Regd. No. M. 5155

THE

Madras Agricultural Journal

GOLDEN JUBILEE YEAR

Vol. XLVIII July 1961 No. 7

CONTENTS

Published by

THE MADRAS AGRICULTURAL STUDENTS' UNION,

(M. A. S. U.)

ESTABLISHED: 1911

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE,

COIMBATORE, S. INDIA.

Annual Subscription:

Inland Rs. 8·00

Foreign Rs. 9·00

Single Copy Rs. 0·70

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Editorial

The importance of water in successful agriculture has been fully realized for ages. Well designed irrigation and drainage systems were existent in the Mohan-Jo-Daro civilization of the Indian valley. The ancient aqueducts and reservoirs, some of them still in use, bring out the creative imagination, skill and co-operative ventures of the people of the earlier days in the proper utilization of water for their betterment. There has, probably, been no other article essential for human life, welfare and development that has exerted as profound an influence on man's attitudes, disposition and civilisation as water. Great ancient civilisations have been associated with great water courses of the Nile, Euphrates and Tigiris and Indus-Ganges. They have waxed and waned in unison with the river waters.

Even to day the prosperity of a country is dependent to a great extent on this important factor, the water. Every effort is made for its proper utilisation. The construction of dams across rivers and streams and regulating the supply for irrigational purposes has gone ahead in the Plan periods. Improvement of minor irrigation links to give the maximum utility has also been given much impetus. The concentration of the Government in the programme of energising tube wells and electrical pumps linked to wells recorded a full utilisation.

With all the great stress as has been placed for a sound water supply for agriculture, power, industry, navigation and for human and animal consumption, there has been serious situations which have arisen frequently in the recent years. The droughty months in summer have seen the want of adequate supply; the rainy months especially when the rains have been more than the anticipated, there had been the floods as experienced recently. Man with his scientific knowledge is striving to meet the forces of nature to his advantage. Seeding the clouds to stimulate more precipitation and desalinisation of sea water for agricultural purposes are two of the great efforts in this direction. Controlling the torrential flows in rivers and streams

by impounding them has been successful to a great extent. However, in all these, there is still more to be conquered than what has been achieved.

A concerted programme for tackling the watershed areas will go a long way in getting the desired effects. Discriminate planting of trees, maintenance of natural grasslands and eliminating the indifferent type of cultivation and grazing in such watershed areas are a few of the essential features. Building up of balancing reservoirs in the upper reaches of streams and rivers above the dam sites is under active consideration. The soil conservation and flood control programmes deserve active implementation in the watershed areas. Desilting of the dams, the canals and tank beds periodically is another important aspect. The strengthening of the bunds of tanks and canals with proper revetment appears to be another immediate necessity. Choking up of waterways by aquatic weeds, some of which have assumed menacing positions, is a pressing problem to be tackled.

Manurial Potential of India *

by

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The secret of good farming is the maintenance of soil fertility. It must be accepted as an axiom in agriculture that what is taken off the land in crops must in some way be put back into the soil or else soil will suffer exhaustion, and starvation of the soil is said to be the root cause of human starvation.

Plants require a number of essential elements. Nitrogen, phosphoric acid and potash are called the chief fertiliser elements. Their requirements depend on the nature of crops raised as well as soil conditions. Bulk of nitrogen supply of any normal soil is present as a constituent of the decayed or decaying plant and animal materials, including microbes, all of which are grouped together under 'organic matter'. In addition to organic nitrogen, the soil contains small amounts of nitrogen in inorganic form, mainly nitrates and to some extent as ammonium compounds. Quantities of both organic and inorganic nitrogen found in the soil vary greatly from soil to soil.

Small amounts of inorganic nitrogen are immediately available for plant use while the larger supply of organic nitrogen is not. But the two are linked through a biological process by which the latter is tranformed, into the former. This change is brought about through the action of soil micro-organisms and is going on continuously at rates which vary according to environmental or other conditions. Because of this process, it is the total nitrogen content which is most important in evaluating the nitrogen fertility status of the soil. Even though only a small part of the total nitrogen is utilised by plants at any given time, eventially, most of it becomes available.

Total nitrogen values of Indian soils are low, compared to those of many other regions of the world. For example, soils of the mid-western United States or of England, average considerably higher, perhaps twice or thrice as high. The relatively low total nitrogen content of Indian soils is partly due to climate and partly

* The author who is personally responsible for the views expressed will feel obliged for any useful comments.

to differences in regional agricultural practices. It is almost impossible to maintain as high a content of organic matter in the soil of tropics as of temperate zones due to climate.

There are in India four broad categories of soils - red, laterite and lateritic, black and alluvial. Red, Black and alluvial soils are deficient in N, P_2O_5 and humus while in lateritic soils the major problem is of P_2O_5 and lime deficiency. The remaining three types have sufficient potash and lime. A majore portion of the cultivated area in the country is deficient in N and P_2O_5 (21). Augustus, 1893).

More work on systematic lines has, however, to be done to find out the full utility of P_2O_5 and K_2O. Some inconclusive data show that phosphates and potassic fertilisers, besides increasing the yield and improving the quality of grain, also help to maintain the fertility of the soil, (8). There is yet an urgent need for an exhaustive soil study in the country. Royal Commission on Agriculture recommended a comprehensive soil map of India. It is time that concrete steps are taken in the direction.

Whatever the existing position, for a long-term development of agriculture, it is extremely necessary to have an idea of the existing sources of plant nutrients and their future potentialities.

Existing Sources of Supply: Since agricultural production in India has reached a sort of an equilibrium stage over a long period, it would be wrong to say that our soils are being depleted by about 2 million tons of nitrogen annually at the existing level. (16). Having exhausted the soil bank of the country over a number of years, a balance has now been established which means that whatever is being removed from the soil is being replenished in one or the other form (17). If this was not so, a constant drain of such a heavy magnitude would bring our averageyields toppling down. They on the other hand have shown some increases during the past few years.

The supply of crop nutrients to the soil is either from tangible sources like cow dung manure, green manure and fertilisers or a number of miscellaneous sources which cannot be precisely accounted for.

Cattle Dung: According to a pilot survey conducted by the Economic and Statistical Adviser to the Government of Madras, in 150 villages of Chingleput district, farm-yard manure which supplied

by far the largest quantity of manures, provided only 26 per cent of the manurial requirements of the District. It was held that this was true of other Districts as well.

Average quantity used per acre there was about 30 maunds of farm yard manure or roughly 9 lb of nitrogen per acre (4). It is a matter of common knowledge that the use of manures in areas of scanty rainfall or without irrigation, is very little. And such areas for the country as a whole are more than two-thirds. Use of manure in the Bengal region under study can be considered as quite above the all-India average.

It would have been very useful if similar studies were available for the country as a whole. But in the absence of any such data, we may assume that on an all-India basis, some 20 to 25 per cent of nitrogen requirements of the soil are being supplied from farm yard manure. If total requirements of nitrogen at present are 3 million tons, the share of cow dung etc. would be of the order of 0·7 million tons. This works out to just 5 lb. per acre for the total cropped area.

Other Sources: As for the balance of 2·3 million tons of nitrogen, during 1955–'56, 0·14 million ton was supplied by chemical fertilisers and roughly another 0·15 million ton by tangible sources like city compost, green manures and oil cakes etc. (18). Remaining 2·0 million tons can thus be considered as the contribution of sources like:

(i) Urine and excreta of cattle while on the field as well as sheep penning etc.

(ii) Human urine and excreta from rural areas where open field latrine system exists

(iii) Plant roots and other vegetable matter left in the field.

(iv) Atmospheric fixture of nitrogen from the air and rain.

(v) Miscellaneous sources like 'rab' system, fish manure etc.

Potentialities of Organic Sources: Cattle and human population of India should normally come in quite handy for providing plant nutrients to the soil. On cent per cent utilization, they alone can supply (Table 1) about 14 million tons of nitrogen.

Assuming that the miscellaneous sources as detailed will continue to supply 2·0 million tons of nitrogen, we would be left with hardly 3·3 million tons of origanic sources from stabled livestock that

can be tapped further. This may be an under-estimate because the quantity of dung excreted by well fed cattle will increase by about 100 per cent.

TABLE 1.

Manurial potential of livestock and human beings.

Source	Number (million)	Quantity per unit per day (lbs)	Quantity total annual m. tons	Percentage constituents N.	Percentage constituents P_2O_5	Percentage constituents K_2O	Total constituents per year '000' tons N.	Total constituents per year '000' tons P_2O_5	Total constituents per year '000' tons K_2O
Cattle ...	*158·6*	*33*	*891*	*0·3*	0·3	0·2	*2673*	*1336*	*1782*
Adult ...	114·8	40	748	0·3	0.15	0·2	2244	1122	1496
Youngstock ...	43·8	20	143	0·3	0·15	0·2	429	214	286
Buffaloes ...	*44·9*	*39*	*287*	0·3	0·15	0·2	*861*	*431*	*574*
Adult ...	28·8	50	235	0·3	0·15	0·2	705	353	470
Youngstock ...	61·1	20	52	0·3	0·15	0·2	156	78	104
Total Cattle & Buffaloes..	203·5	35	1178	0·3	0·15	0·2	3534	1767	2356
Sheep & goat..	94·6	15	231	0·8	0·6	0·3	1848	1386	693
Horses & ponies	1·5	40	10	0·5	0·4	0·3	50	40	30
Other livestock	6·8	25	28	0·6	0·5	0·5	168	140	140
Total livestock	306·5	29	1447	—	—	—	5600	3333	3219
Poultry ...	94·7	25	0·8	1·6	1·5	0·9	13	12	7
Total ...	401·2	—	1447	—	—	—	5613	3345	3226
Livestock urine ...	307·1	15	751	0·8	0·01	1·4	6008	75	10514
Cattle bones...	30 *	30	0·401	3·0	23·5	—	12	942	—
Human excreta & urine ...	550	4	359	0·7	0·3	0·2	2513	1077	718
Total ...	—	—	—	—	—	—	14146	5439	14458

* This has been calculated at 15% cattle mortality.

The next question that calls for examination is the quantity of nitrogen that can be easily tapped from these tangible sources. China, where use of the organic sources is superb, has not been able to utilise more than 70 per cent of its night soil and 60 per cent of the stable manure (10). It would be an achievement if we can succeed to utilise a total of about 50 per cent or roughly 2 million tons of N from these potential tangible sources. This along with 2·0 million tons from miscellaneous sources would work out to hardly 30 per cent of the total organic resources of the country. Additional quantity of nitrogen that can be tapped from this source would thus be of the order of 1·3 million tons. This is because 0·7 million tons out of this is already being utilised.

If 1·3 million tons of additional nitrogen is to be procured from cow dung, that would mean an organised effort not only to educate the cultivator for the proper conservation of farm yard manure and farm waste, but also to provide an alternative source of fuel for him.

Quantity of dung (sun dry) being burnt at presant has been estimated from 80 to 250 million tons (13). Since fuel requirements will be increasing with the increase in population, possibility is that pressure on cow dung for burning will correspondly increase. Assuming that additional demand will be met from what is being wasted at present, we will have to chalk out a programme for replacing 1·3 million tons of nitrogen or say 90 million tons of sun-dry dung. This can be done either by setting up cowdung gas plants in the areas concerned or providing fuel wood at a reasonable price.

Town and Village Compost: As regards sewage and sullage, legislation has been passed by various State Governments compelling all Corporations, Municipalities and Town Committees not to waste urban refuse. Table 2 shows the potential capacity of compost from this source.

TABLE 2.

Sewage and sullage compost potentialities.

Source	Population (millions)	Compot * (thousand tons)
Corporation	10	1000
Muncipalities	32	3200
Town committees	20	2000
Total	62	6200

* Normally 1 million population is assumed to produce 100 thousand tons of compost.

This estimate of 6200 thousand tons of city compost is based on the population of 62 million. Potential city population available for compost by 1980–81 may be about 190 millions.

Besides this, efforts are also being made to educate bigger Panchayats for the use of night soil. Sufficient progress in this direction can also be expected during the coming 20 years. It can,

under the circumstances, be reasonably assumed that with some additions from Panchayats and short-falls from cities, total potentialities from city compost etc, may be 20,000 thousand tons. Working at 0·8 per cent of N, (5) plant nutrients released may be 1960 thousand tons

Town sewage and sullage water is the other potential source which is being tapped and can most conveniently be utilised for the supply of necessary plant nutrients. Report of the Expert Committee on Manures & Fertilisers calculated that 40,000 tons of N and 16,000 tons of P_2O_5 could be harnessed from this source by the end of first plan period. Sewage and sullage can be assumed to provide plant nutrients approximately equal to city compost.

Other Waste Products: There are a lot of other village waste products, which can be utilised (7) Sources of specific waste-organic materials exist in different localities which can be turned into compost manure (5). Forest areas in India cover about 100 million acres which can yield leaf litter for producing 10-15 million tons of compost per annum. About 4 million acres under sugarcane in India can provide sugarcane trash for 12-15 million tons of compost. It is estimated that nearly 1,00,000 acres of tanks, canals and pond areas in West Bengal, Orissa, Bihar, U. P. and Travancore alone are infested with water hyacinth and it would be possible to make nearly 1 million tons of good quality compost by utilising this source. Other waste materials of this type like groundnut husk, tea and coffee wastes, tobacco waste, dried blood meal, etc., where available, could be usefully put into compost pits.

Potentialities from some of these sources are shown in table 3.

TABLE 3.

Manurial potentialities from some waste products.

Source	Compost million tons	Constituents N	P_2O_5	K_2O
			(thousand tons)	
Forest leaf litter	12	120	84	120
Sugar cane trash	13	13	13	18
Water hyacinth	1	3	3	5
Dried blood meal (sheep and goat slaughtered)	0·02	25	—	—
Total	26·02	161	100	143

It would not be difficult to use at least 50 per cent of these tangible waste products. This works out to something like 80,000 tons of N, 50,000 tons of P_2O_5 and 70,000 tons of K_2O.

A number of experiments have been carried out at the Sheilla Dhar Institute of Soil Science, Allahabad for the utilisation of other waste materials like coal and basic slag as manure. It has been shown that besides supplying nutrients which in itself contains, it helps to fix atmospheric nitrogen and also release phosphates of the soil. (3). It may be difficult to assess the total potentialities of such like sources on the basis of limited experiments conducted at one Institute. But they cannot be ignored. Further experiments may be conducted and if found useful, these resources may also be tapped.

Green Manuring: Besides fixing nitrogen from the atmosphere and improving the physical condition of soil, green manures also release locked phosphates (19). Crops raised for green manuring also serve other useful purposes with certain other objects, i. e., they act as catch crops, shade crops, cover crops or forage crops (12). Appendix D explains the culture of legumes like green manures. Although rich in N green manures also supply sufficient quantities of P_2O_5 and K_2O (Table 4) on air dry basis (11).

TABLE 4.

Constituents of some important green manures.

Materials	Composition N.	P_2O_5	K_2O
		(Percent)	
Dhaincha	3·5	0·6	1·2
Sunnhemp	2·3	0·5	1·8
Wild indigo plant	1·8	0·2	0·6
Leaves	3·2	0·3	1·3
Tephrosia Candida	2·0	0·7	1·0
Prickly pear	0·3	1·2	1·1
Rain tree leaves	3·3	1·3	1·1
Forest leaves	1·2	0·6	0·4
Tea prunings	2·4	0·5	1·3
Green weeds	0·8	0·3	0·2
Sea weeds	1·1	0·3	3·0
Fern weeds	3·1	0·5	3·0
Redgram plant	2·8	0·4	2·0

The Technique: Maximum benefit from green manuring cannot be derived without knowing when to grow and when to burry the green matter under the top soil. There is a great need for providing correct time gap between burying a green manure crop and sowing the next crop. Otherwise nourishment provided by the manure would not be available in full, and there may be competition between soil microbes of the crop for nutrients and moisture. This period may be about eight weeks in the case of wheat and barley and less than a week in the case of paddy.

Limitations: With all the advantages of green manuring, there are some limitations which must be given due consideration.

1. It is not possible to green manure dry lands. A minimum of 30 inches of rainfall or irrigation is necessary (10).
2. It has also been stated that the question of growing green manure crops on the field and burying it into the soil was rather impossible in many localities in Kerala because of the very heavy rainfall which begins from early June to the middle of September; total rainfall being about 80 to 90 inches on an average.
3. Availability of seed at the proper time. Some of these problems are now being satisfactorily solved (1). Orissa Government, for example, launched a very comprehensive scheme for the supply of *Dhaincha* seed packets to each of the cultivator. The two ounce seed packet sufficient for sowing one acre is sown on the borders. This is capable of providing sufficient seed for 3 acres at the end of the crop. Supply of seeds having been assured, area under green manuring in Orissa has gone up from a thousand acres in 1957–'58 to million acres in 1959–'60.

Green manuring is already very popular in Andhra and Madras. If Orissa also demonstrates its feasibility, we would be in a better position to gauge the potentialities of green manuring.

Potentialities of green manuring: Since rainfall in India is not well distributed and there are surprisingly large variations in the amount of precipitation received from year to year, we would be restricting ourselves to only those areas where annual rainfall is round about 50 inches and above. With about 72 million acres of unirrigated assured rainfall area and 135 million acres of other irrigated areas, green manuring should technically be possible on 207 million acres of cropped area.

In a perspective of 20 years it can be assumed that many changes may take place in rural India. We may under the circumstances fix a target of about 80 million acres which may be green manured and at the rate of 25–30 lbs per acre, it would release a minimum of nearly one million tons of nitrogen. Another 0.6 million tons can be assumed to be the supply from green manure leafing. A major portion of this may be done by sowing special types of plants on borders of the fields. But such trees can even be grown in any waste land away from the field and green leaf put in the desired field.

Total organic sources: Table 5 summarises total additional potentialities from organic sources, which work out to about 4 million tons of N. With 2 million tons of additional supply from the existing invisible sources, total supply of Nitrogen from organic sources, can be of the order of 6 million tons.

TABLE 5.

Total organic sources (Thousand tons).

Source	N	P_2O_5
Dung etc. from stabled livestock	2000	1000
Sewage and Sullage compost	160	1160
Sewage and sullage water	160	160
Other waste products	80	50
Green manure proper	1000	100
Green leaf manure	600	100
Total	4000	2570

Summary: Level of agricultural productivity in India has more or loss remained stationary over a number of years. In any programme of agricultural development crop nutrients - NPK - will have to play an important role. As against the present availability of about 3 million tons of Nitrogen from all the organic and inorganic sources, the requirements of the country at the end of coming two decades are likely to be of the order of 8 million tons.

The maximum contribution of organic sources (visible and invisible) can be about 6 million tons in terms of Nitrogen. But to get this quantity a programme of a minimum of 10–12 million acres of new village plantations with quick growing species will be extremely necessary. Our administrative machinery will have to be

geared to the responsibility of saving all the wastage in cowdung. City compost programme will need a top priority and green manuring will have to be taken up at a national scale. The task, no doubt tough, is all the same possible and rewarding.

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Agricultural Trends of Tanjore District

by

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Introduction: The "PACKAGE PROGRAMME" of intensified agricultural production sponsored by the Union Ministry of Food and Agriculture has been implemented by the Government of Madras. The Scheme was inaugurated on the Tamil New Year's day in the district of Tanjore which is the granary of the South. The introduction of the package programme in Tanjore District makes another land mark in the history of Agriculture in Madras State. At this juncture it is considered appropriate to take stock of all the past trends in the field of agricultural production. An attempt has therefore been made in the following paragraphs to review the trends in the agricultural features of Tanjore District over a period of half a century.

Land Utilisation: The total geographical area of the district is about 2·39 million acres which represents 7·47% of the total land area of Madras State of about 32 million acres.

The entire district consists of almost plain country. Out of the total land surface of 2·39 million acres, forests cover nearly 31,000 acres or 1·03%. For the quinquenium ending 1906—1910 the area under forest was however only 13,000 acres representing 0·57% of the total area. Barren and unculturable lands represent nearly 29%. The area under this category of land shows an increase from 541,000 acres in 1906—1910 to 685,000 acres in 1951—55 thus showing an increase of 5·3%. Culturable waste lands accounted for 230,000 acres or 9·9% fifty years ago. It showed a slow decline to 7·9% during 1946—50 and a sudden decline to 4·9% or 118,000 acres for the quninquenium ending 1955. This decline is mainly due to the extension of irrigation facilities. The trends in the extent of current fallows and net area sown however present some interesting features. Current fallows covered nearly 199,000 acres or 8·6% in 1906—1910. This slowly increased reaching a peak figure of nearly 249,000 acres or 10·4% in 1926—1930. Thereafter it has started decreasing and has reached a figure of nearly 131,000 acres or 5·4%. The net area sown however does not show any appreciable increase

compared to the area obtained in 1906—1910. Area sown more than once has however doubled from 115,000 acres or 5% in 1906—1910 to 268,000 acres or 11·2% in 1951—55. This increase is again reflected in the total cropped area which has increased from 1·44 million acres or 62·5% in 1905—1910 to 1·66 million acres or 70·6 „ in 1951—55.

Out of the net area sown viz., about 1·4 million acres, roughly, 1·2 million acres are commanded by the various irrigation sources in the district. This represents 85·5% of the net area sown. Agriculture in the rest 14·5% or roughly 0·2 million acres still remains a gamble with the monsoon. The percentage of the total area irrigated to the net area sown was 73·47 for the quinquenium ending 1906—1910. Till 1930, there had not been any appreciable percentage of increase. From 1931 onwards, there has been steady increase. The area now commanded by irrigation is 12% more than that obtained fifty years ago.

There has been a steady increase in the area commanded by Government canals. From 0·8 million acres it has steadily increased to 1·1 million acres thus showing an increase of 10% over the area commanded fifty years ago. The area commanded by private channels has nearly doubled. Reverse is the case under tanks. The area now commanded is only half of that obtained fifty years ago. This may partly be due to the fact that these tanks have been silted up and their water sheds have not been properly protected by anti-erosion measures. Wells with independent ayacuts also do not give a satisfactory picture. The area commanded by this source declined from 1·80% in 1906—1910 to 0·04% in 1936—1940 suddenly shot up to 1·13% in 1946—1950 (probably due to the subsidies offered by Government) but got suddenly reduced to 0·62% in 1951—55. Wells supplementing recognised sources of irrigation also show a downward trend as regards the area commanded.

Cropping Pattern: Food crops occupy roughly 92% of the total cropped area and the rest by non-food crops. From 1·28 million acres in 1921—1925 (88·20% of the total cropped area)the area increased to 1·55 million acres (93·15%) in 1946—50. During 1951—55, there had been a slight fall of about 0·03 million acres. Cereals occupy 83% of the total cropped area. Pulses occupy 5 to 6% and oil seeds about 6%. Paddy is the major cereal occupying 80% of the total cropped area.

The area under paddy has increased from 1 million acres i. e. 75·16% to 1·33 million acres i. e. 80·23% in the course of half a century. The total area covered by cereals does not however show any increase. This means that some of the minor cereals have given place to Paddy. The area under pulses has been steadily increasing till 1950 and thereafter shows a downward trend. Oil seeds exhibit a steady downward trend. A similar picture is presented by fruits and vegetables. The area under condiments and spices as well as drugs and narcotics has been fairly steady.

Trends in Paddy Cultivation: At has already been stated, paddy is the chief crop of the district. It accounts for 80% of the total cropped area. The acreage, total output and yield per acre are furnished in the Table.

TABLE.

Paddy Area of Yields.

S. No.	Average for the quinquenium ending	Average	Output tons	Yield per acre
1	2	3	4	5
1.	1905—1910	1,086,649	608,437	1,254
2.	1911—1915	1,092,887	649,489	1,330
3.	1916—1920	1,087,076	714,505	1,472
4.	1921—1925	1,106,277	725,420	1,469
5.	1926—1930	1,097,841	767,620	1,564
6.	1931—1935	1,104,962	723,098	1,466
7.	1936—1940	1,188,328	888,920	1,675
8.	1941—1945	1,295,720	926,380	1,601
9.	1946—1950	1,341,447	865,204	1,445
10.	1951—1955	1,334,169	934,664	1,569
Total increase percentage		22·8	53·6	25·1

From the table it will be evident that the acreage under paddy has steadily increased from 1·08 million acres in 1906—1910 to 1·34 million acres in 1946—50 and there had been a fall by 0·01 million

acres during the succeeding quinquenium. The total output which was only 0·06 million tons some fifty years ago has been stepped upto 0·93 million tons in 1951—55. A point worthy of note here is that the percentage of increase in the acreage is only 22·8 while the percentage of increase in the total output is 53·6 (more than doubled). The yield per acre has also been stepped up by 25%.

Summary: The trends in Agriculture in Tanjore District for the past half a century has been reviewed. The total geographical area has increased by 3·5%. The area under forests has been doubled. Barren and unculturable waste lands including land put to non-agricultural uses have shown an increase of 5%. Area under culturable waste has been reduced by 1/3rd. The net area sown almost remained the same while the area sown more than once has been doubled. This increase is reflected in the total cropped area.

The area commanded by irrigation has increased by nearly 12%. Of the total area cropped, only 85·51% are irrigated and the rest depends on rainfall. Government canals account for 95% (nearly 10% more than the area commanded fifty years ago) and the rest by tanks.

Paddy is the major crop of the district occupying 80% of the total cropped area. The area under Paddy as compared to the total cropped area has increased by nearly 5% when compared to the figure obtained fifty years ago. This increase is not however reflected in the total area under cereals probably due to the fact that millets given place to paddy. The area under food crops shows a steady increase while the area under non-food crops has correspondingly decreased.

The acreage under paddy has increased by about 23% while the total output has increased by about 54%. The yield per acre has been stepped up by 25% in the course of half a century.

Research Notes

Two High Yielding Selections of Greengram *(Phaseolus aureus Roxb.)* for Madras.

As the production of greengram is very inadequate to meet the requirements of the state, work in the evolution of high yielding strains to increase the production was started in 1943. As a result, a high yielding strain in dryland greengram viz., Co. 1 evolved by pure line selection was released for general cultivation during 1953. This strain was favoured by the ryots as it was capable of yielding 300 lb. of grain per acre. Further research was taken up for the evolution of a strain yielding higher than Co. 1.

During the year 1955, while screening the germplasm maintained at the Station, a culture No. 1535 of Ariyalur (Tiruchirapalli District), was marked for its good growth and heavy bearing of pods. Five single plants were selected and purified and in the subsequent years five selections were compared for yield against Co. 1 in yield trial plots. Sowing was done in drylands during July-August with the receipt of the south-west monsoon showers. The fields were well prepared with two ploughings and a basal dose of 5 tons of compost per acre applied. The experiment was randomised and replicated four times. Each plot was of 30 x 14 links size. The seeds were sown in lines 2 feet apart with a spacing of 6" between plants. The crop received two weedings at 30 and 45 days after sowing. The harvest was done by picking the dry pods as and when they ripened. On the whole three pickings were done. The selections as well as Co. 1 came to harvest simultaneously. As the crop was a failure during 1959 season due to severe drought, the results of four years of trial were subjected to a pooled analysis and are presented in Table.

TABLE

Yield data of greengram selections.

1. Analysis of variance.

Source	D. F.	S. S.	M. S.	F.
Varieties ...	5	72·1610	14·4322	
Interaction varieties x season	15	14·8481	0·9898	14·52*

* — Significant at P = 0·01 level.

2. *Summary of results.*

Variety	Acre yield in lb.	Percentage increase over the standard
1531/1	410	140·1
1535/2	390	133·4
1535/3	237	80·9
1535/4	432	147·5
1535/5	349	109·0
Co. 1 (Standard)	293	100·0
Whether significant or not	Yes	
Standard Error of mean	7	2·5
Critical difference (P=0·05)	22	7·6

Conclusion: $\overline{4\ 1}$ $\underline{1\ 2}$ 5 6 3

The analysis of variance of the yield data was carried out for each season. The error variances for the four seasons were tested for homogeneity by means of the Bartlett's 'M' test. The errors were found to be heterogenous and therefore could not be combined. Hence a weighted analysis of variance of the means of varieties in each season was carried out to test the presence or absence of the varieties x season interaction. As the interaction was found to be non-significant, the interaction mean square was used to test the overall differences among the varieties. From the data presented in Table it may be seen that the results are significant at P=0.01 level. The trial as indicated the superiority of selections 1535/4 and 1535/1 in yield performance over others. The two selections are of four months duration and are capable of yielding 400 lb. of grain per acre i. e., 47.5% and 40.5% increased yield respectively over the yield of greengram Co. 1. It is further observed that the selections have a better vegetative growth than Co. 1. In respect of duration and other morphological characters, the selections are similar to strain Co. 1.

Acknowledgment: The authors wish to record their sincere thanks to Sri K. A. Seshu, Statistical Assistant, Agricultural College and Research Institute, Coimbatore in working out the pooled analysis and interpretation of the results.

Agricultural College and Research Institute, Coimbatore-3.

S. PREMSEKAR
V. SRINIVASAN.

Further Studies on Relationship between Population and Yield in Irrigated Sorghum.

Preliminary studies conducted at the Millet Breeding Station, Coimbatore on the relationship between Sorghum population and yield indicated that closer spacing (1 x 1/2 link spacing) is more advantageous in a Sorghum crop grown under irrigated conditions. It was observed that in a thickly populated crop, the panicle gets smaller in size and the yield per plant is considerably reduced but the loss in yield per plant is made up by an increase in the total number of earheads harvested per acre.

Studies on the differential effects of varying populations on yield and other characteristics were repeated at the Millet Breeding Station, Coimbatore, in 1960 summer season. Sorghum strain Co. 18 was transplanted in one cent plots manured at the rate of 40 pounds Nitrogen in the form of ammonium sulphate and 30 pounds phosphoric acid in the form of super phosphate over a basal dressing of 10 tons of well-rotten compost manure per acre, adopting 2 x 1 link, 1 x 1 link and 1 x ½ link spacing. The effect of spacing on plant characters was studied on 25 plants chosen at random in each of the closely spaced and normal spaced populations. The plot yields were recorded for both grain and straw. The data gathered are tabulated below :—

Treatment	Population in lakhs	Plant height in cm.	Leaf area in sq. cm.	Panicle area in sq. cm.	Peduncle thickness in cm.	Yield per plant in ozs.	Yield per acre in lb. Grain	Yield per acre in lb. Straw
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 x 1/2 Close spacing	2.00	183.0	264	488	0.78	0.44	2156	8713
1 x 1 Close spacing	1.00	179.0	296	538	0.83	0.59	2125	6913
2 x 1 Normal spacing	0.50	185.5	304	578	0.98	0.88	2079	5900

The above results have confirmed the observations made in the previous year that in a thickly populated crop the panicle size is much reduced resulting in a decreased per plant yield but due to an increase in the number of earheads the total yield per acre is higher. Though

the differences between the treatments are not striking this year, the trends however towards a higher grain yield in a closely planted crop are seen. Further in yield of straw, the thickly populated crop has given nearly 50 per cent increase over the normally spaced crop. In a closely planted sorghum crop, the stalks are thin and are preferred for feeding cattle as they are more succulent and soft as compared to the thick stalks which are fibrous and woody.

The observations recorded this year have proved that provided the crop is heavily manured, there is no loss in yield of grain by planting an irrigated crop of sorghum at 1 link x 1·2 link spacing. On the other hand there results a heavier outturn of straw which is of better quality.

Agricultural College & Research Institute, Coimbatore-3.

K. MEENAKSHI,
A. SUBRAMANIAN,
L. SIVAGNANAM.

A note on natural Cross-pollination in Rice at Agricultural Research Station, Aduthurai (Thanjavur District).

To find out the natural cross-pollination in rice under Aduthurai conditions experiments were conducted in both *Kuruvai* (First crop) and *Thaladi* (Second crop) seasons for a period of three years commencing from 1955-'56 to 1959-'60. Varieties ADT. 4 and ADT. 20 for *Kuruvai* season and ADT. 1 and ADT. 2 for *Thaladi* season were used in the study. ADT. 4 and ADT. 1 were the pollinating parents during *Kuruvai* and *Thaladi* seasons respectively since these possessed the dominant character viz, dirty glume. The time of sowing of these varieties was adjusted so that the flowering of both the varieties synchronized. The male parents ADT. 4 *(Kuruvai)* and ADT. 1 *(Thaladi)* were planted in the middle of the field in 10' square using single seedlings spaced 1' apart either way while the female parents ADT. 20 *(Kuruvai)* and ADT. 2 *(Thaladi)* were planted, surrounding the male parents to a distance of 10'. The dates of flowering of the varieties were recorded and it was observed that the period of flowering in the male and female parents was almost the same. After maturity, six individual plants at random in every line from four sides and corners were numbered separately and earheads collected, marking the numbers in a plan, so that the position of any plant whose spikelet or spikelets are later found to be cross fertilized, could be fixed in the plan

and its distance from pollinating parent could be determined. Every individual selection so made was grown during the succeeding year to study the amount of natural crossing. All the seedlings raised from the earheads of a single plant were planted in separate rows and studied. The number of plants possessing the dominant character, viz., dirty furrows in grain was recorded and the percentage of natural crossing worked out. The distance between the pollinating parent and the female parent which was naturally cross fertilized was also determined by locating their positions in the plan.

The results and details of natural crossing observed are furnished below:

Year	Season	No. of Selections		No. of plants with dirty furrowed grains	Total population studied	Percentage	The distance between pollinating parent and female parent
		Taken during the year	Grown & studied during the year				
1955—56	Thaladi	490	...	...	...	...	...
1956—57	Kuruvai	492	...	...	...	...	...
,,	Thaladi	423	490	Nil		...	...
1957—58	Kuruvai	425	492	Nil		...	...
,,	Thaladi	350	423	39	97290	0·04	80·63″ 22·37″
1958—59	Kuruvai	430	425	30	72809	0·04	60·0″
,,	Thaladi	...	350	14	52318	0·03	34·6″
1959—60	Kuruvai	...	430	32	101092	0·03	80·63″ 20·0″

It is observed from the data presented that though the natural crossing did not take place during 1955—56 and 1956—57, there was natural crossing to some extent in later years. The percentage of natural crossing ranged from 0·04 to 0·03 and the distance upto which the natural cross-pollination took place ranged from 6 to 7' from the pollinating agent.

Agricultural Research Station, Aduthurai.

V. SRINIVASAN and
A SUBRAMANIAN.

A note on the wave shaped method of paddy cultivation experiment at Rice Research Station, Thirurkuppam.

The Japanese method of paddy cultivation introduced in India in 1953 is being widely adopted throughout the country with suitable modifications. Another method of rice cultivation practised in Japan known as "Wave method" which is a modification of the original technique in cultural, manurial and cropping practices using specially designed implements has been introduced at Sri. Aurobinda Ashram, Pondicherry by a Japanese farmer. To compare the "Wave shaped method" with the modified Japanese method and the local method of paddy cultivation, an experiment was conducted at the Rice Research Station, Thirurkuppam for three years from 1956—'57 to 1958—'59 using rice strains TKM. 3 in *Sornavari*, Co. 25 in *Samba* and TKM. 6 in *Navarai* seasons.

The layout was randomised block with the following variants.

1. Modified Japanese method of planting (Farm method).
2. Local method of planting (Ryots' method as adopted in the particular locality).
3. Wave shaped method of planting with 1' 6" between rows and 4" between plants in the line.
4. Wave shaped method of planting 2' 6" between rows and 2½" between plants in the line.
5. Wave shaped method of planting with 10" between rows and 5" between plants in the line.
6. Japanese method with 10" x 5" spacing.

The plots measured 40' x 7½' and there were eight replications.

Healthy and mature seeds were dried in shade for two days and soaked for three hours in copper sulphate solution, washed, dried in a cool place and kept for sowing. The dry seed bed was manured with Farm Yard Manure @ 20 cartloads per acre and in the case of wet seed bed it was manured with green leaf @ 10,000 lb./acre. Beds 4' wide were prepared in South to North direction with channels all round 1' wide and 5" deep and the channels between beds were 1' wide and 2½" deep. The seed rate adopted was 3 lb. per cent for variant 1, local seed rate for variant 2, and 5 lb. of seeds in 6 cents in the case of other four variants. Seeds were sown in rows and in groups of 2 to 3 seeds at a spot. After sowing, the beds were watered for 24 hours 1" deep. One day after, the beds were allowed to dry but the channels around had water to level till the seed germinated. Therefore beds were watered once in three days till sprouts had grown 1 or 1½" high. Later watering was done once in 6 days. After all strong sprouts had grown out, beds were allowed to dry completely to stop growth of leaves and to stimulate the growth of new strong roots. When the beds were completely dry, husk (wetted) was spread over. When seedlings were 1 — 1½" high the beds were weeded and hoed carefully, poor and unhealthy seedlings were removed. Ten days before transplanting, beds were watered deep and water in the channels surrounding the beds was agitated for three days so that the muddy water covered up the lower parts of the plants. Seedlings with 12 or more fully grown roots were transplanted. Seedlings were pulled out on the evening preceding the day of transplantation and stacked on dry ground.

The field was manured with green leaf at 5000 lb. and super phosphate @ 150 lb./acre as basal dressing, and 150 lb. ammonium sulphate one month after planting. Before planting roots of dry nursery seedlings were dipped in super phosphate solution. Four seedlings were planted per hole for all variants except for local method where bulk planting was done. Five days after planting, plots under "Wave shaped method" were given one scraping of the soil round the plants and one intercultivation was done five days after the scraping of the soil. Fifteen days after planting one earthing up was given and this was repeated upto one month before flowering. Plots under "Modified Japanese" and "Japanese methods" were given intercultivations at intervals of 15 days commencing from the 15th day after transplanting upto one month before flowering. Plots under local method were hand weeded.

In 1956—'57 *Sornavari* season, treatment 1 gave the highest yield of grain and straw while wider spacings namely 18" x 4" and 30" x 2½" as in wave shaped method gave poor yields. In 1957—'58 *Sornavari* treatment 6 gave the highest yield of grain and treatment 2 gave the highest yield of straw whereas wider spacing of 30" or 18" between rows as in wave shaped method was definitely poor. In 1958—'59 *Sornavari* season, with regard to grain yield, Treatments 1 and 6 were statistically superior to the wave shaped method of planting. Treatment 2 gave the highest yield of straw. The results were in conformity with those obtained in the previous years. The Japanese method of planting (Treatment 6) with a spacing of 10" x 5" was found to be superior to treatment 5, i. e. wave shaped method of planting with 10" x 5" spacing. Hence adoption of a spacing wider than 10" x 5" was not economical.

Rice Research Station,
Thirurkuppam.

L. DHANARAJ and
K. THANDAVARAYAN.

Preliminary studies on the response of rainfed cumbu to direct application of Ammonium sulphate

Rainfed cumbu is the chief food crop grown in the southern black soils of the state. Among the various methods of increasing crop yields, efficient manurial practices play a dominant role. In the case of rainfed crops especially as they are controlled by the widely fluctuating monsoons, it is essential to evolve and follow an economic system of manuring for getting the maximum yields.

Earlier experiments conducted at the Agricultural Research Station, Kovilpatti have indicated that when the previous Karunganni cotton is manured with ammonium sulphate to supply 20 lb. N per acre, there is a residual effect on the succeeding cumbu crop and five tons of compost per acre for the cumbu crop would be sufficient for obtaining normal yields.

An observational trial was conducted during the year 1958—'59 and repeated in 1959—'60 to determine whether the application of ammonium sulphate alone @ 20 lb. N level per acre as is done for Karunganni Cotton would enhance the yield of cumbu. The trial was laid out with three treatments in fifty cent plots each viz., (1) No manure (control) (2) compost @ 5 tons/acre and (3) Ammonium sulphate to supply 20lb. N per acre. The strain K. 1 cumbu was used. The compost was applied at the last ploughing and the ammonium sulphate was drilled with gorru a few days before sowing. The yields of grain alone were recorded. The details are given in the following table.

S. No.	Treatment	Results during 1958—'59 Acre yield of grain in lb.	% over control	1959—'60 Acre yield of grain in lb.	% over control	Cost of Application and manure
						Rs. nP.
1.	No manure (control)	104	—	410	—	—
2.	Compost @ 5 tons per acre.	240	130·8	470	14·6	30·75
3.	Ammonium sulphate @ 20 N level per acre	280	170·0	542	32·2	20·50
	Rainfall during crop growth :	188.5 m.ms.	—	425·5 m.ms.	—	
	Date of sowing :	6-11-1958	—	16-10-1959	—	

The direct application of ammonium sulphate to rainfed cumbu has given encouraging results and an overall average increase of 72·7% over the no manure treatment and 101·1% of the compost @ 5 Tons per acre treatment were recorded. Also compared to the application of 5 Tons of compost per acre, the application of ammonium sulphate @ 20 lb. N level per acre is cheaper by Rs. 10·25 in cost and more remunerative in yield by 101·0%. Thus there is a two-way economy.

Further replicated trials have been laid out at the Agricultural Research Station, Kovilpatti for confirmation of these results.

Agricultural Research Station, Kovilpatti.
Dated: 21-4-1961.

S. S. NARAYANAN
A. RAJAMANI

Abnormalities in Sorghum panicle.

The occurrence of certain abnormalities in the Sorghum panicle is recorded. In the abnormal panicle (Fig. 1) it is observed that the lowermost branch of the whorl, is transformed into a leaf like structure and from the axil of the same there arises a normal fertile panicle, smaller in size than the main one with its flag leaf.

FIG. 1 FIG. 2

In the panicle seen in Fig. 2 the lower branches of the panicle appear to arise from the axils of leaf-like structures while the lowermost branch gets converted into a vegetative branch. In another abnormal panicle (Fig. 3) just below the lowermost branch of the panicle, on the peduncle is borne a vegetative branch with several small leaf-like structures.

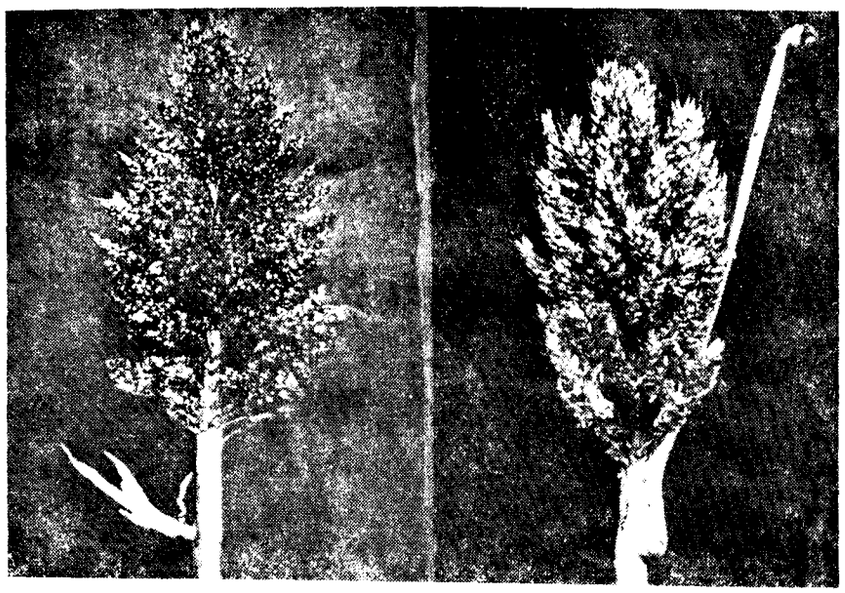

Fig. 3

Fig. 4

In another panicle (Fig. 4) just below the lowermost branch of the panicle, on the peduncle there arises a sheath-like structure, which is almost equal in length to that of the panicle itself. The occurrence of the extra appendage viz., sheath-like structure found attached at the lowermost whorl on the peduncle is an abnormal feature.

The panicle abnormalities described in this note are not heritable. These may be considered as freaks in Sorghum panicle.

Millet Breeding Station,
Agricultural College &
Research Institute,
Coimbatore-3.

L. SIVAGNANAM
M. S. THANGAM
K. MEENAKSHI

Breeding Cotton for High Fertility Conditions

The breeding of cotton varieties which would respond well to high fertility conditions is receiving, of late, the attention of cotton breeders. The information on the response of new cotton strains to different levels of fertilizer application is expected to throw light on their yield potential. With this object in view, an observational trial was laid out at the Cotton Breeding Station, Coimbatore during 1958-59 winter season, to test the response of strains in the Main Strain Trial to different levels of nitrogen.

The strains included in the trial were 9030 G., 9030—8—5 and 01545 C from the Main Strain Trial and MCU. 1 the cultivated strain. Each strain was sown in an area of 8.4 cents divided into four continguous plots of 2.1 cents each for the four manurial doses of 0,20,40 and 60 lb nitrogen applied as ammonium sulphate, in two split doses, as per the normal procedure. Otherwise, the schedule of operation given was similar to all the plots.

Experimental data were gathered on the daily mean flower production, kapas yield and resistance to insect pests.

1. **Flower production :** The daily mean flower production recorded showed a general trend for increased flower production as the levels of nitrogen increased. Among the four strains tested, the response was marked in 9030 G and MCU. 1. (Vide Table I).

TABLE I.

S. No.	Strain	Daily mean flower production per plant levels of nitrogen.			
		0 lb.	20 lb.	40 lb.	60 lb.
1.	9030 G.	0.81	0.93	0.92	1.34
2.	9030-8-5	1.30	1.33	1.23	1.19
3.	01545-C	1.40	1 00	1.08 .	1.60
4.	MCU. 1	0.89	1.20	1.25	1.58
	Mean	1.10	1.12	1.12	1.43

2. **Kapas yield :** The kapas yield showed a significant increase for all the four strains tested, as the levels of nitrogen increased. But the response was greater in the case of 01545 C, while it was the least in 9030 G. (Vide Table II).

TABLE II.

S. No.	Strain	Yield of kapas in lb per acre levels of nitrogen				Percentage increase at 60 lb N. level over 0 lb.
		0 lb	20 lb	40 lb	60 lb	
1.	9030 G	755	730	795	868	15
2.	9030-8-5	700	795	780	991	42
3.	01545 C	612	785	919	1010	65
4.	MCU. 1	868	937	1072	1163	34
	Mean	734	812	892	1008	37

3. Reaction to insect pests: [illegible] the different [illegible] fertilizer applied [illegible] (Vide Tables III, IV and V).

TABLE III.

Incidence of Jassids.

(Expressed as percentage of curled leaves to the total).

S. No.	Strain	Percentage of curled leaves levels of nitrogen 0 lb	20 lb	40 lb	60 lb	Percentage increase at 60 lb N. level over 0 lb.	Mean of the strain.
1.	9030 G	33	37	36	53	61	40
2.	9030 S 5	31	32	44	50	61	39
3.	01545 C	35	41	50	56	60	46
4	MCU. 1	29	40	47	50	72	42
	Mean	32	38	44	52	63	42

TABLE IV.

Top - bored plants.

S. No.	Strain	Percentage of top-bored plants levels of nitrogen 0 lb	20 lb	40 lb	60 lb	Percentage increase at 60 lb N. level over 0 lb.	Mean of the strain.
1.	9030 G	32	41	35	35	22	37
2.	9030 S 5	35	27	38	46	31	37
3.	01545 C	43	48	40	47	9	45
4.	MCU. 1	33	35	40	42	27	38
	Mean	36	38	38	44	22	39

TABLE V.

Mortality due to stem-weevil attack.

S. No.	Strain	Percentage mortality levels of nitrogen 0 lb	20 lb	40 lb	60 lb	Percentage increase at 60 lb N level over 0 lb.	Mean of the strain.
1.	9030 G	0.31	0.92	0.71	0.94	203	0.72
2.	9030-8-5	0.31	0.45	0.45	1.24	300	0.61
3.	01545 C	0.94	1.35	2.40	1.35	44	1.51
4.	MCU. 1	1.24	0.94	1.50	1.35	8	1.26
	Mean	0.70	0.92	1.27	1.22	74	1.03

The increased dosage of nitrogen induced increase in the incidence of insect pests, in all the strains tested. Both the reselections of 9030 showed tolerance to pests at the lower levels of nitrogen, compared to the strain 01545 C. But, there was a tendency for these two strains to break down in their tolerance to insect pests at higher levels of nitrogen.

Agricultural College and Research Institute, Coimbatore-3.

S. KAMALANATHAN,
H. S. JAVAD HUSSAIN,
C. NAGARAJAN.

Letter to the Editor

Sir,

I got 200 suckers of the Giant Kew Pine Apples from the Horticulturist, Gauhati (Assam) in March 1959 and planted them in line 3 feet apart as a cordon round about my vegetable garden in one of my villages in Shiyali taluk, Tanjore District (only 4 miles from the sea coast). My object in trying this crop in the CauveryDelta is first to find out the cropwar economics of this fruit and secondly to find out the extent of success that one may expect while cultivating this subtropical fruit in a flat country with moderate rainfall and good irrigation facilities in contrast to the mountainous steppes of Assam and Malabar with heavy rainfall where this commercial crop is cultivated practically with little care.

During the period of the growth of plants a good number perished due to root rot caused by the microorganic fungi thriving most probably in the rotten cattle manure. A few plants withered even after fruiting but the percentage of casualities at that advanced stage is very negligible. Of course, some plants—the suckers having been brought from the Himalayan regions and first propagated in the

FIG. 1

FIG. 2

flat coastal regions of the South — strangely reacted to the contradicting environment, climate and soil conditions just before flowering. Only one plant just before flowering divided into two branches and threw out two separate flower buds maturing into two fruits each weighing 6 lbs. Though this is an abnormality, it is a freak positive in that one and the same plant produced two fruits of economic size. A few others — say about 10 in number — threw out proliferations and organic Zooids (I named them as such). For the sake of the agricultural readers of the

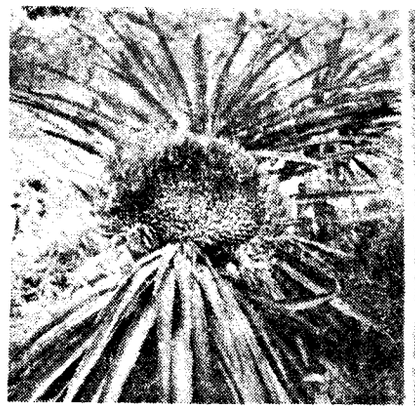

FIG. 3

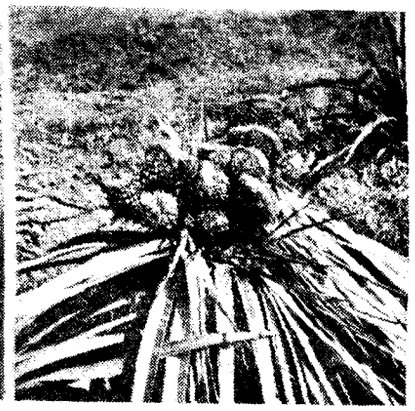

FIG. 4

journal I am sending photographs taken just before plucking the fruits viz. (1) Pine Apple doubles in a plant which I termed as Freak positive (2) A fruit split into two joined only at the loins, a fruit of no economic value — Freak negative. (3) Proliferation — A fruit shaped like an inverted half moon with crowns and slips all round (4) Mere organic Zooids thrown out in the shape of clusters resembling ladies hair tresses. (Only vegetative reproductions). A normal fruit produced in one plant weighed 14 lb.

Kunnam House,
Sirkali
28—5—1961

S. RAMAMURTHY IYER OF KUNNAM

Award of Ph. D. Degree:

Sri D. John Durairaj, Reader in Soil Science, Agricultural College and Research Institute, Coimbatore - 3, has been awarded the Ph. D. Degree for his thesis on "Advanced Studies on Soil Colour" by the University of Madras. Our congratulations to him.

AGRICULTURAL JOTTINGS FOR AUGUST 1961.

As we write these jottings, the moosoon has strengthened further all over the South. Heavy rains are being reported from Kerala, Mysore and Konkan coast, doing damage everywhere through floods. This is really unfortunate. It is unsual to get so much of continuous downpour during the early part of the monsoon. These early showers upset the cropping programme. Timely operations are not possible and crop yields are reduced. Two problems arise out of these rains, one of heavy soil erosion and the other, diseases of crops.

The Problem of Soil Erosion:

Soil Erosion is a menace to every nation in this world. It has been estimated that nature takes 300 to 1000 years to build a single inch of top soil which may be lost by erosion during the course of a year's rainfall. The problem of soil erosion is very old and goes back to the days when man started to produce crops by clean cultivation on slopy land on which rain fell in heavy showers.

What is soil erosion? Erosion is the movement and the subsequent washing away of soil material by water or wind., from unprotected land i. e. land exposed to rain and wind. By removing the vegetation i. e. nature's covering protection over the soil, rain drops beat the soil into suspension and the pores are clogged with fine material, thus diminishing the rate of absorption of rain water. The result is run off of the surplus water carrying the soil along with it as muddy water. Loss of the valuable fertile soil and plant mutrients is the result. In many places, the loss of nutrients from such erosion has been known to exceed even that of crop production.

Prevention and protection of our crop land from erosion are therefore very important to maintain soil fertility. The Agricultural Department has recognised the damage from soil erosion and has alerted farmers to the need to adopt soil conservation measures such as bunding, terracing, gully plugging, strip cropping etc. Subsidies and other financial assistance have been extended in special areas. Your Agricultural Extension Officer will tell you more about the dangers of soil erosion and help you to adopt soil conservation measures to control erosion.

The Late Blight of Potato:

Surprisingly a new fungus disease that has affected large areas of our potato crop in the Nilgiris, called the 'late blight of potato' has come into our midst. This disease has not occurred in South India so far. This is is a deadly disease and was responsible to wipe out whole fields of potato crops in Ireland in 1845 which resulted in a famine in that country.

The early stage of the disease in the potato crop is indicated by the development of large spots, dark red in colour. Subsequently the spots spread and the leaves start to rot. A white fungus outgrowth can be found on the underside of the leaves. Very soon the disease spreads to the stems, the plant wilts and rots and finally falls down. The spread is so fast that the whole plant rots in about two days. In the advanced stages the tubers are also affected. The disease spreads through fungal spores getting dispersed by wind and rain.

How to control the disease and prevent its recurrence are the most important things. Use only tubers from disease free crop areas for seed. Even before the disease appears spray 1% Bordeaux mixture as a prophylactic measure. This should start early and the first spraying is done when the potato plant has grown to a height of about 6 to 8 inches. This spraying with Bordeaux mixture or other copper fungicides should be repeated every 10 or 15 days. In all, about three or four sprayings would keep the crop free of the disease. A fortnight before harvest, the stem along with the dead leaves are pulled out and removed and preferably burnt to protect the tuber from getting infected. The godowns where the seeds are stored are frequently inspected and infected tubers removed from time to time as infection is noticed.

As the disease has occurred for the first time its subsequent occurrence can be prevented by adopting the above precautionary measures. Save your potato crops by timely action.

The New Cotton Variety MCU 3 (90396):

Cotton breeding work at the Agricultural College and Research Institute, Coimbatore is a continuous process directed to evolving better quality and high yielding strains of cotton. Staple length which is the length of the cotton fibre is an important quality in cotton. Madras has succeeded for the first time in evolving a cotton with a staple length of over one inch in the newly evolved MCU 3 (Madras Cambodia Uganda 3). Farmers in the Winter Cambodia region of Coimbatore and Salem and Tiruchi districts are accustomed to grow MCU 1 all these years, which replaced Co 2 cotton during the forties. MCU 1 was found superior to Co 2 both in yield and quality of the cotton fibre.

MCU 3 is the new comer to the field to replace MCU 1. It yields more than MCU 1, has a higher ginning percentage and a longer staple. Tests have indicated that it can spin 40's count as against 36 count with MCU 1. Another outstanding quality of MCU 3 is its resistance to the deadly stem weevil attack. Mortality form stem weevil attack has been found to be very low. The attack from jassids, another important pest of cotton is also reduced.

What Spacing to Adopt in Irrigated Cotton:

Spacing or the distance from plant to plant in any crop is dependant upon the fertility status of the soil and the growth habit of the crop. During the evolution of high yielding superior cottons, some transformation has also occurred in the growth habits of the cottons MCU 1 and MCU 3. An MCU 1 or MCU 3 plant does not require as much space as Co. 2 plant with the result, there will be more plants to the acre helping to increase yields. Researches have indicated that in MCU cottons, the spacing can be as close as 2 feet between the rows of plants and 6 inches between plants in the row with two seedlings per hole, as against the previous spacing of 2½ feet between rows and 9 inches in the row for the earlier varieties. Of course, if your field is very fertile or if you are accustomed to manure your cotton crop heavily, a wider spacing as of old can be adopted. Why not consult your Agricultural Extension Officer who will tell you more about these matters.

Manuring of Cotton:

Some cotton growers in the winter cambodia area of Coimbatore district are accustomed to manure their irrigated cotton crop very heavily and obtain record yields. Very large quantities of cattle manure or compost, some times even up to 50 cart loads per acre, are applied supplemented with artificial fertilizers. They get yields upto 2000 lb. or more per acre. They have found it very profitable to manure heavily and get high yields. This is so because, other costs of cultivation are constant and if yields could be stepped up by 50% or more by heavy manuring, it certainly gives a higher margin of profit per acre.

It is not however within the possibility of every farmer to apply such large doses of manures and fertilisers but the results highlight the fact that cotton responds well to heavy manuring and it is profitable too. Researches at the Agricultural Research Institute have also indicated the profitability of applying about 10 tons per acre of cattle manure or compost supplemented with 200 to 300 lb. of nitrogenous fertilisers like ammonium sulphate.

Handle Pesticides with Care:

From time to time, we hear of cases of poisoning from insecticides. Insecticides are so essential for crop protection that we cannot ban their use. They are very essential for farmers. But by adopting some elementary precautions in their use all hazards of accidental poisoning can be avoided. The more important precautions are outlined below.

1. Store pesticides in a separate place away from reach of children—Don't keep them along with family medicine.
2. Keep the lid well closed.

3. Always read the lables before use—Do not remove the labels from the containers. Follow the directions given scrupulously.
4. Bare hands should not be used for handling insecticides.
5. Wash your hands and body thoroughly with soap when exposed to pesticides. Protect your body with clothing. Better to wear a head gear while spraying or dusting.
6. Dust or spray along the wind and don't stand facing the wind or the spray.
7. Do not eat, drink, smoke or chew while spraying.
8. Remove clothes after spraying and wash them well in a separate place and do not mix with other clothes.

When you feel your head ache or when you feel giddy immediately after spraying suspect poisoning. Vomiting may follow. See a doctor immediately. Don't neglect even a head ache because it is a warning symptom.

If it is a contamination of the skin, remove all clothes and wash the body well. If your eyes are affected flush your eyes with clear water. If the poison has entered your stomach, induce vomiting by giving repeated doses of concentrated salt solution. These are first aids before the doctor arrives.

Tell the doctor what insecticide may have caused poisoning. Keep the label of the container and show it to him. Labels often contain first aid measure and remedies.

Anab-E-Shahi Grapes:

Anab-E-Shahi is a very fine variety of grapes introduced from Hyderabad which thrives well in parts of Coimbatore and Madurai districts. This variety yields big bunches weighing even two pounds each. The berries are also large in size, are very sweet and are immensely liked by the consuming public. Very high yields of even 60,000 lb. per acre have been recorded. On an average about 20 to 30 thousand pounds could be expected under good management from the two crops obtained in a year. It can be seen that the cultivation of Anab-E-Shahi grapes is a very profitable proposition.

A well drained sandy or red loam is the most suitable soil for the successful cultivation of Anab-E. Shahi. A good source of water supply for irrigation is also essential. Planting is done in pits $4' \times 4' \times 4'$ in rows 25 feet apart and $12\frac{1}{2}$ feet in the row. Rooted cuttings are planted

and the vines are trained to grow on pandals about six feet high. Each vine spreads on the pandal through lateral branches equally spaced. Pruning is done twice a year. The technique of pruning is easily learnt.

Because of the high yield, the vines are to be heavily manured. Each vine when fully grown should receive about 500 lb. of cattle manure, 500 lb. green leaf, 10 lb. each of ammonium sulphate, super phosphate and muriate of potash. Spraying is done with 1% Bordeaux mixture as a protection against fungus diseases. The vines should be properly irrigated as and when necessary. The vines reach good bearing in about three or four years.

(From the Extension Specialist, Agricultural College and Research Institute, Coimbatore-3.)

OBITUARY

We learn with regret the passing away of Sri V. Gomathinayagam Pillai, Ex-Millet Specialist of the Madras State in his village Elayarasanandal in Tirunelveli.

Late Sri Gomathinayagam was one the first batch of students for the B. Sc., in Agriculture degree course at the Madras Agricultural College, Coimbatore. He completed the course in 1924 and soon after entered in the Agriculture Department as an upper subordinate in Millet Section. He served as a Research Assistant in Millets till 1946 when he was promoted to the Madras Agricultural Service and posted as Cardamom Specialist at Singampatti. In 1954 he was appointed as Millet Specialist, and he retired from service the same year.

Sri Gomathinayagam has done research on the breeding of cholam and cumbu, and later on cardamom. He has contributed about a dozen papers on these crops.

He was a very popular officer. He was very social and took keen interest in all public activities at the Agricultural College. He has been Secretary of the Agricultural Officers' Club. He was closely associated with the management of the Madras Agricultural Journal. He was also the Secretary of the Union.

Weather Review — for June, 1961.

RAINFALL DATA (IN INCHES)

Region	Station	Total rainfall for the month	Departure from normal	Total since 1st January
North	Madras (Meenambakkam) ...	4·4	+ 2·6	6·9
	Tirurkuppam*	4·4	+ 2·1	7·1
	Vellore	5·4	+ 2·6	8·5
	Gudiyatham*	2·4	— 1·1	10·3
East Coast	Palur*	1·1	— 1·2	10·4
	Tindivanam*	2·0	+ 0·5	8·2
	Cuddalore	4·5	+ 3·1	11·8
	Nagapattinam	1·3	+ 0·1	11·7
	Adutthurai*	2·7	+ 1·3	15·1
	Pattukkottai*	2·7	+ 1·3	10·9
Central	Salem	3·3	+ 0·1	9·4
	Coimbatore (A. M. O.)* ...	4·5	+ 2·2	11·5
	Coimbatore	4·1	+ 2·6	12·6
	Tiruchirapalli	3·0	+ 1·3	8·4
South	Madurai	1·1	— 0·4	11·2
	Pamban	0·3	+ 0·1	9·3
	Koilpatti*	1·3	+ 0·8	14·3
	Palayamcottai	0·9	+ 0·5	11·3
	Ambasamudram*	2·9	+ 1·9	22·4
	Nagercoil*	20·4	+ 16·5	30·4
	Capecomorin*	11·4	+ 8·7	26·7
Hills	Kodaikanal	4·6	+ 0·3	19·1
	Coonoor*	2·5	— 0·4	28·7
	Ootacamund* ...	7·6	+ 1·6	21·4
	Nanjanad*	11·5	+ 2·0	29·9

* Meteorological Stations of the Madras Agricultural Department.

The month began with dry weather throughout the State. The monsoon advanced vigorously along the West Coast with the result that fairly widespread rains were received in Madras State for four days from 7—6—1961 to 10—6—1961.

In regard to the fluctuations of day temperatures there were no large changes. The noteworthy rainfall and zonal rainfalls are furnished hereunder:—

Nagercoil received 7·20″ of rain on 29—6—1961.

Zonal Rainfalls (in inches)

Name of the Zone	Rainfall for June, 1961 (inches)	Departure from normal	Remarks
North	4·2	+ 1·6	Above normal
East Coast	2·4	+ 0·9	do.
Central	3·7	+ 1·6	do.
South	5·5	+ 4·0	Far above normal
Hills	6·6	+ 0·9	Just above normal

From the Agricultural Meteorologist, A. C. & R. I., Coimbatore-3.

Departmental Notifications

Gazetted Officers—Madras Agricultural Department
Postings and Transfers during the month of July, 1961

Name and Designation	Posted or Transferred to
Sri S. Pandiperumal, Soil Conservation Assistant Bodinayakanur	D. A. O., Pattukottai.
,, R. Shanmugasundaram, D. A. O., Pattukottai	D. A. O., Nagapattinam.
,, B. Venkataswamy, Farm Manager, Vanur	D. A. O., Mannargudi.
,, K. S. Kutti Mudaliar, D. A. O., Polur	D. A. O., Usilampatt.
,, S. Annaswamy, Seed Development Officer, Madurai	D. A. O., Madurai.
,, M. S. Sethuraman, Assistant Agronomist, Koilpattti	Gazetted Assistant, Office of the Director of Agriculture, Madras.
,, K. Narayanan Nair, Gazetted Asst. to the Director of Agri., Madras	State Marketing Officer, Madras.
,, D. Shanmugasundaram, State Marketing Officer, Madras.	Retired.
,, C. Ekambaram, Sugarcane Specialist, Cuddalore	Agronomist (Package Programme), Thanjavur.
Kumari R. Andal, University Botany Laboratory, Madras	Assistant Mycologist, Coimbatore.
Sri T. K. S. Dakshinamurthy, Seed Development Officer, Coimbatore	Additional Superintendent, Central Farm, Coimbatore.
,, S. Rajarathnam Chetty, Additional Superintendent Central Farm, Coimbatore.	Agronomist and Associate Professor of Agriculture, Coimbatore.
,, R. Subbiah Pillai, D. A. O. Madurai	D. A. O., Polur.
,, Y. B. Morachan, Assistant Lecturer in Agriculture, Coimbatore.	Lecturer in Agronomy, Coimbatore.
Dr. P. Madhava Menon, Superintendent A. R. S. Palur	Cytogeneticis. A. C. & R. I., Coimbatore.

Upper Subordinates—Agricultural Department
Postings and Transfers during the month of July, 1961.

Name and Designation	Posted or Transferred to
Sri T. Shanmugasundaram, Special Agril. Demonstrator (Sugarcane Pest), Karur	Special A. D, (Sugarcane), Kulithalai.
,, A. A. Abdul Latheef, Tobacco Development Assistant, Nagercoil	Tobacco Development Assistant, Erode.
,, S. Srinivasan, Plant Protection Assistant, Cuddalore	Farm Manager, State Seed Farm, Sathiathope.
,, M. Shanmugavel, Plant Protection Assistant, Trichy	Coconut Nursery Asst., Devipattanam.

Name and Designation	*Posted or Transferred to*
Sri S. Ganapathi, E. O. Agriculture, Ramnad	Coconut Nursery Assistant, Tiruppalani.
,, K. S. Paramasivam, Plant Protection Assistant, Trichy	Oilseeds Assistant, Salem.
,, N. Sankararaman, E. O. Agriculture Palur	Farm Manager, State Seed Farm, Vazhavachanallur.
,, P. Veluswamy, Cotton Certification Inspector, Tirupur	Cotton Assistant, Sea Island Development Scheme, *Nagercoil.*
,, K. Krishnan, E. O. Agriculture, Conjeevaram	Farm Manager, State Seed Farm, Kolandalore.
,, A. N. Raghunathan	Assistant in Mycology, A. C. & R. I., Coimbatore.
,, R. Kumaraswami, Oilseeds Asst., Bhavanisagar	Resigned.

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

Sri C. R. Nagarajan	Assistant Lecturer in Chemistry, A. C. & R. I. Coimbatore.
,, A. H. Abubacker	Agricultural Demonstrator, Palur.
,, M. Arunachalam	Extension Officer for Agriculture, Watrap.
,, M. Balakrishnan	Farm Manager, State Seed Farm, Puthurpalayam.
,, K. Chandrudu	Special Agricultural Demonstrator, (Sugarcane), Uthiramerur.
,, S. M. Ebrahim Pillai	Agrl. Demonstrator, Periakulam.
,, T. Govindarajan	Asst. in Chemistry, A. C. & R. I. Coimbatore.
,, R. Janakiraman	Agricultural Demonstrator, Kammapuram.
,, P. Jayasurya	Extension Officer for Agricultuer, Udumalpet.
,, N. Mallikarjunan	Agricultural Demonstrator, Rasipuram.
,, L. Manivel	Extension Officer for Agriculture, Sakkottai.
,, K. K. Mathan	Asst. in Chemistry, Nanjanad.
,, N. Mohammed Sheriff	Agricultural Demonstrator, Manachanallur.
,, P. Nachimuthu	Extension Officer for Agriculture, Viyampatti.
,, V. K. Nagarajan	Farm Manager, State Seed Farm, Samathur.
,, A. Narayanan	Plant Protection Asst. (Mycology), Tiruchirapalli.
,, T. R. Narayanan	Statistical Asst. Block Soil Scheme, Koilpatti.
,, J. Oliver	Extension Officer for Agriculture, Singanallur.
,, R. Padmanabhan	Agrl. Demonstrator, Raishivandyam.
,, K. Ponnuswamy	Cashew Development Asst. A. R. S. Pattukkottai.
,, T. Purushothaman	Asst. in Meteorology, A. C. & R. I. Coimbatore.
,, K. Raju	Soil Conservation Asst. Kundah Project.
,, Ramabadran	Asst. in Chemistry, A. C. & R. I. Coimbatore.
,, P. R. Ramachandran	Asst. in Chemistry, A. C. & R. I. Coimbatore.
,, P. P. Ramaswamy	Asst. in Chemistry, A. C. & R. I. Coimbatore.

Sri N. M. Ramaswamy	Asst. in Oilseeds, Co-ordinated Manurial Trial in Groundnut, Salem.
,, P. Rangaswamy	Asst. Lecturer in Horticulture.
,, R. Sangiah	Plant Protection Asst. (Mycology) Pattukkottai.
,, N. Sathyadoss	Asst. in Chemistry, Central Stores, A. C. & R. I. Coimbatore.
,, S. Shanmugasundaram	Asst. in Botany, A. C. & R. I. Coimbatore.
,, K. S. Shanmugham	Farm Manager, Dt. Livestock Farm Orthanad.
,, C. V. Sivakumaran	Asst. to Professor of Plant Breeding and Genetics, A. C. & R. I. Coimbatore.
,, P. V. Subba Rao	Paddy Asst. A. C. & R. I. Coimbatore.
,, K. S. Subbiah	Asst. in Chemistry, Scheme for maximisation, Koilpatti.
,, P. C. Sundara Bapu	Asst. Lecturer in Entomology, A. C. & R. I. Coimbatore.
,, C. R. Srinivasan	Extension Officer for Agriculture, Villivakkam.
,, P. Swaminathan	Asst. Lecturer in Agronomy, A. C. & R. I. Coimbatore.
,, K. Thangavel	Extension Officer for Agrl., Kolathur.
,, G. Velayudhaswamy	Extension Officer for Agriculture, Kabilarmalai.
Kumari K. A. Seethalakshmi	Asst. Lecturer in Botany, A. C. & R. I. Coimbatore.
Sri T. Abdul Majeed	Asst. in Soil Chemistry, Coonoor.
,, H. Ahmed Shah	Satistical Asst., A. C. & R. I. Coimbatore.
,, P. K. Anaiappan	E. O. Agrl., Thalanayar.
,, A. Arthanariswamy	E. O. Agrl., Gangavalli.
,, P. Bagavathisundaram	E. O. Agrl., Koradacheri.
,, V. K. Balakrishnan	E. O. Agrl., Paramathi.
,, P. S. Balasubramaniam	E. O. Agrl., Pattukotta.
,, K. Chandrasekharan	E. O. Agrl., Natchiarkoil.
,, M. G. Dinaisan	Agrl., Demonstrator, Kumarakshi.
,, P. C. Divakaran Nambiar	Farm Manager, State Seed Farm, Uthukottai.
,, Duraiswmy Kannan	E. O. Agrl., Merkanam.
,, S. George Solomon	Agricultural Demonstrator, Madhavaram.
,, N. Guruswamy	E. O. Agriculture, Chidambaram.
,, R. Guruswamy	E. O. Agriculture, Panruthi.
,, D. Henry Devadoss	Agricultural Demonstrator, Kalavai.
,, G. Ignaci	E. O. Agricultural, Polur.
,, S. Jayabrathi	Research Asst. A. C. & R. I., Coimbatore.
,, N. Jayaraman	E. O. Agricultural, Uthukottai.
,, K. Kandaswamy	Agricultural Demonstrator.
,, T. M. Kandaswamy	E. O. Agriculture, Madurantakam.
,, M. Krishnamurthy	E. O. Agriculture, Pallipet.
,, Krishnamurthy	Agricultural Demonstrator, Madras.
,, V. Krishnamurthy	Coconut Development Assistant, Madras.
,, A. Krishnan	Assistant in Botany, Ooty.
,, A. Lakshmanan	E. O. Agriculure, Conjeevaram.
,, E. V. Madhavan	Analytical Assistant, Coimbatore.
,, S. T. Mani	Research Assistant, A. C. & R. I., Coimbatore.

Review of market conditions of commercial crops in the notified areas in the Madras State for the month of June 1961.

Cotton :

COIMBATORE DISTRICT: *Season:* The rainfalls recorded during the month under report amounted to 100 mm. at Coimbatore, 45 mm. at Avanashi, 50·8 mm. at Gobichettipalayam, 162·5 mm. at Pollachi and 13·4 mm. at Tirupur. The rains received in Pollachi and Coimbatore Taluks were favourable for the growth and development of early sown groundnut crop. In some areas of Pollachi Taluk, the late sown groundnut crop has been affected. The land for sowing of groundnut (winter) crop, was prepared in Avanashi Taluk. The condition of the standing crop of ragi, cholam and cumbu were reported to be generally satisfactory.

Arrivals, Transactions and Prices: Kapas: The kapas market at Tirupur started with an opening stock of 34782 quintals of Cambodia and 5237 quintals of Karunganni Kapas and the arrivals were 30591 quintals of Cambodia and 773 quintals of Karunganni kapas. The despatches during the month were 39175 quintals of Cambodia and 2455 quintals of Karunganni kapas leaving a stock of 26198 quintals of Cambodia and 3555 quintals of Karunganni kapas. The price ranged from Rs. 130/- to 148/- per quintal for Cambodia kapas and Rs. 110/- for Karunganni.

Lint: The lint market at Tirupur started with an opening stock of 34,919 quintals of Cambodia lint and the arrivals were 29783 quintals of Cambodia and 437 quintals of Karunganni lint. Despatches were 24009 quintals of Cambodia and 285 quintals of Karunganni Lint, leaving a balance of 40695 quintals of Cambodia lint and 152 quintals of Karunganni Lint.

The price ranged from Rs. 325/- to 350/- per quintal for Cambodia and Rs. 260/- for lint.

RAMANATHAPURAM DISTRICT: *Season:* There were no rains during the first fortnight. But second fortnight witnessed inclement weather and 45·21 mm. of rainfall. In most of the places preparatory cultivations were in progress and in some cases sowings of groundnut were also undertaken. Sowings are expected to be completed by the end of July.

Arrivals, Transactions and Prices: The arrivals of Kapas were 27840 quintals and disposals were 29475 quintals to prices ranging from Rs. 99/- to 104/- for Lakshmi and Rs. 93/- to 99/- for Karunganni. The closing stock was 2500 quintals at prices ranging from Rs. 243/- to 277 at for Karunganni. The closing stock was 1875 quintals. Cotton seed prices ranged between Rs. 35/- to 44/- per quintal.

TIRUNELVELI DISTRICT: *Season:* Rainfall amounting to 45 mm. was reported during the period under report. The rainfall was considered not necessary for cotton crop.

Arrivals, Transactions and Prices: The arrivals of Karunganni Kapas were at 12840 quintals and disposals at 4760 quintals at prices ranging between Rs. 98/- to 110/-. 8mall quantities were Uganda also arrived and disposed at prices around Rs. 115/- per quintal. About 3800 quintals of Karunganni lint were also disposed of at around Rs. 250/- to 260/- per quintal.

Groundnut :

SOUTH ARCOT DISTRICT: *Season:* The rainfall received at various places amounted to 3·50" at Chinna Salem, 3" at Ulundurpet, 2·60" at Villupuram, 2·0" each at Tindivanam and Kallakurichi, 1·40" at Cuddalore and 0·5" or less at other places. The condition of standing crops was reported to be good. Harvest of summer groundnut crop was in progress. Sowing of winter groundnut crop commenced in some areas in the district.

Arrivals, Transaction and Prices: As the harvest of peanuts alone was completed and as the harvest of spreading variety had not commenced on a large scale, arrivals to the markets decreased. A quantity of 5519 tonnes from local produce and 755 tonnes from other district arrived for sale. Despatches to other districts amounted 3068 tonnes and exports to other states to 142 tonnes. The stock at the end of the month stood at 2398 tonnes.

RAMANATHAPURAM DISTRICT: *Arrivals, Transaction and Prices:*

Virudhunagar Market	Opening Stock (*in quintals*)	Arrivals	Sales	Closing Stock
Groundnut Pods	...	15,500	15,100	400
Groundnut Kernels	6,700	15,295	16,025	5,970

The prices of groundnut and groundnut products were, Groundnut pods Rs. 23·00 to 26·00 and Groundnut Kernels pucca Rs. 88·33 to 88·00 and Groundnut Oil at Rs. 476·71 to 485·71 and Groundnut oilcake at Rs. 74·22 to 87·43.

NORTH ARCOT DISTRICT: *Season:* Summer showers were fairly widespread and scattered almost throughout the District during the month. These showers were received almost intermittantly throughout the month and were extremely beneficial for preparing the land for groundnut cultivation. Towards the close of the month sowings of winter groundnuts were also taken up extensively and are progressing rapidly.

Arrivals, Transactions and Prices: The arrivals were 3700 quintals of pods and 6703 quintals of kernels adding to the opening stocks and the disposals were 5600 quintals of pods and 6496 quintals of Kernels leaving 6230 quintals of pods and 3876 quintals of kernels as the closing stock.

The prices ranged between Rs. 19 to 35 per bag of 40 kgs. for pods and Rs. 240 to 270 for kernels per candy. The oil ranged from Rs. 473 to 515.

TIRUCHIRAPALLI DISTRICT: *Season:* Light to moderate rains were received at few places in the district during the month under review with the result that the harvesting of summer, groundnut crop was completed only in few places. In certain other places preparatory cultivations for the winter groundnut crop was in progress.

Arrivals, Transactions and Prices: The regulated market Jayankondan received heavy arrivals of 7089 bags as against 2013 bags last month and the Regulated Market at Ariyalur received 201 bags as against 132 bags in the previous month. The other two regulated markets remained inactive as before. The prices of groundnut kernels ranged between Rs. 230·00 to 265·00 per candy of 240·85 kilogram.

Gingelly:

SOUTH ARCOT DISTRICT: *Arrivals, Transactions and Prices:* The arrivals of gingelly totalled to 450 bags of 80 kilograms each. Despatches to other districts came to 370 bags. The quantity of gingelly consumed

by chekkus and mills were reported to be 365 bags and 260 bags respectively. The stock with trade at the end of the month was reported to be 701 bags. The price of per bag of 80 kilograms ranged from Rs. 80·00 to 86·00 in all the markets.

Tobacco:

COIMBATORE DISTRICT: *Arrivals and Transactions:* At the end of the month under report, there was a stock of 33847 quintals of chewing and 2930 quintals of cheroot tobacco. About 7495 quintals of chewing and 630 quintals of cheroot tobacco were exported to places in Kerala, Bombay, Mysore and Andhra States and to Madurai, Nilgiris, South Arcot and Salem districts of Madras State.

Tobacco market during the month continued to be dull and demand from outside was limited. But the prices of pitcured variety of tobacco showed an upward trend by about Rs. 43/- per quintal due to good demand for this variety from the merchants of North Arcot District, Mysore and Andhra Pradesh. The prices of pitcured variety ranged up to Rs. 248/- per quintal.

Prices of chewing tobacco, Meenampalayam ranged from Rs. 177 to 242 and for other varieties from Rs. 132 to 230. Cheroot variety ranged from Rs. 177 to 231.

Cardamom:

MADURAI DISTRICT: During the month under report, heavy rainfall was reported in cardamon plantations in Kerala hills, adjoining Madurai district. The standing crop of Cardamom was good. Arrivals were comparatively poor during the month. Auctions were held only at Pattiveeranpatti.

Prices ranged from Rs. 7·15 to 8·50 at Bodinaickanur and Rs. 7·54 to 8·58 at Pattiveeranpatti.

Review of administrative activities of Market Committees in the State during the month of June, 1961

The Market Committees of South Arcot, North Arcot, Coimbatore, Tiruchirapalli, Tirunelveli and Ramanathapuram were continued to function during the month under report.

Enforcement :

Name of the Market Committee		Section 5(1) A	Section 5(1) B	Section 5(3) A	Section 5(3) B	Weighment A	Weighment B
1. South Arcot	...	158	1474	97	930	77	822
2. North Arcot	...	...	...	...	...	...	...
3. Coimbatore	...	115	2467	78	1575	19	671
4. Tiruchirapalli	...	162	1344	154	1215	140	1053
5. Tirunelveli	...	34	185	7	88	33	174
6. Ramanathapuram	...	16	443	10	381	9	300

N. B. A. Licenses issued during the month.
B. Licenses issued upto the month.

Meetings : The second ordinary meeting of the Tirunelveli Market Committee was held at Sankarankoil on 30—6—1961. The committee resolves to acquire at Sankarankoil for the construction of Regulated Market about 5 acres of land at the site west of the high school approved by State Marketing Officer.

An ordinary meeting of the Ramanathapuram Market Committee was held at Virudhunagar on 28—6—1961. 14 subjects were discussed by the committee. A meeting of the North Arcot Market Committee was held on 27th June, 1961 at Chengam in the premises of Co-operative Marketing Society, Chengam. All the subjects were passed by the Committee.

The Madras Agricultural Students' Union.

PATRONS

1. Dewan Bahadur C. Arunachala Mudaliar, Zamindar of Chunnampet, Chunnampet P. O.
2. Raja Sri Krishnachandra Gajapathi Narayana Dev, Parlakimidi P. O.
3. Sri V. C. Palaniswami Gounder, M. L. A., Vellakinar, Coimbatore Dist.
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Edited and Published by Dr. D. Daniel Sundararaj, B. Sc. (Ag.), M. Sc., Assoc. I. A. R. I., Ph. D., for the Madras Agricultural Students' Union and Printed by A. Subramaniam, at The Coimbatore Co-operative Printing Works, Ltd., Coimbatore.

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