

MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.

1009

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Dated 30-6-1870 19

Not to be folded or roughly handledJ
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*Proceedings of the Madras Government, Revenue Department,
30th June 1870.*

No. 440. Read the following Proceedings of the Board of Revenue, dated 16th May 1870, No. 3,329:—

Read the following letter from the Honorary Secretary, Government Farm, to the Acting Secretary to the Board of Revenue, dated Madras, 6th April 1870, No. 7.

I HAVE the honour to enclose a report by Mr. Robertson on the experimental cultivation of Queensland Maize at the Government Farm at Sydapet.

2. The successful introduction of this Maize into the Madras Presidency and the method of its cultivation cannot, the Farm Committee think, be too widely made known.

ENCLOSURE No. 1.

Experiments with Queensland Maize under dry cultivation.

On the 9th of October 1869, 240 pounds of yellow Maize was received from Sydney: it was a good fresh sample of the "one-hundred-and-twenty-day variety," and contained 82 per cent. of vital seed, dried at 212 degrees Fahrenheit. Seventy-eight grains weighed an ounce. It was distributed as follows:—

	Pounds.
To Collectors	68
Sown in vacancies in general crop	15
Do. for experimental purposes	157

2. *Soils.*—The soils of the different experimental plots are very similar in composition. As they have already been described in former Reports, I would only remark that, they are very poor and hungry, and contain on the average nearly 90 per cent. of sand.

3. *Preparation of the seed.*—To prevent squirrels, rats, crows, etc., destroying the seed, it was all tarred. The process is as follows:—Take one and-a-half pints (about half a Madras measure) of hot water, and add about one-twelfth of a pint (about one-fourth of an ollock) of tar, stir well together. After allowing the solution to cool, pour it through about twenty measures of Maize, mix thoroughly, until the seed assumes a dark mahogany colour; it must then be dusted with sand, saw-dust, or dry earth, to prevent the seeds adhering together, and will be ready for sowing. In America it is usual to steep the seed for ten or twelve hours before it undergoes this process; but I have not found steeping to answer here, excepting during dull or showery weather, the dry condition of the soil and the great heat of the sun, being injurious to the vitality of the seed when in a softened condition. Whether this arises from the rupture of the cells by the too rapid escape of moisture, or from the silicious coating of the seed having been destroyed, rendering it less able to withstand the effects of a high temperature, I am unable to say. However, I have not found it beneficial to steep seed before sowing, when there is less than 10 per cent. of moisture in the soil, or when the temperature in the shade, exceeds 80 degrees.

The areas of the different plots, the quantities of seed sown, and the dates of the sowings are as follow:—

	Area in yards.	Date of sowing.	Actual amount of seed sown.	Seed sown per acre.
			Pounds.	Pounds.
Plot 1	5,774	October 12	36	30
" 2	10,647	" 18	54	25
" 3	6,044	" 31	40	32
" 4	4,918	" 26	27	26
Total...			157	...

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4. *Cultivation.*—The land being in good order, a deep ploughing and a single cultivation at right angles to the line of the plough was sufficient to prepare it for ridging. Ridging was performed by the double mould board-plough. The drills were placed thirty-six inches apart; the manure was spread in the open furrows between the drills. To Plot 1, it was applied at the rate of twenty-five tons per acre; to Plot 2, at the rate of fifteen tons; and to Plot 3, at the rate of twenty tons. To Plot 1 in addition two cwt. of bone-dust was applied. No manure was applied to Plot 4, the soil being in good condition, having carried no grain-crop since it was reclaimed from the jungle. After spreading the manure the ridges or drills were split through the centre by the double mould board-plough, the soil falling on the manure on either side, and forming new drills. These drills were then consolidated and reduced to half their height by a single operation of the chain-harrows. A uniform seed-bed being formed a gang of coolies then passed along the drills, making holes about two inches deep and ten or twelve inches apart. Into these holes the seeds, was deposited by a gang of coolies following. Another turn of the chain-harrows completed the work.

The after-cultivation consisted of two hand-hoeings and three bullock-hoeings. So effectual was this cultivation that, after harvesting the Maize, it was only necessary to plough once, to prepare for Gram, no weeding or any other cultivation being requisite. Estimating a pair of bullocks, driver, etc., to cost 12 Annas per day, and a cooly Rupees 5 per month, the average cost per acre will be nearly as follows:—

	RS.	A.	P.
1 Ploughing	1	0	0
1 Cultivating	0	6	0
Collecting weeds	0	12	0
1 Chain-harrowing	0	2	0
Ridging	0	8	0
Spreading manure	0	6	0
Splitting ridges	0	8	0
1 Chain-harrowing	0	2	0
Seed, 28½ lbs.	0	10	0
Preparation of seed and sowing	0	12	0
Cultivation during growth—			
2 Hand-hoeings	2	0	0
3 Bullock-hoeings	1	8	0
Scaring birds	0	8	0
	0	2	0

The farm-yard manure was worth 1 Rupee per ton, and the bone-dust 2½ Rupees per cwt. As these were only "four months' crops," and as they would appropriate only a very small proportion of the manure applied, it would be *unfair* to debit them with the whole cost of the manure. In this country there is no reliable data for calculating the duration of a manure: in England it is usual on heavy soils to charge farm-yard manure over four years, and on light soils, over three years. However, I am not acquainted with any cultivated soils in *India* and so poor as those constituting this Farm, and will, in these calculations, assume that the fertilising effects of fold-yard manure will only continue to operate during two years, and of bone-dust, during three years.

5. *Observations during growth.*—The plants appeared above ground four or five days after sowing, and in a fortnight after, were six inches high. At the end of six weeks they began to flower, when their heights varied from six to seven feet. The weather was favourable during the early growth of the crop, and during the month of November especially so. The temperature in the shade ranged from 72 to 78 degrees, and showers were very frequent. Rain fell on twenty days in November, the total fall being 8.35 inches; during December the

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weather was not so favourable, though the showers between the 11th and 16th were very beneficial. Rain fell on nine days during this month, the total fall being 5.24 inches. No rain fell between the 25th of December and 15th January, and in consequence the crops suffered severely, many fine plants withering from the deficiency of moisture—the fact that nine-tenths of the soil consisted of sand must be remembered. On the 16th of January a severe storm of wind and rain broke over this district, and the whole of the plants in Plots 1 and 2 were levelled to the ground: considerable damage was done to the plants on Plots 3 and 4. However, on these the cobs were just beginning to form, and the destruction was not so complete. It was deemed absolutely necessary to cut down at once the whole of the crop on Plots 1 and 2. Before this storm took place the appearance these crops presented was very fine: the plants were from ten to eleven feet high, and many of the stalks at half their height were four inches in circumference, and the crops were level and uniform throughout.

6. *Harvesting.*—Only about a month having elapsed since the bulk of the plants on Plots 1 and 2 were in flower, much the greatest proportion of the cobs were green and immature when this storm occurred—indeed, not 5 per cent. of the cobs were fit for gathering. It was useless, under the circumstances, to leave them longer in the field; we therefore commenced gathering the cobs on the 17th. They were easily broken off with the hand; they were then carted to the shed, and peeling commenced immediately afterwards. The outer skin was entirely removed, and the inner skin merely turned back so as to expose the grain to the free action of the air. By means of the inner skin the cobs were tied together in pairs; they were suspended over ropes stretched across the rooms where they remained until fit for shelling. The cobs being so thoroughly soaked by the heavy rain, it was necessary, in order to prevent the corn moulding or sprouting, to dry them as rapidly as possible. Under ordinary circumstances, in a dry climate like this, I would prefer to leave the skin on the cobs until the grain is glazed and fully hardened. When the skin is removed too early the grain dries very quickly, and the sample is shriveled and inferior. Neither would it be necessary to suspend the cobs over lines, as was done in the instances recorded. If well matured and gathered during favourable weather, very simple precautions will suffice, to prevent the corn heating. The fresh cobs before peeling weighed as follows:—

	Actual weight.	Weight per acre.
	TONS. CWT. LBS.	TONS. CWT. LBS.
Plot 1	3 3 24	2 12 13
" 2	3 5 102	1 9 92
" 3	0 17 28	0 12 105
" 4	1 1 14	1 0 59

After the removal of the cobs the straw was cut down, and after drying, was stacked. When perfectly dry and fit for stacking, it weighed as follows:—

	Actual weight.	Weight per acre.
	TONS. CWT. LBS.	TONS. CWT. LBS.
Plot 1	3 6 64	2 4 16
" 2	3 15 11	1 14 0
" 3	3 4 103	2 11 10
" 4	3 8 49	3 7 39

The straw was very rich in saccharine matters—indeed it was so sweet, that I frequently noticed the coolies with pieces in their hand eating it, as they would eat sugar-cane. It was stacked for

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consumption during the hot season. All kind of stock are particularly fond of it. The average cost per acre for harvesting, etc., was as follows :—

	RS.	A.	P.
Gathering cobs	1	8	0
Carting do.	0	6	0
Peeling, tying, hanging, etc.	1	8	0
Shelling cobs, etc.	0	8	0
Reaping and sheafing straw...	1	0	0
Carting, etc.	0	12	0
Total	4	10	0

The shelling of the cobs was chiefly performed by a small Maize-sheller made by Mr. W. G. Ainsworth, Sydney. With this machine two men can shell 450 pounds of cobs per hour. The cost of the machine is about fifty shillings in Australia. The work is done very satisfactorily. A large shelling-machine, made by Ransomes and Sims, was occasionally employed, but the work done by it was much more costly: it required three men to work it, and only husked 350 lbs. of cobs per hour. This machine cost £10 in England. It does not separate the corn satisfactorily.

7. *Yield of grain, etc.*—The grain was not weighed until it was thoroughly dried—indeed, not until it was in a condition fit for packing: the returns are therefore 15 or 20 per cent. lower than they would have been, had it been weighed in ordinary marketable condition. The following returns show the weight of grain obtained :—

	Actual weight.	Weight per acre.
	Pounds.	Pounds.
Plot 1	1,851	1,551
" 2	1,877	854
" 3	1,063	831
" 4	850	836

As issued for seed the sample contained 96 per cent. of vital grain. One Madras measure weighed 2 lbs. 12½ ounces; and when dried at 212 degrees Fahrenheit, 85 grains weighed 1 ounce. When thoroughly seasoned 20 average-sized cobs yielded from 7 to 7½ pounds of Maize. I have no personal knowledge of the proportion of corn that average-sized, native-grown cobs yield. The following is the only instance bearing on the subject that has come within my own knowledge:—Being anxious to experiment with Maize, a supply was obtained in the Vellore District: it consisted of 10,300 cobs of the yellow variety. After drying the cobs were shelled, and the total yield of grain was only 338 pounds. Thirty cobs only yielded one pound of grain: thus one Queensland Maize-cob yielded more grain than 12 of the Vellore cobs.

Financial Results.—Valuing the straw at Rupees 10 per ton, and the grain at Rupees 50 per ton (about 15 measures per Rupee)—prices I would readily give for either straw or grain of similar quality—we have the following results :—

	Value of straw per acre.	Value of grain per acre.	Total return per acre.
	RS. A. P.	RS. A. P.	RS. A. P.
Plot 1	22 1 0	34 9 11	56 10 11
" 2	17 0 0	19 1 0	36 1 0
" 3	25 8 0	18 15 0	44 7 0
" 4	33 8 2	18 10 0	52 2 2

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The following is the average cost of production :—

	Cost of cultivation per acre.	Proportionate value of manure per acre.	Cost of harvesting per acre.	Total per acre.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Plot 1	9 2 0	14 2 8	4 10 0	27 14 8
" 2	9 2 0	7 8 0	4 10 0	21 0 0
" 3	9 2 0	10 0 0	4 10 0	23 12 0
" 4	9 2 0	...	4 10 0	13 12 0

The matter will stand thus :—

	Plot 1 per acre.	Plot 2 per acre.	Plot 3 per acre.	Plot 4 per acre.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Value of straw and grain	56 10 11	36 1 0	44 7 0	52 2 2
Cost of production, etc.	27 14 8	21 0 0	23 12 0	13 12 0
Profit per acre	28 12 3	15 1 0	20 11 0	38 6 2

The large profit made on Plot 4 is due altogether to exceptional circumstances. The yield of grain from Plots 1 and 2 would have been much greater had not the effects of the storm caused the crop to be harvested before being matured. In forming any conclusion on the results of these experiments, the wretched nature of the soil must not be lost sight of. Not only is it very poor in the elements of plant-food, but it is physically a bad soil. It parts with its moisture too rapidly, and during hot weather becomes very hard and compact. However, if such soils—and there is a large area of similar soils in an uncultivated state in this district—will under Maize give a profit of 25 Rupees per acre, the profit from Maize cultivation on good soils must be large.

In the district enjoying the north-east monsoon Maize can be harvested in ample time to allow of a Gram-crop being obtained before the hot season commences. Indeed, I question whether Gram can be grown under more favourable circumstance than after a well-cultivated Maize-crop: the best Gram now growing at the Farm is on the land where the Maize was grown. The profits from the Gram-crop will be sufficient to pay rent and other charges not debited to the Maize.

Nutritive value of Maize.—As a food for the people Maize is greatly superior to Ragi, Cumbao, Cholum, &c. Many natives are extremely fond of it: though we protected our crops with the greatest care, it was impossible to prevent a large number of cobs being carried away. In America and several other countries it forms the staple-food of the people; and it is not less valuable as a food for farm-stock. Horses, cattle, sheep, pigs, and poultry eat it and thrive on it. A paragraph has recently been going the round of the Agricultural Newspapers, stating that; the London Omnibus Company cleared £50,000 last year by substituting Maize for Oats in feeding their horses, and that, the horses have done their work better, and have had less disease amongst them than when fed with Oats. I have not had an opportunity of experimenting with Maize to any extent in feeding horses in this country: I have, however, used a considerable quantity in feeding working-bullocks, and in the manufacture of mutton. Amongst other experiments, the following were made to determine the relative feeding-values of Gram and Maize, when given to working-cattle and feeding-sheep :—

	February 2.	February 12.	February 22.	March 4.	March 14.	March 24.
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.
Working-cattle.						
Weight of the pair fed on Maize	1,762	1,765	1,799	1,806	1,806	1,823
" " on Gram	1,765	1,789	1,767	1,759	1,786	1,768

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The animals were fed per day as below :—

1 Pair...	6 lbs. of Maize.
	5 " of Tour.
	100 " of Cholum fodder.
1 " ...	6 " of Gram.
	5 " of Tour.
	100 " of Cholum fodder.

To be quite sure that the animals were similarly worked, I gave one animal in each pair Gram, and one animal in each pair Maize. Thus:—

1 Pair	1 Bullock	...	...	...	...	...	Gram.
	1 "	...	...	...	...	...	Maize.
1 "	1 "	...	...	...	...	...	Gram.
	1 "	...	...	...	...	...	Maize.

For the first few days the Maize was not readily eaten : however, at the end of a couple of weeks they eat it freely, and continued increasing in weight until, at the termination of the experiment, they had increased 71 pounds in weight. The other pair eat Gram from the first, but they never made the progress made by the pair fed on Maize; and at the termination of the experiment had only increased 3 pounds in weight.

Two lots of sheep, containing 6 wethers each, were put on to feed on the 2nd of February last. Each lot had as much Gram-fodder as the animals could eat. Besides the Gram-fodder, Lot 1 consumed daily 3 pounds of Bran and 6 pounds of Maize, and Lot 2, 3 pounds of Bran and 6 pounds of Gram : the results are as follow :—

Date of weighings		Fed on Gram, average weight per head.	Fed on Maize, average weight per head.
		Pounds.	Pounds.
February, 2	...	38.75	37
" 12	...	39	37.33
" 22	...	40.83	37.33
March 4	...	43.83	39.66
" 14	...	44.33	42.80
" 24	...	45	45

As in the case of the cattle-experiment, so in this case, the Maize was novel to the animals, and was not eaten readily during the early part of the experiment. However, as soon as the animals got to like it, they made greater progress than those on Gram. At the termination of the experiment those on Maize had increased 8 pounds per head, while those on Gram had only increased 6.25 pounds per head. Satisfactory as these results are, I believe they would have been more so had the Maize and Gram been crushed and mixed together before being distributed to the animals. Gram and Maize serve different purposes in the animal economy: the former is a flesh or muscle producer, while the latter is a heat or fat former.

SUMMARY.

1. The seed is preserved from the attacks of squirrels, crows, etc., when perfectly tarred.
2. It is only advisable to steep the seed when the weather is dull and showery.
3. The seed is best sown on drills about three feet apart with intervals of ten or twelve inches between the seed. It may be planted two inches deep, at the rate of 30 pounds per acre.
4. Maize should always be well manured: from fifteen to twenty tons per acre may profitably be applied.
5. The cobs should be well matured before being gathered. If the weather during the harvesting of the crop be favourable the skins are best kept on the cobs until the seed is perfectly hardened and glazed.

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6. From 2½ to 3 tons of dry straw per acre may be expected; it is rich in saccharine matters, and is valuable for all kind of farm-stock.

7. On good soils 2,000 pounds of grain may be grown per acre without extraordinary management.

8. One average-sized Queensland cob yielded more grain than 12 of the cobs grown in the Vellore District.

9. The average cost of production may be estimated at Rupees 25, while the gross return will vary according to the quality of the soil from Rupees 50 to Rupees 60 per acre.

10. The profit may vary from 25 to 30 Rupees per acre according to the quality of the soil: the better the cultivation, the larger the profits.

11. Queensland Maize is only a 4-month crop, and may be harvested in time to allow of a crop of Gram being grown before the commencement of the hot season.

12. Maize is valuable as a food for the people, more so, indeed, than Ragi, Cholum, Cumbao, etc., generally cultivated in this district.

13. Maize is valuable for all kind of farm-stock. Working bullocks fed on Maize increased 71 pounds in weight, whilst these fed on a similar quantity of Gram only increased 3 pounds.

14. Sheep yield more mutton when fed on Maize than on Gram.

15. Maize can be sold at 50 Rupees per ton, and leave a handsome profit to the cultivator.

16. The large quantity of straw yielded by a crop of Maize renders this crop particularly valuable in a country like this.

17. Maize can be profitably cultivated on a soil so poor as one containing 90 per cent of sand; but the better the soil, the better will be the crop.

18. Maize for feeding-purposes is best given crushed and mixed with some other food.

SYDAPET,
2nd April 1870.

(Signed) W. R. ROBERTSON,
Superintendent, Government Experimental Farm.

SUBMITTED to Government.

2. The Board would suggest that Mr. Robertson's valuable paper should be printed and circulated to Collectors, with spare copies for distribution, as also to the Remount Agent and the several Rajahs and more enlightened landholders who show an interest in the agricultural prosperity of the country. The summary might be published in the District Gazettes.

3. The Board consider that Mr. Robertson's very full and interesting report is deserving of much praise.

No. 441. ORDER THEREON, 30th June 1870, No. 1,009.

Miscellaneous.

English...	200
Tamil ...	2,000
Telugu...	1,800

THE marginally noted number of copies of Mr. Robertson's Report will be struck off at the Government Press. The summary only should be published in all the District Gazettes in the vernacular of the district.

(True Extract.)

(Signed) H. E. STOKES,
Under-Secretary to Government.

To the Board of Revenue.
,, the Superintendent, Government Press.

Exd. F. R. Bantleman.

John

1870.

Under date the 30th June 1870.

Read the following. *Proceedings*

of the Board of Revenue.

M.E. 16 May 1840 No. 3329.

Submy. Report from Superintendent
Govt. Farm Committee, on experi-
mental cultivation of Jerusalem
Mauze, with suggestion that it should
be printed & circulated to fanners, &c.

The marginally noted number of copies of Mr. Robertson's report will be struck off at the Govt. Press. The summary only should be published in all the District Gazettes in the vernacular of the district.

Open.

English - 200.
Tamil - 2000.
Telugu - 1000.

N

J. H.

[Signature]

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Gen. a. a. a. a. 1 - Leaf for Pref.

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Cost. of 1870. \$110,000.

REVIEW:

THE BOARD OF REVENUE.

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Dated June, 30th

Recd

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G. O., 30th June 1870, No. 1,009.

JOE

NO. 440-441.

Experimental cultivation of Queensland Maize—Farm Superintendent's Report ordered to be printed in English, Tamil, and Telugu at the Government Press, and the summary only published in all the District Gazettes in the vernacular of the district.

