigour of plants giving them strength to withstand attacks of pests and disease. Chilean nitrate also decreases wilting in hot dry weather.

The manurial ingredients removed from the soil by ragi according to Wood (1952) are 49 lb. of nitrogen, 30 lb. of P_2O_5 and 202 lb. of K_2O per acre. The cultivators manure their fields liberally with 20 cartloads of farm yard manure and with wood ash at 2 cartloads per acre. They have also lately taken to top dressing of ammonium sulphate at 100 lb. per acre one month after planting. Some of the ryots apply, super phosphate by placement at 100 lb. per acre just prior to planting. Application of 20 cart loads of farm yard manure per acre a week to ten days before planting, super phosphate at 100 lb. per acre by placement just prior to planting and top dressing of ammonium sulphate at 100 lb. per acre one month after planting is the manurial regimen adopted on the station and recommended to the cultivators. At the Agricultural Research Station, Palur, a trial was conducted for four seasons to study the usefulness of Chilean nitrate as fertilizer for ragi, the results of which are presented in this paper.

Experimental Details: The object of the experiment was to assess the relative merits of ammonium sulphate and Chilean nitrate on ragi at 40 lb. nitrogen and 60 lb. nitrogen per acre when applied alone and in combination with lime, farm yard manure and super phosphate. The variants included in the experiment are the following:

1. Basal dressing of lime at 450 lb. + cattle manure at 3 tons and super phosphate to supply 30 lb. P_2O_5 per acre.
2. Same as 1 + ammonium sulphate to supply 40 lb. nitrogen pe acre.
3. Same as 1 + ammonium sulphate to supply 60 lb. nitrogen per acre.
4. Ammonium sulphate alone to supply 40 lb. nitrogen per acre.
5. Ammonium sulphate alone to supply 60 lb. nitrogen per acre.
6. Same as 1 + Chilean nitrate to supply 40 lb. nitrogen per acre.
7. Same as 1 + Chilean nitrate to supply 60 lb. nitrogen per acre.
8. Chilean nitrate alone to supply 40 lb. nitrogen per acre.
9. Chilean nitrate alone to supply 60 lb. nitrogen per acre.

The experiment was started during 1952—53 May to September season and continued for three more seasons viz., December to March season 1952—53, May to September and December to March seasons 1953–54. The trial was laid out with the above treatments in randomized blocks replicated five times. Though manurial treatments were different yet all the nine treatments received the same cultural treatments. Farm yard manure was applied ten days before planting and super phosphate by placement a day prior to planting. The plots received mumty digging to incorporate the manures.

The strain of ragi used in the experiment was P. L. R. 1 with a seed rate of 1 lb. of seed per cent; 25 days old seedlings were planted in singles giving a spacing of one link each way. After one month, all the treatments except treatment No. 1 were top dressed with the scheduled quantities of the fertilizers. It was observed that the crop in treatment No. 1 receiving the basal dressing only was pale green and stunted in growth and the flowering was delayed by about three to four days while the other eight treatments did not show much difference among themselves.

Results: The yield data for the four seasons were analysed statistically for individual seasons and the combined effect and the summary of results is presented in the Table I.

In three out of four seasons' trials treatment No. 1 consisting of the basal dressing only has recorded significantly poor yields than all the other eight treatments. During 1953—54 May to September season it is on a par with treatments 4, 8 and 9 i. e. Ammonium sulphate alone at 40 lb. nitrogen and Chilean nitrate alone at 40 lb. nitrogen and 60 lb. nitrogen per acre respectively and significantly lower than the otner treatments 2, 3, 5, 6 and 7. During all the four seasons the treatments 2, 3, 6 and 7 receiving artificials at 40 lb. and 60 lb. nitrogen per acre together with the basal dressing have recorded better yields than their counterparts 4, 5, 8 and 9 receiving no basal dressing. The above conclusions are confirmed in the combined effect for all the four seasons put together. The order of sequence of treatments in all the four seasons' trials and the combined effect indicate that ammonium sulphate has given slightly better out turn than Chilean nitrate.

The over all yields of treatments receiving ammonium sulphate compared with treatments receiving Chilean nitrate expressed as percentages are as follows:

	1952—'53 May to September	1952—'53 December to March	1953—'54 May to September	1953—'54 December to March	Combined effect of all four seasons
Ammonium sulphate	103·0	100·0	103·0	106·6	104·2
Chilean nitrate	97·0	100·0	97·0	93·4	95·8

Summary: Ragi crop grown with a basal dressing of lime at 450 lb. + cattle manure at 3 tons + super phosphate to supply 30 lb. P_2O_5 per acre is stunted in growth, pale green in colour, delayed in flowering by about 3 to 4 days and recorded very low yield, significantly lower than all the other eight treatments receiving a top dressing of the artificials one month after planting. The basal dressing of lime, cattle manure and super-phosphate helps in increasing the yield of ragi when applied in combination with the artificials as is evidenced by the performance of treatments 2, 3, 6 and 7 as compared with their counterparts 4, 5, 8 and 9 receiving no

basal dressing. Though ammonium sulphate records increasing yields over Chilean nitrate and in both fertilizers 60 lb. nitrogen gives a better effect than 40 lb. nitrogen, yet statistical evidence, except in the case of 1952—'53 May to September season, does not show significant increase. The following conclusions are drawn.

1. A basal dressing of lime at 450 lb. + cattle manure at 3 tons + superphosphate at 30 lb. P_2O_5 per acre by itself records very low yields of ragi unless supplemented by a top dressing of either ammonium sulphate or chilean nitrate.

2. The artificials record increased yields when applied in combination with the basal dressing than when applied alone.

3. The heavier dose of 60 lb. nitrogen per acre records better yields than 40 lb. nitrogen per acre in the case of both the fertilizers but the increase is not significant, except in 1952—'53 May to September season.

4. Though ammonium sulphate records increased yield over Chilean Nitrate, the yield difference is slight and not significant.

Acknowledgment: The autors express their sincere thanks to the Government Agricultural Chemist for having kindly planned the experiments. Their thanks are also due to Sri W. R. Nargunam for the help rendered in the conduct of the trials.

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TABLE I.

Summary of Results

Season of Trial	Particulars	TREATMENTS 1	2	3	4	5	6	7	8	9	G. M.	S. E.	Fisher's 'Z' test satisfied or not (P=0·05)	C. D. (P=0·05)
1952—1953 May to September	Acre yield of grain in lbs.	748	1129	1498	921	1096	1169	1299	1068	1113	1112	43	Yes	124
	Percentage on Control	100·0	150·9	200·3	154·9	146·5	156·3	173·6	142·7	148·7	149·0	5·8		16·7
1952—1953 December to March	Acre yield of grain in lb.	597	1014	1104	962	1108	1132	1058	936	830	971	62	Yes	180
	Percentage on Control	100·0	169·8	184·9	161·2	185·8	189·8	177·4	156·8	139·1	162·6	10·4		30·1
1953—1954 May to September	Acre yield of grain in lb.	378	585	620	462	491	502	586	429	366	491	34	Yes	94
	Percentage on Control	100·0	154·7	167·8	122·4	130·0	132·8	155·0	113·3	97·0	130·3	8·6		24·8
1953—1954 December to March	Acre yield of grain in lb.	998	1835	2178	1759	1795	1919	2045	1627	1387	1727	92	Yes	264
	Percentage on Control	100·0	184·0	218·2	175·7	179·0	192·3	204·8	162·9	132·2	177·8	9·4		27·1
Combined four Seasons	Acre yield of grain in lb.	643	1117	1300	1000	1097	1153	1213	993	887	1045	70	Yes	203
	Percentage on Control	100·0	173·6	202·0	155·4	170·4	179·3	188·6	154·4	137·8	162·4	10·9		31·5

Conclusions

1952—1953

May to September Season 3, 7, 6, 4, 2, 9, 5, 8, 1

December to March Season 6, 5, 3, 7, 2, 4, 8, 9, 1

1953—1954

May to September Season 3, 7, 2, 6, 5, 4, 8, 1, 9

December to March Season 3, 7, 6, 2, 5, 4, 8, 9, 1

Combined effect of all the four Seasons 3, 7, 6, 2, 5, 4, 8, 9, 1

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Research Notes

A Preliminary note on Topping of 'Desi' (*G. arboreum* race *indicum*) Cotton

Introduction: In parts of Koilpatti taluk, where large concentrations of cultivated karunganni cotton occur, there is a practice of breaking off tips of cotton plants at stages of growth before flowering. Long thin bamboo poles are utilised for the purpose. These poles are lashed about vigorously in such a manner as to snap 6" to 8" of main shoots from the tip. The growers believe that by so doing, rank vegetative growth is averted and the plants are forced to yield are earlier and more productive crop than would otherwise be the case.

Materials and Methods: With a view to test the truth of the belief, experimental investigations were undertaken on the black soil area of the Cotton Breeding Station, Coimbatore during 1948—'49 to 1950—'51. The varieties used were improved karunganni strains namely K. 1 and K. 5 (*G. arboreum* race *indicum*). The treatments adopted were as follows:

1. Topping at the commencement of squaring stage.
2. do. flowering stage.
3. No topping (Control)

The six variants viz., 3 with K. 5 and 3 with K. 1. were randomized and replicated. Topping was done by nipping off a few inches below the growing point of the main stem. This was preferred to cane lashing to ensure a more uniform snapping of stem tip segments.

Results: The yields were analysed and the results thus obtained are summarised in Table below:

TABLE

Topping Experiments on Desi Cotton.

S. No.	Treatments	Yield in lb. of seed cotton per acre			
		1948–'49	1949–'50	1950–'51	Mean.
1	2	3	4	5	6
1.	K. 5 topping at squaring stage	357	272	275	301
2.	K. 5 topping at flowering stage	394	268	272	313
3.	K. 5 No topping	347	257	290	297
4.	K. 1 topping at squaring stage	361	319	290	323
5.	K. 1 topping at flowering stage	422	314	327	354
6.	No topping K. 1	384	330	312	342
	Significance by 'Z' test (P = 0·05)	No	No	No	

It will be noted that the differences between treatments were not significant indicating thereby that it was not profitable to adopt this practice.

Discussion: Absence of expected yield appreciation following topping of the kind described in this paper is in conformity with similar findings by Redding and Kemboosh (1906) in Georgia. It is recorded that in Greece, more than 20 topping experiments were carried out in several places with a large number of cotton varieties. Beyond profuse lateral growths from accessory development, no yield increases followed these attempts. On the other hand decreases in yield have been reported by Ayres (1921) at Mississipi and by Templeton (1931) in Egypt. On a comparison of productivity of 'bored' plants (Cotton plants, the terminal buds of which get destroyed by shoot borers and which develop lateral branches in top nodes profusely) Venkataraman and Jaganatha Rao (1933) found that these naturally topped plants gave significantly higher yield. But these authors did not include any scheme of topping studies in their investigations, to simulate the condition brought about by the shoot borer. In view of the finding reported in this peper taken in conjuction with similar finding from a majority of workers elsewhere, topping with poles would appear to have no scientific justification so far as the claim for enhanced yield is considered. But the persistence with which this practice is followed in the maritime parts of Koilpatti taluk is very probably due to the need for curbing rank vegetative growth so as to facilitate easy 'watching' of the crop at harvest time. Absence of such a practice in the hinterland of Tirunelveli district is probably due to the comparatively smaller heights of the crop than in coastal zone.

Summary: Breaking off tops of growing shoots in cotton with a view to secure increased yields is not a sound agricultural practice. But it may have other significance as keeping down terminal growth to facilitate efficiency of crop watch during harvest. This is the finding based on an experimental investigation carried out at the Cotton Breeding Station, Coimbatore, during the years 1948 to 1951.

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Preliminary Studies on the incidence of Silver Shoot on Paddy at the Paddy Breeding Station, Mangalore

An observation trial was laid out during the first crop season of 1955–'56 with the seven popular first crop strains (MGL. 1 to MGL. 5, MTU. 3 and PTB. 9) in order to study the incidence of silver shoot *(Pachydiplosis oryzae)*. The varieties were planted in two series with a view to find out (1) the differential response of the pest attack due to the time of planting and (2) response due to the effect of varying soil and water conditions.

The time of planting series consisted of planting these seven strains in the first week of June (early planting) middle of June (normal planting) and beginning of July (late planting). All the three batches were planted in one plot under a similar type of soil and water conditions, and counts of incidence were recorded at weekly intervals starting from the first week after planting till the crop was in shot blade stage. The average number of tillers variety-wise and the percentage of incidence recorded for different varieties under the three different times of planting are presented below :—

S. No.	Strain	4-6-'55 batch		18-6-'55 batch		1-7-'55 batch	
		Percentage of incidence	Average No. of tillers	Percentage of incidence	Average No. of tillers	Percentage of incidence	Average No. of tillers
1.	MGL. 1	8.0	4.3	11.5	5.9	4.8	4.5
2.	MGL. 2	9.1	5.1	11.7	5.9	7.7	4.2
3.	MGL. 3	16.6	5.7	11.0	6.9	5.2	5.0
4.	MGL. 4	14.8	5.9	15.7	5.9	9.5	5.4
5.	MGL. 5	4.4	5.3	4.6	6.5	5.4	4.3
6.	MTU. 3	14.8	5.1	16.5	5.6	7.0	5.1
7.	PTB. 9	9.1	5.2	14.7	5.6	8.5	5.1

From the above table, it is seen that (1) tillering is maximum in the batch planted on 18—6—1955 (normal planting) followed by early planting (4—6—1955) and late planting (1—7—1955).

(2) Though there appears to be a progressive increase of incidence with increased tillering in all the strains, strain MGL. 5 alone has shown markedly low incidence in all three batches of planting.

In the second series to find out the effect of varying soil and water conditions on the pest incidence all the seven varieties sown on the same date (28—5—1955) were planted on 28—6—1955 under three soil conditions–viz. high level with good drainage (plot No. D. 4) low level with good drainage (plot No. F. 22) and ill drained plot (plot No. G 1)

Counts for tiller production and pest incidence were recorded as in the first series which are presented below :—

S. No.	Strain	High level with good drainage D. 4		Low level with good drainage F. 22		III drained plot G. 1	
		Percentage of incidence	Average No. of tillers	Percentage of incidence	Average No. of tillers	Percentage of incidence	Average No. of tillers
1.	MGL 1	5.8	6.5	3.6	5.4	13.0	5.9
2.	MGL 2	4.6	6.0	4.9	5.8	14.6	6.1
3.	MGL 3	7.0	7.3	4.8	7.1	13.0	7.1
4.	MGL 4	10.6	7.1	3.4	6.3	14.8	8.3
5.	MGL 5	6.6	7.3	2.9	7.5	10.8	5.9
6.	MTU 3	11.3	6.9	6.4	7.7	23.2	8.5
7.	PTB 9	10.0	6.9	4.2	6.3	18.4	7.1

From the above figures it is seen that:—

(1) the pest incidence is the least in the plot with good drainage, the ill drained plot showing the maximum incidence.

(2) an increase in tillering is accompanied by corresponding increase in pest incidence.

From the above two trails, MGL 5 appears to be comparatively resistant to the pest incidence and drainage influences pest attack.

Paddy Breeding Station, Mangalore.

M. K. GANESH PAI.

Madras agric. J., 45 : (6) 240—243, 1958

A Note on the Fish Manure Trials conducted at the different centres in the State

Introduction : A good sample of fish manure on an average will contain about seven percent nitrogen, an equal amount of phosphoric acid and about one percent of potash. The organic matter content will be about 70 per cent. Thus it is seen that fish manure is rich in both nitrogen and phosphorous. Therefore, fish and fish wastes can be used advantageously for all crops. As these materials take some time to disintegrate into simpler substances and thus render available their plant nutrients for crops, they should be incorporated with the soil a few months before planting or sowing.

In a large number of trials in some of the farms on the West Coast fish manure has been invariably found to be profitable for paddy and coconut. It has also been said that fish-manure is much better adopted for use on sandy or naturally open soils, than on compact clayey ones. The fish manure will maintain a steady supply of nitrogen and phosphorus for crops during growing season and therefore is a good manure that can be used with advantage on a liberal scale whenever available.

To confirm the above findings, trials were laid out at three centres in the State with the objective of testing the efficacy of the fish manure both as a nitrogenous and phosphatic manure in comparison with ammonium sulphate and superphosphate over a basal application of green manures (5000 lb. per acre). Incidentally the combined effect of fish manure and ammonium sulphate was also sought to be tested. However the quality of the manure used for the trials was poor containing low amounts of nitrogen and phosphoric acid and high amount of insolubles.

TABLE I.

Composition of Fish Manure and Fish Meal samples used in the experiments (per cent on air-dry basis).

S. No.	Nature of sample	Particulars	Nitrogen	Phosphoric Acid	Potash	Insolubles
1.	Fish Manure	A. R. S. Pattukottai	1·50	0·51	0·60	46·50
2.	Fish Manure	A. R. S. Tirurkuppam	2·24	3·18	1·07	62·20
3.	Fish Meal	Mangalore	6·88	5·30	1·43	22·27
4.	Milled Fish	Mangalore	2·43	1·69	0·85	33·01
5.	Milled Fish Meal	Mangalore	2·30	1·78	0·63	33·34
6.	Fish Manure	Mangalore	5·63	4·40	0·77	25·92

Experimental : Trials were laid out at three centres, namely, Pattambi, Pattukottai and Tirur, on the Government Farms. The plan of the experiment consisted of six treatments replicated six times as given below :—

Treatments :

1. No manure (control)
2. Fish manure to provide 30 lb. Nitrogen.
3. Green leaf 5,000 lb. per acre.
4. Green leaf at 5,000 lb. plus fish manure to supply 30 lb. nitrogen plus * super phosphate to make up to 30 lb. of P_2O_5.
5. Green leaf at 5,000 plus ammonium sulphate to supply 30 lb. Nitrogen plus super phosphate to supply 30 lb. of P_2O_5.
6. Green leaf at 5,000 lb. plus fish manure to give 15 lb. Nitrogen plus ammonium sulphate to give 15 lb. Nitrogen plus super phosphate to make up to 30 lb. P_2O_5.

Size of plot :— 2 cents.

Replications :— Six in randomised blocks.

Results : During the year 1955 no trials were conducted in any of the Government Farms for want of fish manure owing to the failure of mackerel fishery. The trials were conducted in the main crop season of 1956–'57 and the results are as in Tables II and III.

Summary of Results.

TABLE II.

Rice Research Station, Tirur.

Field Number : 13–E — Sown : 25—9—1956
Previous Crop : Fallow — Planted : 15–11—1956
Variety : Co. 25 — Harvested : 1—4—1957

Particulars	Treatments					
	1	2	3	4	5	6
Yield of grain in pounds per acre ...	1323	1484	1556	1872	1717	1639
Percentage on control ...	100·0	112·1	117·6	141·5	129·7	123.9
Yield of straw in pounds per acre ...	2592	2680	2946	3434	3256	3323
Percentage on control ...	100·0	103·4	113·7	132·4	125·6	128·2

(* This was raised to a level between 42·5 and 48 lb. depending on the P_2O_5 content of the fish manure available at the different centres).

Treatmental differences were statistically significant for grain and straw.

Conclusion: Grain Yield 4, 5, 6, 3, 2, 1.

Straw Yield 4, 6, 5, 3, 2, 1.

TABLE III.

Agricultural Research Station, Pattukottai.

Field Number: E. 1 & 2. Sown: 20—8—1956

Variety: Co. 25 Planted: 21—9—1956

Harvested: 21—2—1957

Particulars	Treatments					
	1	2	3	4	5	6
Yield of grain in pounds per acre ...	2183	2912	2754	2985	2930	2997
Percentage on control ...	100·0	133·5	126·1	136·8	134·2	137·3
Yield of straw in pounds per acre ...	7180	8132	8498	8748	8543	8837
Percentage on control ...	100·0	115·9	121·2	124·7	121·7	125·9

Treatmental differences were not statistically significant for grain and straw.

Agricultural Research Station, Pattambi.

Results not available owing to separation of States.

Conclusions: The results of the trials carried out with the fish manure for one year in the main crop season go to show that the yield of paddy, grain and straw, were statistically significant for the treatments at Tirur Farm, while it was not so at Pattukottai Farm.

At Tirur Farm it is seen that in regard to both grain and straw yields, green leaf at 5,000/- lb. plus fish manure to supply 30 lb. nitrogen (Treatment 4) has given the highest yield, but it is on a par with green leaf at 5,000 lb. plus ammonium sulphate to supply 30 lb. nitrogen plus super phosphate to supply 45 lb. P_2O_5 as well as with green leaf 5,000 lb. plus fish manure and ammonium sulphate to supply 15 lb. each of nitrogen and super phosphate to supply 45 lb. of P_2O_5 (Treatments 5 & 6).

In the case of trials at Pattukottai though green leaf 5,000 lb. plus fish manure and ammonium sulphate to give 30 lb. of nitrogen equally plus super phosphate 30 lb. P_2O_5 (Treatment 6) gave the highest yield of 2997 lb. per acre of grain and 8837 lb. of straw, the results were not statistically significant for the different manurial treatments.

Further work could not be carried out owing to the paucity of supply of fish manure at present.

Acknowledgments: The authors are thankful to the Director of Agriculture, Madras for according permission to publish this note.

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VISWANATHAN, P. S.
VARADARAJAN, S.
MARIAKULANDAI, A.
VENKATASUBRAMANIAM, M. K.
KRISHNAN, R. H.

Agri. Coll. & Res. Inst.
21—1—1958.

Students' Corner

The following students have been elected as office bearers of the Students' Club for the year 1958—'59.

			Year
1.	Club Secretary	: K. S. SUNDARESAN	III
2.	Games Secretary	: K. RAMASWAMY	III
3.	Editor — Tatler	: A. MAHARAJA	III
4.	Cricket Captain	: V. NARAYANAN	II
5.	Hockey Captain	: R. RAMAKRISHNAN	II
6.	Foot-ball Captain	: A. K. MUTHUSWAMY	II
7.	Tennis Captain	: C. RAMAKRISHNAN	II
8.	Minor Games Captain	: M. S. VENUGOPAL	II
9.	Debating Society Secretary	: R. MANIKAM	II
10.	Social Service Secretary	: AMIRTHADEVARATHINAM	II
11.	Photographic Society Secretary	: M. MURUGESAN	II
12.	Dramatic Society Secretary	: P. BALASUBRAMANIAM	III
13.	Hiking Society Secretary	: A. V. RAJAN	III
14.	Volunteer Corps Leader	: M. K. RAJENDRAN	III
15.	III Year Class Representative	: C. RAMADOSS	III
16.	II Year Class Representative	: N. SUNDARESAN	II

Weather Review — For May, 1958.

RAINFALL DATA (IN INCHES)

Division	Station	Total rainfall for the month	Departure from normal	Total since 1st January 1958
North	Madras (Meenambakkam)	2·2	+ 1·2	3·1
	Tirurkuppam*	2·6	— 0·2	4·3
	Vellore	2·9	+ 0·6	6·7
	Gudiyatham*	2·2	— 0·5	5·0
East Coast	Palur*			
	Tindivanam*	3·2	Nil	4·1
	Cuddalore	3·4	— 1·5	5·2
	Nagapattinam	2·3	+ 1·3	3·9
	Aduthurai*	1·6	Nil	2·2
	Pattukkottai*	4·1	+ 1·9	6·0
Central	Salem	3·7	+ 2·7	7·6
	Coimbatore (A. M. O.)* ..	4·8	+ 0·2	7·6
	Coimbatore	3·0	+ 0·6	5·9
	Tiruchirapalli	4·3	+ 1·8	7·4
South	Mathurai	4·6	+ 2·0	5·9
	Pamban	3·3	+ 0·6	6·6
	Koilpatti*	5·2	+ 4·2	9·3
	Palayamcottai	1·9	— 0·5	7·2
	Ambasamudram*	4·2	+ 2·6	9·4
	Nagercoil*	6·9	+ 5·7	16·3
Hills	Kodaikanal	3·7	— 1·3	11·8
	Coonoor*	8·7	+ 2·3	22·7
	Ootacamund*	9·7	+ 4·7	31·3
	Nanjanad*	7·4	— 0·8	15·6
		6·5	+ 0·3	14·3

Note:— * Meteorological Stations of the Madras Agricultural Department.

But for the interference of dry weather for four days in the course of the month, the weather was generally fair with intermittant thundershowers throughout the State.

Thundershowers occured locally in south Madras on 1—5—'58, when weather was dry elsewhere in the region. On 2—5—'58, an easterly wave was apparently moving across the Ceylon-Comorin area, when thundershowers were received at a few places in Madras State. As the easterly wave moved across the Maldives, thundershowers were localised in the State for two days from 3—5—'58. On 5—5—'58, conditions were unsettled in the southwest and adjoining southeast Bay of Bengal and on the subsequent day, a shallow depression, that developed in the southwest Bay, was lying at 300 miles southeast of Madras. Under its influence, localised rains or thundershowers occured in Madras State for two days from 5—5—'58. Due to the movement of the shallow depression northwards with its centre near Lat. 13° N and Long. 83° E, fairly widespread rains or thundershowers were received in Tamilnad on 7—5—'58. The displacement of the depression on 8—5—'58 with its centre at 250 miles eastnortheast of Madras brought forth thundershowers at a few places in the State. On 9—5—'58, the depression weakened into a trough, became unimportant and a residual upper air circulation persisted in the westcentral and adjoining southwest Bay of Bengal between 1·5 km and 3·0 km a. s. l, as a result of which interior Madras received thundershowers at a few places. Though an extended upper air trough was lying over the south and the adjoining central Bay on 10—5—'58, weather was dry in Madras State. The trough became less marked on the subsequent day, and a

ole incursion of equatorial maritime air took place into the extreme south Bay Bengal, with the result, rains or thundershowers were localised in Madras State two days from 11—5—'58. On 13—5—'58, the southwest monsoon advanced o the south Andaman sea. A temporary advance of the monsoon was taking ce into the south Bay of Bengal to the south of Lat. 10° N and into the Ceylon-norin areas. Rains or thundershowers were local in Madras State on 13—5—'58. e monsoon was moderate in the south Andaman Sea and was advancing into the th Andaman Sea on 14—5—'58, and the weather was dry in Tamilnad on that y. Rains were localised in the State on 15—5—'58.

Rains or thundershowers occurred locally in Madras State on 16—5—'58. A clonic storm formed rapidly in the westcentral Bay of Bengal on 17—5—'58, oved northeastwards on the subsequent day, resulting in rains or thundershowers a few places in Madras State for two days from 17—5—'58. As the storm akened, dry weather was prevalent in Tamilnad on 19—5—'58. For two days om 20—5—'58, interior Madras received thundershowers at a few places. On —5—'58, weather was dry throughout the State. The development of an upper r trough in the southeast Arabian Sea off the Malabar coast and its movement rthwards brought in scattered thundershowers in Madras State on 23—5—'58, d localised thundershowers in interior Madras for three days from 24—5—'58. ue to the formation of a trough of low pressure over the east Arabian Sea off the alabar, Kanara and the south Konkan coast, thundershowers were scattered in adras State on 27—5—'58 and localised on 28—5—'58. On 29—5—'58, the low essure wave moved into the north Andaman Sea, and under its influence the onsoon was strengthening in the south Andaman Sea and the adjoining south-ast Bay of Bengal. Interior Madras received rains or thundershowers at a few laces for two days from 29—5—'58. As the low pressure wave from the east ecame apparently feeble mainly dry weather prevailed throughout the State n the last day of the month.

Day temperatures were generally below normal throughout the month of lay, 1958.

Rainfall: The noteworthy rainfalls and the zonal rainfalls for the month re furnished below:

Noteworthy Rainfalls

S. No.	Date	Name of place	Rainfall in inches
1.	3—5—1958	Coonoor	2·12
2.	5—5—1958	Kodaikanal	3·10
3.	5—5—1958	Pamban	3·47
4.	6—5—1958	Ambasamudram	3·21

Zonal Rainfall (in inches)

Name of Zone	Rainfall for May, 1958	Departure from Normal	Remarks.
North	2·5	+ 0·3	Just Above normal
East Coast	3·0	+ 0·7	do
Central	4·2	+ 1·2	Above normal
South	4·2	+ 1·9	do
Hills	8·1	+ 1·6	do

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore-3.
10th June, 1958.

C. B. M., M. V. J., & M. S. D.

Departmental Notifications

Gazetted Officers — Postings and Transfers

Name and Designation	Posted to or Transferred
Sri K. Natarajan, Soil conservation Trainee	Asst. Agri. Engineer (Soil Conservation Scheme, Kodaikanal)
,, T. P. Shanmuga Nainar, Asst. Agri. Engineer Soil Cons. Scheme, Kodaikanal.	Asst. Agri. Engineer, Soil Cons. Scheme, Coimbatore.
,, M. Sundaram, Lecturer in Chemistry, Agri. College, Coimbatore.	Regional officer, Fertilizer Demonstration Scheme under I. C. A. R. Madras Region.
,, T. A. Govind Ayyar, Statistical Asst., A. C. R. I.	Asst. Agri. Chemist (Soil Survey Officer).
,, V. G. Venkataramana Rao, Asst. Marketing Officer.	Asst. Marketing Officer, Cuddalore.
,, K. Dorai Raj, Seed Dev. Officer (paddy, Madurai)	Leave for 30 days, preparatory to retirement.
,, G. V. Ramana.	Lecturer in Agri. Madras Veterinary College.

Upper Subordinate — Postings and Transfers

Name and Designation	Posted to or Transferred
Sri P. Ramalingam, F. M., Kattupakkam.	A. D. Ponneri.
,, K. M. Ramanujam, A. D., Manaparai.	Spl. A. D. (sugarcane) Villupuram.
,, K. Mahadava Pillai, A. D., on leave.	Asst. in Plant Physiology (groundnut) Coimbatore.
,, M. Raju, Ex-Officer in Agricultural, Tirunavalur, S. Arcot Dist.	Agricultural Instructor Bhavanisagar.
,, S. Kannan, A. D., Uthangarai.	Asst. in Chemistry, Coimbatore.

Final Year B. Sc. (Ag.) Students, Appointments. as Upper Subordinates.

Name and Designation	Posted to or Transferred
Sri Abdul Hameed	F. M., S. S. Farm, Elangi.
,, K. C. Alexader	A. D. Acharapakkam.
,, K. Arunachalam	Spl. A. D. (Cotton, Kadambur.)
,, S. Balakrishnan	A. D., Vilathikulam.
,, J. Balasubramaniam	F. M., S. S. Farm, Kolanthalur.
,, M. Balasubramaniam	do. Sakottai.
,, N. V. Chakrapani	Agri. Instructor Ext. Centre, Krishnagiri.
,, C. M. Chandrasekharan	F. M , S. S. Farm, Sirukaverikuppam.
,, S. Charles Daniel	Cane Asst. Cuddalore.
,, R. Chinnaraj	A. D., Uthukuli.
,, R. Chockalingam	Spl. A. D. (Sugarcane) Ambur.
Sri G. Y. David Ponnyya	Asst. in Entonology, Coimbatore.
,, K. S. S. Eswaran	A. D., Rural Ext. Training Centre, Krishnagiri.
,, S. Ganesan	P. P. A., Vellore.
,, T. P. Gopalaswamy	Soil Cons. Asst. Walajah.
,, T. S. Govindarajan	Asst. in Chemistry, Coimbatore.
,, B. Habibullah	do. do.
,, A. Jagadesan	Research Asst. Coimbatore.
,, S. Jayaraj	Ext. Officer for Agri. Sivakasi.
,, V. Kannan	A. D., Nellikuppam.
,, M. S. Karuppuswami	Assistant in Chemistry, Coimbatore.
,, H. Khaleel Ahmed	do. do.
,, S. Kolandaiswami	F. M., S. S. Farm, Tirukalambur.
,, K. Kothandaraman	A. D., Gummudipoodi.
,, K. K. Krishnamurthy	F. M., S. S. Farm, Thathampatti.
,, T. N. Krishnamurthy	F. M., Kambakkam.
,, K. Krishnan	Paddy Assistant, Palur.
,, K. Kulandaivelu	A. D., Manaparai.
,, M. Krishnan	F. M. Live Stock Res. Station, Pallatur.
,, S. Kunjithapatham	Farm S. S. Farm, Medumbalam.
,, K. Kuppusamy	Asst. in Chemistry, Coimbatore.
,, D. Lawrence Alexandar	Spl. A. D. (Cotton) Aduthurai.
,, N. Loganathan	Farmer Manager, S. S. Farm, Uppupet.
,, D. Magbhool Khan	do do Harur.
,, Maikumperumal Pillai	P. P. A., Nagarcoil.
,, R. Manoharan	A. D., Andiyur.
,, V. Mariappan	A. D., Peralem.
,, R. Maruthanayagam	Farm Manager, S. S. Farm, Vattakanal.
,, Mirza Jaffer Hussain	Ext. Officer in Agri., Tirunavalur.
,, Moosa Sheriff, N.	Paddy Asst., Coimbatore.
,, P. Murugan	F. M., S. S. Farm Colgrain Estate, Nilgris.
,, P. Mustaffa	Ext. Officer in Agri., Nilakottai.
,, V. Muthu	F. M., S. S. Farm, Salem Dt.
,, P. Narayanaswami	Ext. Officer in Agri. Madurai.
,, N. Natarajan	F. M., Bhavanisagar.
,, G. Parthasarathy	F. M., S. S. Farm, Veerapadiputhur.
,, S. Pitchai	F. M., S. S. Farm, Ayyalur.
,, S. Ponnuvel	Ext. Officer for Agri., Arni.
,, S. Premanathan	Asst. in Chemistry, Coimbatore.
,, W. R. Raghunatha Rao	F. M., S. S. Farm, Kanjikudi.
,, N. G. Raj	Ext. Officer for Agri., Andipatti.
,, T. S. Rajamani	A. D., Arkonam North.
,, M. Rajan	Ext. Officer for Agri., Usilampatti.
,, H. S. Rajasekhar	F. M., S. S. Farm, Tiruvannamalai.
,, B. Raju Naidu	Ext. Officer in Agri., Bargur.
,, T. K. Ramachandran	A. D., Viralimalai.
,, K. S. Ramadorai	P. P. A., Trichy.
,, S. Ramakrishnan	A. D., Pullambadi.
,, K. M. Ramanathan	P. P. A., Salem.
,, S. Rangaraju Chetty	F. M., Coconut Dev. Asst., Tanjore.
,, S. Sankaran	do Tirupathur.
,, N. Sankaranarayanan	do Kakuppam.

Name and Designation	Posted to or Transferred
Sri V. Seetharaman	A. D., Keeranur.
,, P. M. Shahul Hamid	F. M., S. S. Farm. Devadanam.
,, P. Shamsudeen	Ext. Officer for Agri., Kalayar Koil.
,, V. Sivarama Sethu	do Musiri.
,, A. Srinivasan	P. P. A., Sattur.
,, R. Srinivasan	F. M., S. S. Farm, Kolathur.
,, V. Srinivasan	Asst. in Chemistry, Coimbatore.
,, C. K. Subramaniam	Ext. Offieer for Agri. Kinathukadavu.
,, P. Subramaniam	A. D., Ambasamudram.
,, K. V. Subramaniam	F. M., S. S. Farm, Orathur.
,, Syed Kareem	do Vellapakkam.
,, M. J. Tom	Ext. Officer for Agri., Tiruvadanai.
,, B. Varadan	F. M., S. S. Farm, Mullaikombai.
,, V. R. Varadarajan	Coconut Dev. Asst.
,, V. N. Vasantharajan	F. M., S. S. Farm, Vanur.
,, C. Veeraswami	Coconut Nursery Asst., Pattukottai.
,, T. Venkataraman	Oil Seeds Dev. Asst., Orthanad.
,, R. Venkateswaralu	Ext. Officer, Saidapet.
,, Venugopalan	Research Asst., Coconut Res. Station, Veppankulam.
,, P. Vijaya Kumar	Farm Manager, S. S. Farm, Sethiathope.
,, V. G. Viswanathan	do Melalathur.
,, Abdul Latheef, A. D , Vilathikulam.	A. D., Tobacco Dev. Scheme, Nagerkoil.
,, C. R. Anthoni, A. D., Anamalai.	Spl. A. D. (Sugarcane) Coimbatore.
,, Y. K. Chandrasekharan, Spl. A. D., (Sugarcane) Coimbatore.	Cocoanut Dev. Asst., Coimbatore.
,, C. Rajalingam, Ext. Officer for Agricultural, Mudukulathur.	Ext. Officer for Agricultural, Kallal.
,, Hydross, Agri. Inst., S. V. Nagaram, N. Arcot Dist.	Coconut Dev. Assistant, Madurai.
,, A. V. Srinivasan, Ext. Officer for Agricultural, Bargur.	Ext. Officer for Agri. Mudukolutur.
,, T. K. Gopala Rao, Paddy Asst., Palur.	Special Agri. Demonstrator (Sugarcane) Karur.
,, V. G. Mathew, F. M., S. S. Farm, South Arcot District.	Cocoanut Dev. Assistant, Guindy.
,, V. Srinivasan, Tirukadaiyur.	Extention Officer, Mayaram.
,, Muthiah, A. D., Melalokkur.	P. P. A., Madurai.
,, T. Kanakasabai, Ext. Officer for Agricultural, Arni.	Agricultural Instructor, Rural Extention Training Centre, S. V. Nagaram.
,, K. V. Daniel,	A. D., (Sugarcane), Kallakurichy.
,, C. Narayana Kurup, (on leave)	Horticultural Assistant College orchard Coimbatore.
,, N. N. Rajagopala Rao,	Cotton Asst., A. R. S., Aduthurai.
,, T. Venkatachalam, Agri. F. M., (Animal Husbandry) Dept. Alamathi.	Dairy Manager, Agri. College, Cbe.
,, P. Vincent, Asst. Millets Section	Asst. in Paddy.
,, T, Abdul Shakoor, Fruit Asst.,	Fruit Asst., Coonoor.
,, K. G. Ramachandra Unni, Fruit Asst., Coonoor.	Coconut Dev. Asst., Nagarkoil.

Madras agri. J., **45** : (6) 249—253, 1958

Review of Market Conditions of Commercial Crops in the Notified Areas for the Month of May, 1958.

Cotton : In this Section Lint : Candy of 784 lbs.
Kapas : Pothi of 280 lbs.

Tirupur : Coimbatore District : There was a rainfall of 9·5 cm. at Tirupur besides good showers being recorded in all places of Coimbatore district during the month. The same were beneficial for the 2nd crop Karunganni as well as Cambodia Cotton.

The market started with an opening balance of 11967 candies of Cambodia and 608 candies of Karunganni lint. The total receipt into the market were 13311 candies of Combodia and 977 candies of Karunganni lint which included 2988 candies of Cambodia and 454 candies of Karunganni locally ginned. A quantity of 12966 candies of Cambodia and 759 candies of Karunganni lint were despatched from Tirupur during the month to Tanjore, Salem, Dindigul and Madras in Madras State and Bombay and places in Kerala and Andhra Pradesh States. At the end of the month there was a closing stock of 12312 candies of Combodia and 826 candies of Karunganni lint.

Kapas : The kapas market started with an opening stock of 37113 pothis of Cambodia and 5093 pothis of Karunganni kapas. The total arrivals into the market of Tirupur were 4773 pothis of Cambodia, 9468 pothis of Karunganni. The disposals during the month were 47601 pothis of Cambodia and 8810 pothis of Karunganni kapas in the market area of Tirupur. At the end of the month there was a closing stock of 37245 pothis of Cambodia and 5751 pothis of Karunganni kapas.

Prices : Good demand continued for superior varieties of cotton and the prices slightly improved.

	Lint per candy of 784 lb.
Cambodia superior quality	Rs. 900 to 980
,, average ,,	Rs. 750 to 850
Karunganni superior ,,	Rs. 860

	Kapas per pothi of 280 lb.
Cambodia superior quality	Rs. 125 to 140
,, average ,,	Rs. 100 to 120
Karunganni superior ,,	Rs. 116

Ramanathapuram District: During the month the seasonal conditions were reported to be favourable for the 2nd crop Karunganni and Uganda crop.

The following were the arrivals and disposals of kapas and lint in the important markets of the district during the month of May, 1958.

Kapas in pothis of 280 lbs. and lint in candies of 784 lbs.

	Opening stock	Receipts	Total	Disposals	Closing stock
Kapas	3000	39000	42000	38500	3500
Lint	695	4400	5095	4400	695

The trend of the market for kapas ruled steady during the month in view of the firm tone that prevailed for lint and the improvement noticed in seed prices.

The following were the prices of kapas, lint and cotton seeds during the month of May, 1958.

	Kapas in pothis of 280 lbs.
Karunganni	Rs. 83 to 92
Tinny/Karunganni	Rs. 75 to 82
Tinny	Rs. 42 to 76

	Lint in candy of 784 lbs.
Karunganni	Rs. 736 to 799
Tinny Karunganni	Rs. 636 to 736
Tinny	Rs. 606 to 630
Uganda Certified	— —
Uganda uncertified	Rs. 961
Cambodia best	Rs. 900 to 925
Cambodia average	Rs. 650 to 750

	Seed in maunds of 82 2/7 lbs.
Karunganni	Rs. 8.10 to 9.33
Tinny	Rs. 9.33 to 9.92
Cambodia	Rs. 6.50 to 7.66

South Arcot District: As it is off season the arrivals were poor and negligible. Villupuram market alone had an arrival of 3 pothis which was sold at an average price of Rs. 62.10 per pothi of 280 lbs. The trade was left with a balance of 37 pothis at the end of the month. There were no despatches during the month under report.

Groundnut: *South Arcot District:* Arrivals of summer crop were on the increase.

The market started with an opening balance of 1611 tons and the arrivals from the district produce amounted to 3375 tons, while receipt from other districts like North Arcot, Tiruchirapalli, Mathurai etc., came to 759 tons. There were no imports from other States. The off take by oil mills and country chekkus was 2562 tons and 364 tons respectively. Despatches to other districts like Madras, Chingleput, North Arcot, Salem, Tiruchirapalli, Tanjore etc., amounted to 903 tons and exports to Pondicherry amounted to 55 tons. Wastages were calculated at 196 tons. The stock with the trade at the end of the month stood 1665 tons.

Prices declined slightly due to increased arrivals. The average prices in the several markets ranged from Rs. 132.31 to 147.78 per candy of 531 lb. according to quality.

North Arcot District: The following were the stocks, arrivals, disposals and prices of groundnut at North Arcot markets during May, 1958.

In tons

Kind of Commericial Crops.	Opening balance.	Arrivals.	Disposals.	Closing balance.
Groundnut kernels	277	699	856	120
Groundnut pods	822	774	1217	379

Price Trend: There was only a slight increase in the price of oil by about Rs. 5/- per candy. Groundnut kernels that ruled at Rs. 130 to 155 per candy of 531 lb, oil Rs. 295 to 315 per candy of 500 lb. and pods Rs. 15 to 18 per bag of 80 lb.

Ramanathapuram District: The following were the arrivals, disposals and closing stocks of pods and kernels in Virudhunagar market during the month of May, 1958.

	Opening stock.	Receipts.	Disposals.	Closing stock.
Groundnut pods (in tons)	—	550	550	—
Groundnut kernels in candy of 531 lbs.	585	1300	1250	735

The following were the prices of pods, kernels, oils and oilcakes that prevailed during the month of May, 1958.

Groundnut pods in maunds of 82—2/7 lbs.	Rs.	12.16
Groundnut kernels in candy of 531 lbs.	Rs.	140 to 155
Groundnut oil per 35 lbs.	Rs.	19.50 to 20
Groundnut oilcake per maund of 82—2/7 lbs.	Rs.	7.75 to 9.66

Gingelly: *South Arcot District:* Vridhachalam market received 788 bags comprising 358 bags from the district produce and rest from outside the District, while Tindivanam market had an arrival of 19 bags and other markets nil. The oil mills consumed 16 bags and the country chekkus 796 bags. Despatches to other Districts amounted to 30 bags. The stock with the trade at the end of the month was 352 bags.

Prices improved slightly and the average worked out to Rs. 69.16 per bag of 168 lbs.

Tobacco: *Coimbatore District:* At the beginning of the month the market started with an opening balance of 10905 candies of chewing and 125 candies of cheroot tobacco arrivals into the market were 350 candies of chewing and 280 candies of cheroot tobacco during the month. The total arrivals about 3000 candies of chewing and 200 candies of cheroot tobacco were exported to Nilgiris, Salem, North Arcot, South Arcot, Tanjore in Madras State and places at Mysore, Bombay, Kerala and Andhra State.

The following were the price range:

Prices in Rs. per candy of 500 lbs.

Variety	I Grade	II Grade	III Grade
1. *Chewing tobacco (Sun-cured):*			
(a) Meenampalayam	255—310	200—250	100—180
(b) Other varieties	200—295	150—180	75—125
2. *Cheroot varieties:*			
Sun-cured grown in Erode and Bhavani Taluks	190—240	150—180	80—120
3. *Chewing tobacco:*			
Pit cured grown in Palladam and Sulur areas.	210—270	130—200	75—100

Cardamom: There was a good rainfall during the month in all the areas of Cardamom plantations in the Kerala hills as well as in Madurai district and other places. Spraying, dusting and weeding operations were in progress.

Estimated stock position during May, 1958 in different markets are as follows:

Quantity in lbs.

		Arrivals.	Despatches.	Closing balance.
1. Bodinaickanoor	...	92,000	71,000	33,000
2. Thevaram	...	Nil.	3,500	3,500
3. Pannaipuram	...	Nil.	10,000	10,000
4. Kombai	...	Nil.	1,000	2,000
5. Uthamapalayam	...	Nil.	Nil.	3,000
6. Cumbum	...	Nil.	40,000	15,000
7. Gudaloor	...	Nil.	3,000	Nil.
8. Pattiveerampatti	...	6,800	6,400	1,400
9. Virudhunagar	...	27,000	37,000	2,000

The minimum and maximum prices that prevailed during May, 1958 for the different trade qualities are given below:

Prices in Rs. per lb.

1. *Bodinaickanoor:*		
(1) Green	...	8 to 9.03
(2) Shipment	...	7.30 to 7.98
(3) Seeds	...	10.21 to 11.25

2349 lbs. of cardamom were sold in auction, by the Branch Association of the Cardamom planters of South India, Bodi during the month.

2. Market prices at other assembling centres like Thevaram, Pannaipuram, Kombai, Uthamapalayam, Cumbum and Gudaloor during May, 1958.

Prices in Rs. per lb.

(1) Green	...	7.81 to 9.00
(2) Shipment	...	7.50 to 7.75
3. *Pattiveeranpatti:*		
Sundried	...	9.39 to 10.14
,, inferior	...	7.64 to 8.87
Store green	...	9.80 to 10.42
,, inferior	...	7.47 to 8.87
Seeds	...	10.42 to 11.00
Splits	...	7.52
Lights	...	5.24 to 6.02
4. *Virudhunagar:*		
Green	...	8 to 8.75
Shipment	...	7.25 to 7.75
Seeds	...	10.75 to 11.25

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Review of Administrative Activities of Market Committees during May, 1958.

General: The Market Committees of South Arcot, North Arcot an Coimbatore continued to function during the month. The Marke Committees of Ramanathapuram and Tirunelvely could not function du to the cases pending with the Supreme Court.

Enforcement: The progress of licencing by Market Committee during the month were as follows:

Name of the Market Committees	Section 5 (1)		Section 5 (3)		Weighmen	
	A	B	A	B	A	B
South Arcot Market Committee	104	1386	68	976	60	91
North Arcot Market Committee	108	841	77	702	44	43
Coimbatore Market Committee	104	761	87	639	143	45

A = Issued during the month.

B = Issued up to the end of the month.

Meetings: A meeting of the South Arcot Market Committee wa held on 24—5—1958; 31 subjects were disposed of.

An ordinary meeting of the North Arcot Market Committee wa held and 16 subjects were disposed of.

Quality Analysis: Nil.

Quality Competition: Nil.

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Announcement

THE RAMASASTRULU MUNAGALA PRIZE, 1958.

The last date for receipt of papers for the above award has been extended up to 31st July 1958.

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