

Table V

Germination trials with Adt. 1 preserved in a saturated moist chamber.

Period of testing.	Adt. 1 (control).					Adt. 1 (naphthalene treated)				
	3rd day of trial	4th day of trial	5th day of trial	6th day of trial	Total Germination	3rd day of trial	4th day of trial	5th day of trial	6th day of trial	Total Germination
3rd week	94	5	1	::	100	16	39	26	2	83
4th "	91	5	2	::	98	::	3	10	20	33
5th "	97	1	::	::	98	::	2	5	3	10
6th "	92	2	1	1	96	::	::	::	::	::

Table VI

Germination trials with Adt. 4 preserved in a saturated moist chamber.

Period of testing.	Adt. 4 (control).					Adt. 4 (Naphthalene treated).						
	3rd day of trial.	4th day of trial.	5th day of trial.	6th day of trial.	Total Germination.	3rd day of trial.	4th day of trial.	5th day of trial.	6th day of trial.	7th day of trial.	8th day of trial.	Total Germination.
1st week.	99	::	::	::	99	97	2	::	::	::	::	99
2nd "	99	1	::	::	100	99	::	::	::	::	::	99
3rd "	95	4	1	::	100	45	48	1	1	::	::	95
4th "	100	::	::	::	100	8	47	24	::	9	::	88
5th "	99	1	::	::	100	::	::	11	8	13	4	36
6th "	95	4	::	::	99	::	::	::	1	2	6	9
7th "	86	10	1	::	97	::	::	::	::	::	::	::

SOME SOUTH INDIAN VILLAGE STUDIES *

(A Preparatory Study of "Villur" Village No. 119, in Tirumangalam Taluk, Madura District, Madras Province).

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Animals.

(a) *Bullocks.* In the whole district, the average area tilled by a pair of bullocks is largest in Tirumangalam taluq. The indigenous cattle of the district being small sized, bullocks are generally bought at high prices at Madura and other places. In Villur, on account of the precarious rainfall, the produce obtained does not justify the maintenance of costly bullocks and the people are too poor to afford the initial cost. Only a few cultivators go in for these, while the others have to remain content with the inefficient locally bred animals. Naturally they are overworked and worked at too early an age.

* Continued from page 188, May issue.

A good pair of bullocks can cultivate 5 or 6 acres of wet or garden lands, or 10—12 acres of dry lands. In 1920 there were 1080 cattle, of which half were cows and buffaloes. The present figures are just the same. There are no more than 300 pairs of bullocks for the whole village of 1074 holdings. The number is very inadequate for the requirements. Most of the small cultivators keep only one head and pool their resources when necessity arises. During the season about 500 ploughs are engaged from outside for 4 or 5 days.

(b) *Other cattle* Cows giving more than half measure of milk at a time are rare, and buffaloes yield a trifle more. Milking is done twice a day. The milking period of the animals varies from 4—6 months. As milk and milk-products are not very common articles of diet among the cultivators these animals are neglected. One or two individuals used to keep stud bulls. At present, however, there is no good bull in the village or nearby, and all animals breed indiscriminately.

(c) *Maintenance of Cattle.* Fear of theft prevents them from being left in the fields as is done in other taluqs. All cattle are generally kept in sheds inside the house compound. There is no flooring and the place is ordinarily very dirty and foul-smelling. Nothing by way of litter is provided. In the rainy season particularly the condition is very bad. Occasionally the animals are washed in one of the ponds. No land is set apart for communal grazing. Cattle graze on patta lands, unoccupied assessed lands and porambokes. The green fodder available in these places is meagre. Samai, varagu and cumbu are rarely used. Cholam, ragi and paddy-straw are generally used as dry fodder, and the first is often grown for the purpose. A quantity of straw is put in the feed box in the shed just after the cattle return from the fields and replenished as often as necessary. Cotton seed is the only oil-seed used. This is soaked in water overnight, ground next morning in a stone mortar and given in a tub mixed with rice-washings, etc. Groundnut cake is also used now. The cleanings of the cereals and pulses and rice-washings are freely used. No distinction is observed in the feeding of different animals. Bullocks require no tending. Cows and buffaloes are tended by cowherds during the day for a small fee (four annas per head per month). There are about 10 individuals tending from 30 to 50 or 60 heads each.

(d) *Cattle diseases.* Infectious diseases are very rarely found.

(e) *Sheep and goats.* Sheep and goats are better cared for than cattle. They numbered 1635 in the year of resettlement and this strength is apparently maintained. Those who keep sheep and goats generally look after them themselves. Occasionally when the owner has got more animals than he can manage himself, he employs a shepherd for the purpose. The animals belong to the ordinary breeds of the locality and fetch good prices in the market. The skins obtain good

Here also the question of rationing is neglected. The animals are given whatever fodder is available and the trees on public lands are foliated for the purpose.

Miscellaneous Crops. In the year of resettlement there were 40 acres of fruit and other trees. Enquiry reveals that in the past the area was greater, and in a flourishing condition. The fruit gardens consisted of different varieties of citrus, mango, guava, pomegranates, etc. A good deal of enthusiasm has been displayed in the cultivation of coconut which does not easily grow in this locality. No attempts have ever been made towards marketing the produce. Regular markets are not available. Tirumangalam, Virudhunagar and other small towns have only recently developed while Madura is too far away. Recently a pomegranate garden was let out to a fruit-seller at Madura on an annual contract. The produce of old gardens seem to have been used solely for domestic consumption by the owners. Similarly flowers like rose and jasmine were grown. The gardens belonging to the temples are still in existence and the tenant is enabled to sell a portion, after meeting the temple requirements. The demand for flower is considerable in this locality and a good deal is brought from outside during particular seasons. Green vegetables are also grown in garden lands and in tank-beds. Brinjals, sweet potatoes and gourds are common, but no effort is made to make marketing a dependable source of income. The markets are not studied and nothing is known about sorting, dressing and packing of commodities for sale.

The Babul (*Acacia arabica*, Willd) grows freely everywhere. Besides serving as fuel, it is put to many uses. The timber is valued for its hardness and durability and is freely used in the manufacture of wooden parts of agricultural implements. The bark, leaves, seeds, and gum are used for industrial and medicinal purposes.

Leisure and side Industries. Some cultivators do carting in the off season. The villagers keep a few fowls, and pigs but poultry rearing and pig keeping as such are not practised. No cottage industry or handicraft of any special nature is known to have existed in the place, even the handspinning industry having died out. The majority of the villagers are idle for six months in the year.

Marketing and trade.

(a) *Roads and communications.* Madura, Tirumangalam and Virudhunagar are all accessible by rail directly from Kalligudi. These towns are on the metalled road from Madura to Tuticorin and Villur and Kalligudi are being connected to this road. At present there are country-cart fair-weather roads to all these towns, but they are very uneven, and take a long time to cross. Bullock carts are the only vehicles available for travel and transport of commodities but these are not always available in sufficient numbers to cope with the traffic.

(b) *The markets.* The chief market, Virudhunagar, is 8 mi distant and Tirumangalam, a smaller one, is at the same distance the opposite direction. There are two weekly fairs at Kallupatti and Kalligudi, each four miles distant. Because Madura is 20 miles from the cultivator does not find it possible to go there. The conditions actually obtaining in these places are not fully known to the cultivators in the village. Sometimes sale by auction takes place in the weekly fairs. Many classes of persons frequent these fairs—dealers, millers and brokers—all more or less acquainted with the art of buying and selling. In such an assemblage a farmer, unless he is exceptionally capable or has a special class of grain to offer, is at a disadvantage. There is no doubt that many of them lose a good deal in the transactions they make here. Brokers easily dupe them with false weights and measures.

(c) *Commodities marketed.* Cotton, betel-leaf, groundnuts, chilli and green vegetables are the main crops produced. Usually brokers come and purchase these at wholesale rates. Betel leaf is daily taken in small bundles to the villages, and sold by the growers themselves. Cotton seeds are sold to local oil mongers for crushing. Green vegetables are purchased by the brokers at the gardens. Milch cattle are rarely available for sale. Milk and milk products are scarce. Sheep and goats are disposed of by the cultivators themselves at the weekly fairs. The milk of these animals is seldom utilized. Eggs or poultry are very rarely taken to the weekly fairs.

(d) *Local transactions.* There are about half a dozen whole-time retail shops and several smaller part-time shops. They deal in the daily necessities such as rice (increasingly of late), cloth, spices, salt and kerosene oil, which are brought almost exclusively from Virudhunagar. The stuff sold is inferior but the price is always kept up as high as possible. Things are often sold for credit and interest is charged on out-standing balances. The practice of exchange and barter rarely occurs. Labourers in the gardens get their wages paid in kind which are exchanged for rice or other necessities.

Joint activities, common property, etc.

(a) *Co-operation.* It is recorded in the resettlement register that "the customary labour or irrigation works—*Kudimaramat*—will be performed by the ryots as usual". No one seems to worry about this important part of the village work and it is neglected. Another joint activity which has died away is the system of *kaval* by which the safety of the crops was secured for a small contribution in kind. While this and similar co-operative efforts are working well in the surrounding places, their absence at Villur affects greatly the extent and nature of the cultivation.

Co-operation for traditional and communal purposes still exists to a great extent among the different communities, particularly

Ahambadiyas and Chettis. The co-operative spirit among the Vellalas is seen in the cultivation of paddy. About 20 or 30 or even more people carry out the cultivation in one garden. It is also usual for two or three men to join in the local trade business. Efforts towards productive purposes on modern lines, have however, never been made in the village. The Panchayat Court which has been in existence for the last 10 years only aims at arbitrating minor offences and even this work is not discharged to the satisfaction of all.

(b) *Common or public property and income.* There appears to have been no land set apart for common social or economic purposes at any time. No mention of it occurs in either of the settlement reports. Within the village there are a few *chavadis* belonging to the different communities, which are used for communal purposes. There is great difficulty felt in finding space in the season for threshing grain. Any vacant site is pitched upon and momentarily converted into a threshing floor, right in the middle of the village, in front of houses, in the back yards or anywhere. The crops have to be carried to long distances. The grains get mixed with sand and other impurities. Generally the *poramboke* which has a total area of 713.85 acres serves for all common purposes. The villagers are totally indifferent to these properties. The fishery rights of three of the irrigation tanks is sold annually in public auction and five smaller tanks are taken on lease by the ryots who pay a fixed rent of Rs 0--2--9 per every cultivated acre. There are several ponds whose water is used for drinking and other purposes. Fishing is not allowed in these. When these ponds dry up, people scrape away the sediments for manurial purposes but no regular cleansing is done. Some game birds are found in small numbers, but nobody cares for them. Snipe can be had in good numbers. Teals are found on the tanks when they are full. Big trees which formerly adorned the wayside and *porambokes* are disappearing and replanting is neglected and there are no wind break to protect the crops against wind. Some money is raised by auctioning the right to collect a tax ('*mahimai*') imposed by common consent on articles of certain classes bought or sold in the village. This sum does not now seem to be utilised for common good but is spent for communal purposes for the Ahambadiyas alone.

Tests for agricultural prosperity.

(a) *Ease with which land revenue is paid.* The regular cultivators being very submissive to authority, arrears in the annual revenue collection are rare. That great difficulty is felt at the time of paying taxes is evident. Money is often borrowed at usurious rates of interest. Land-owners do not find it easy to make the tenants (who are usually Ahambadiyas) pay the tax according to contract.

(b) *Rise in land value, rental, prices of agricultural produce.* The present prices are much lower than what prevailed before and are

further decreasing. The agricultural produce from this village never obtained any special price for their quality.

(c) *Increase in the number of plough cattle, ploughs, carts.* There has been no increase in any of these, though obviously necessary. A good deal of the ploughing of this village is paid for and generally the lands are ploughed inadequately.

(d) *Improvements in methods of cultivation.* No new crops have been introduced and the methods of cultivation are the same since time immemorial. On the other hand there is a good deal of neglect in the existing practices.

(e) *Extension of area under cultivation.* About 22 acres of cultivable lands remain unoccupied. Moreover about 30 or 40 acres of dry lands have been recently relinquished by the owners as not worth the cost of keeping. All the lands are not equally well cultivated even according to the prevailing standards. General poverty, ignorance, lack of facilities, all play their part, so much so that in the same type of lands yields vary considerably. Though wells were dug in rapid succession some years back, the activity has received a set-back now.

Sources of help for the village.

There are no societies or private organisations in or near about the village interested in rural welfare. Some *chavadis* and wells have been erected by private benevolence and temple functions used to have been permanently endowed in the past.

Tirumangalam, the taluq head-quarters, is the chief place for this village from the point of view of official help. Besides the usual administrative offices, the agricultural demonstrator, a minor irrigation overseer and a P. W. D. overseer, are stationed here. The offices of the Taluk Board, Deputy Inspector of Schools, Vaccinator, Health Inspector, and an indoor dispensary are also located here. The Village Development Committee, the District Educational Council and Office, the Deputy Registrar of Co-operative Societies are all at Madura.

The needs of the Village. Before constructive attempts are made towards the improvement of the village the following preliminaries have to be accomplished. The disturbances due to scoundrels and thieves must be put an end to if necessary with the help of the police, and a full sense of security afforded to all peaceful cultivators. The several manure pits that are even now existing can be easily converted into rough latrines, by putting a screen round the pit and a few planks across. The ponds and wells used for drinking or other toilet purposes should be set apart for the different uses and properly maintained. The people themselves are no doubt aware of these follies and it will not be difficult to effect the necessary arrangements with a little active persuasion. The following improvements and the

methods of effecting them are suggested from the point of view of the small cultivator in order of their importance :

1. If one condition is more necessary than another for good crops, it is a suitable supply of water, for no amount of manuring or other treatment of the soil will make up for a deficient rainfall. There are no rivers or canals nearby, wells are therefore most important. It is besides within reach of the individual cultivator. The points that require consideration in this connection are :

(a) *Water lifting.* The prevailing rate of hiring a *kavalai* (the best of the existing methods) for a day is between Rs 1-8-0 and 2/-. The cost will be slightly less for the owner as he will have other advantages such as manure and availability of the bullocks for other work. But half the small cultivators do not own any animals and those who do and have sufficient lands and wells do not find it advantageous to put them to full use. Calculations show that the same work could be done in less than half the time by a small portable pumping set consisting of an engine of $1\frac{1}{2}$ h. p. and 2" pump at a cost not exceeding twelve annas. Operating a set like this is not very technical and must be quite easy for the cultivator to learn. The only consideration is the initial cost which is about Rs 500/-. There are many other advantages and greater output low rate of depreciation. It is therefore worth the trial for any cultivator who possesses one or more wells and sufficient lands; or he must hire the set when free; either individually or on a co-operative basis.

(b) *Improvement and construction of wells.* To determine the extent to which the existing wells can be improved, location of new wells, etc., it is necessary to have an estimate of the quantity of underground water available every year, and its general layout. An efficient and cheap method of constructing wells is another important requirement.

2. Manures.

The following considerations are necessary in determining the choice of type of fertiliser, the amount to be used and the time and method of application.

(a) *Production.* The existing method of utilising farm-yard manure is much wasteful. Trials may be made for manufacturing compost by the *Indore process*, which is said to be quite easy for the cultivator to practise, and by which the manure will be at least doubled in quantity and improve in quality. The fine powdery character of the compost is a great advantage. When farm-yard manure is treated in this way it ceases to be foul-smelling and the sanitation will be greatly improved as all waste products are used up. If the present insufficient number of cattle could be conveniently increased (see below) more farm-yard manure will be available. A larger quantity of green manure can also be had by increasing the growth of crops for this purpose.

(b) *Local purchase.* Sheep-penning, oil cakes, etc., are available in the village itself and it is to the advantage of the village as a whole that they should all be used.

(c) *Chemical manures.* Though the cost of these is a serious deterrent at present, their use is inevitable under intensive cultivation. Recourse must be had to them whenever soil fertility is desired to be increased. When the particular crops to be grown for the market are determined, the outturn can only be raised above ordinary by the judicious application of chemical manures. The chief manurial requirements of this village will be in the form of phosphates and potash.

3. Cattle.

Having regard to the fact that no land is set apart for grazing and that adequate maintenance is not possible for cattle throughout the year, the present number of animals seems too great. On the other hand, it is insufficient to meet the work in the village. Arrangements for grazing have therefore to be made. Though there are 713 acres of poramboke, no portion of it can be conveniently used for grazing. The 22 acres of unoccupied land are distributed in several plots. However as almost the whole of wet and dry lands remain uncultivated after the winter crop, arrangements could possibly be made for grazing in them, if a suitable variety of grass could be grown.

Co-operation. For the small holders and the landless co-operative credit is indispensable. It is not only the most suitable form of joint effort to begin with, but easy credit facilities are not available and the need is very great during the seasons. It affords an excellent training in the handling of money, in expending it on productive purposes and in the elements that combine to build up sound credit. It readily lends itself to organisation for mutual help. The beginning must be made with a small number of chosen members.

Joint effort is also necessary for carrying out the minor improvements or repairs to tanks — '*kudimaramat*'—, prevention of field pests and such matters. There is also great scope for co-operative undertakings in small machinery such as flour mills, oil mill and rice huller.

Side Industries. Sheep farming exists to a sufficient extent but it is essential that a proper system of feeding should be established. Cow-keeping and poultry farming are useful and readily-available side industries in this village. The market for these is sufficiently big and breeding of milking animals may itself prove a valuable occupation. Supply of milk to the towns can be profitably undertaken. Fish is consumed freely in the locality and there are several private and public tanks, besides wells. A great scope for a profitable industry exists in this line if it could be determined what kind of fish grows under the conditions. Carting may afford a part-time occupation when agricultural and horticultural conditions develop.

Horticulture. The adoption, or substitution in place of ordinary food crops wherever desirable, of horticultural crops is the ultimate means by which the cultivator can become really prosperous. Such crops require much more labour than the ordinary ones and hence this form of cultivation is particularly necessary to this village where cheap labour is plentiful. A number of vegetables, different kinds of fruits and flowers have been and are still grown to a small extent. Their cultivation is neglected and preparations for sale are unknown. In these crops the quality is more important than quantity and early maturity is often advantageous. With fruit and vegetables the utmost importance is attached to freshness and the packing may be made more attractive. Another important consideration is the sorting into grades and uniformity in bulk.

Marketing. There has been no real marketing or market-growing up till now. As regards the production of vegetables, fruits and flowers, these have to be adjusted according to the seasonal demands and prices prevailing at those times. It would be ideal if a co-operative buying and selling agency could be created in the village.

Organisation of labour. Labour is one of the main problems of this village as it is the source of maintenance for at least a third of the population. The prevailing wages conditions are fair for the locality, but sufficient work is not available. Organisation is therefore essential for its improvement. If the time and extent of inside as well as outside requirements could be fairly known and approximated, the quality of particular kind of labour can be increased or maintained with confidence and with the improvement in agriculture, wages must also rise.

Crops. The present practice of growing short term paddy broadcast should be restricted and the transplanted varieties reintroduced. This will give more work to the cultivators, better grains and more produce. As diseases due to bad seeds are common, procuring good seeds is very important. No change in the existing crops will be necessary for some time to come, excepting that their purity should be kept up by proper selection.

Agricultural practice. There are many details in the general cultivation methods which are grossly neglected. Preparation of the soil, especially proper and timely ploughing, requires greater attention because rainwater which falls upon the soil should be made to enter it and percolate rapidly through the interstices. Crop rotation must also be properly adhered to.

Soil improvement. The soils are on the whole good, and wherever necessary tank-silt is freely applied. Removing the saline ingredients is necessary in case of many lands. As sufficient water to wash away these salts is not available, growing of suitable plants in

them may be tried. The 'karuvcl' tree appears to be quite good for the purpose. It should not be cultivated longer than has been found necessary to neutralise the salt, because it is an exhaustive crop. In fact the moment it has taken a hold of the soil the improvement may be regarded as established and it should be early removed.

The best way of effecting the above improvements would be to provide a model small cultivator in the village who will serve as an example and a guide in all these matters. He will have just as much land as any small cultivator, distributed in the different soils, with a well or two and necessary animals and implements. While conducting the cultivation under the best of existing practices, he will seek help from the proper experts and authorities (already referred to) for the various problems that arise.

Research Notes.

The Relation Between the Size of Seed and the Development of the Plant Resulting from it in Rice.

The nature of the influence of seed-weight on the vigour and yield of the resultant crop is still a mooted question among investigators of field crops. Results obtained by different workers on wheat, oats, rice etc., in different countries are not all uniform. It has been stated that rice growers of Japan, Formosa and Italy usually grade the seeds before sowing so as to eliminate the lighter seeds. The rationale of this practice was tested at the Paddy Breeding Station, Coimbatore with two pure lines of rice, Co. 4 (six months' duration) and Co. 10 (four months' duration). A small sample of seed from each of these was graded into three groups light, medium, and heavy, based on the weights of individual grains. About 100 plants in each group were planted in randomised blocks with regular spacings, the seeds having been sown in special pots previously,

The heavier seeds in both the varieties germinated earlier and the seedlings showed greater vigour. The early differences, however, gradually evened out in the case of the long duration variety Co. 4. When the final yields were recorded for each group separately there was no difference among the three groups. In the case of the early variety, Co. 10, the greater vigour of the plants from the heavier seeds was maintained to the end. The yields of the plants from heavier seeds were also significantly more than those from the light seeds.

The different groups of seed in the two varieties are genetically identical as they are all from a pure line but while in a long duration variety there is no advantage to be gained by separating the seed into light and heavy, there appears to be a definite gain in weeding out the light seed from the sample in a short duration one.

The experiment was conducted only on a small scale and the results require further confirmation. If the results of the short duration variety were to be confirmed, it should be an easy matter to increase the output by the elimination of all light seed in a sample.

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