

no vitality. The results of the germination percentages obtained in the different varieties tested are given below.

Viability of Sorghum Seeds Preserved in the Earheads.

Local Name.	Botanical group.	Percentage of germination.							
		1 year old.	2 years old.	3 years old.	4 years old.	5 years old.	6 years old.	7 years old.	
1. Vellai Cholam	Sorghum Durra.	89	82	59	38	1	0	0	Irrigated (Dindigul).
2. Chinna Manjal Cholam	"	100	99	86	22	5	0	0	Irrigated (Coimbatore).
3. Peria Manjal Cholam	"	...	93	97	87	58	1	0	Rainfed (Coimbatore).
4. Patcha Jonna	"	...	...	...	92	16	4	0	Rainfed (Ceded Dts.)
5. Tella Jonna	Sorghum cernuum	...	...	...	95	18	0	0	"
6. Talai Virichan	Sorghum Roxburghii var. Hians.	...	94	90	69	21	2	0	Rainfed Gaping glumes.

It will be noted that in this naked grain, grains with their glumes on the earhead retain their viability longer than when kept as loose seed. So even when larger quantities of seed are to be preserved, picked earheads can be stored in closed metal bins or earthen pots with a few balls of naphthaline.

The rate of deterioration in viability is higher in the irrigated than in the rainfed sorghums. The percentage of germination decreases rapidly in the irrigated varieties after the second year, while in the rainfed varieties the seeds retain full vitality (about 90 per cent.) for three to four years and decreases to less than 50 per cent. after five years and even when six years old stray seeds (1 to 5 per cent.) germinate. In no case did seven years old seeds germinate.

SOME SOUTH INDIAN VILLAGE STUDIES *

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

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Rainfall and Irrigation.

Nature of Rainfall. The rainfall is very uncertain and scanty even in the best of seasons. A study of the district during a number of years shows no indication of its being concentrated in the two short periods during which the monsoons blow. On the contrary, it appears that there is a continuous rainy season of 9 months' duration

* Continued from Page 148, April issue.

which brings more and more rain until November, when it rapidly declines. During a first rate season there will be rain in almost every month of the year, though the bulk of rainfall is received in October and November, every fall will be of some use to one or another of the many crops that are grown, provided it be not too heavy and protracted. Usually there is nothing like regularity in their occurrence or amount. During some years rain falls in desirable abundance but either too early or too late in the season. This state of affairs naturally confuses and misleads the ordinary cultivator. Often his anticipation fails and he meets with disappointment.

(b) *Tanks.* The tanks of this village fall under the IV class, i. e., those which supply water for 3 months or under. There are two big tanks irrigating 175 and 250 acres each, a dozen small tanks irrigating under 50 acres each, and 6 private ones irrigating 54 acres in all. All the private tanks and six of the smaller ones are purely rain-fed. One big tank and four smaller ones are partly rain-fed but partly supplied by the surplus from tanks which themselves are rain-fed. The other big tank and the remaining 2 small tanks are purely surplus-fed. Not unexpectedly, therefore, some of these tanks often get exhausted in the last stages of the crops and the only hope left is in subsoil or underground water.

(c) *Wells.* When the Revenue Department started issuing agricultural loans about 30 years ago many of the cultivators took the advantage, for the purpose of digging wells. This however did not prove so beneficial as was expected. Springs are generally found at a depth of 15 to 20 feet in hard rocky strata. Good springs are hard to get and there are instances where more than Rs. 1000 has been spent for a well which could not supply enough water for one acre a day in summer. Though well-digging still remains a gamble in these parts, yet every year we find stray attempts at improving old wells or digging new ones. No scientific method is yet known. The loose soil is dug out by the country implements and when rocky strata are met they are drilled and blasted. Silting is not very rapid as the underground is mostly rocky but a parapet wall on the top is necessary to prevent the surface drains flowing into the well in rainy season. Nearly 500 wells have been dug, out of which about 300 are in working condition. About 60 are in wet lands and serve as additional sources of water for paddy and for raising a second crop in summer. The rest are in dry lands and help to grow garden crops.

The water obtained from these wells varies according to the soils through which it passes, but is in no case equal in fertilising value to rain water or tank water. On account of the saline ingredients in the soil, good water is rarely obtained. However none of the wells in the fields is unused, though those within the house-compounds are

neglected. Some people even prefer the alkaline water for irrigating certain crops like chillies.

No water pump has ever been brought to this village, though there are said to be at least 4 or 5 wells, which with slight improvement, can each engage an engine of 5 h. p. and a pump 3" diameter.

(d) *Methods of irrigation.* (i) *Flood irrigation.* Mostly in wet lands. For this the land must be level and where it is not naturally so, it is corrected by the plough.

(ii) *Furrow irrigation*, in garden lands. Furrows 4-8 feet apart are made in the fields with a gentle slope from the supply. The land is divided into small squares or rectangles, bordered on one side by a furrow. Water is turned into the plots from the furrows.

(iii) *Basin irrigation.* This is practised only for trees and creeper vegetables. A wide circular furrow or basin is excavated around each trunk and water is run from a furrow laid along the rows. Similar basins are made in case of creeper vegetables and watered by hand till they take root.

Generally the tillage operations are not planned in such manner that water may be admitted with ease and held without difficulty during the whole time the land is idle or at rest. Irrigation by underground pipes is unknown. Due to the ignorance as to the requirements of the crops in respect of water, frequent and excessive irrigation also occurs. This brings about the shallowness of rooting and other evils.

Manuring.

The practice of manuring is widely prevalent and various substances are used as manures. Major portion of these is not purchased but made by the cultivators themselves. Sheep penning, oil cakes, farmyard manure and green manure have to be paid for. Farmyard manure or household refuse is generally used for wet lands. Despite the fact that the villagers always try to find other material for fuel than dung cakes, the available farmyard manure is far from sufficient to meet the requirements even of the wet lands. The careless manner in which it is handled shows an utter lack of knowledge about the manurial elements of the different substances. Manurepits are rare and all sorts of refuse are thrown in a heap in the back yard of houses or vacant sites. This not only causes damage to the manure by exposure but it is also a great breeding place for the disease-bearing flies and insects. Though generally very inadequate quantities are applied, cases have occurred where its excess had led to purely vegetative growth. Cattle urine is totally neglected. Green manure is used in plenty; in fact this is the most largely used manure at present for wet lands. *Avarin*, *virale* and *kolingi* (*Sesbania aculeata*) are the crops usually employed. If the soil is alkaline (*soudu*) more leaves and tank silt are used. The first plant rarely grows wild in this locality. All the three

are mostly grown for this purpose. Sometimes horsegram or redgram is sown on wet lands after the harvests to be ploughed in as green manure for the next paddy crop. Leaves of trees such as *neem*, are also freely used. The fields are well ploughed and irrigated before green manure is spread and trodden. Oil cakes, e. g. castor, gingelly and groundnut are commonly used for wet lands though in very small proportion. They are ground to powder and applied just before flowering of the crop. Sheep penning is done for all kinds of lands as often as possible. Chemical manures are being introduced. Depots are now established within a distance of 4 miles and their use is increasing in surrounding places.

Crops.

(a) *Crop seasons.* The two cultivating seasons prevalent are *kalam* (winter) and *kodai* (summer). On wet lands only the *kalam* crop is raised, for the tanks can hardly supply enough water for anything else. In years of unusually good rains when the tanks get refilled, a second crop is obtained. Where there are wells in wet lands, cereals such as *cholam* (Sorghum) or *ragi* (Eleusine coracana) are grown in summer as a second crop. Dry lands without wells grow only the *kalam* crop while garden lands raise two and sometimes three. The following table gives the details of crops cultivated in the year of resettlement (1920). Since that time groundnut cultivation has nearly doubled and *tenai* and *kudiravali* have gone out of cultivation. Other crops grown are practically the same.

Table V. *Extent of crops cultivated.*

	Paddy	594 acres.		Cotton	1740 acres.
	Cholam	225 "		Gingelly	53 "
	Cambu	92 "		Castor	2 "
	Ragi	152 "	Industrial	Groundnut	193 "
Cereals	Tenai	3 "	crops	Others	19 "
	Samai	101 "		Betel	12 "
	Varagu	35 "		Chillies	61 "
	Kudiravali	40 "	Vegetables	Plantain	6 "
	Others	383 "		Others	12 "
	Horsegram	13 "		Double crop area	155 "
Pulses	Blackgram	1 "			
	Redgram				
	Others	1			

(b) *Extent and nature of crops grown.* The village is hardly self-sufficient in its food crops; in fact it is so in all the essential crops. There are more than 1000 acres under cereals other than paddy. This area however produces, under the best of existing conditions, not more than a fourth of the annual requirements of the village. Less than another quarter is met by paddy, while more than half has to be purchased from outside in the form of imported rice. The same is the case as regards pulses and vegetables, though the requirements of

the latter shrink according to circumstances. Redgram and blackgram are hardly grown at all, while gingelly cultivation requires extension to meet the needs of the place. Cotton, groundnut, chillies and *pan* (betel) are the chief money crops. Though the price of cotton has gone down and the demand for groundnut is not so much as before, yet there seems to be no sign of any diminution in the extent of their cultivation. On the whole, the cotton area, though only 471'26 acres is best suited for the crop, no other equally valuable crop could be found for the rest of the lands. Groundnut oil is being increasingly consumed locally. Chillies are not successfully cultivated, and considering the importance of the crop, there is great prospect for its extension. The crop seems to be subject to many diseases and blights which have not been understood well. Selection of seed and the best methods of cultivation are not known. Betel is a crop raised almost exclusively by the Vellalas; its cultivation is generally well done. The leaves are consumed largely in the surrounding villages and so it has got a fair market. Plantain does not occupy the place it ought to, as admittedly it gives good returns. The reasons are fear of theft, the high initial expense and the costly method of water-lifting.

(c) *Rotation of crops.* All wet-lands without wells grow only paddy and receive no benefit of rotation. In cases where there are wells, the land is occasionally let out for *pan* cultivation: or a second crop cereal such as *cholam* or *ragi* or a vegetable like brinjal is grown; and rarely a green manure crop. In dry lands *cholam* and *varagu* are never sown twice running on the same land; they are usually followed by *samai* or horsegram. The advantage of rotation is also gained by the system of mixed crops with cotton or groundnut as the main crop. This practice is most common. As regards garden lands the inferior cereals, vegetables, chillies or some pulse, are raised in a system of rotation; root crops like sweet potatoes are rarely grown. Both in dry and garden lands inter-tillage is common. Catch crops are also frequently raised in the place of regular staple crops.

Methods of cultivation.

(a) *Renting lands.* Large scale cultivation has never been attempted in this locality, though there are 47 holdings possessing between 10 to 50 acres each. It is only 2 or 3 farmers among them who keep a labourer permanently. More than one pair of bullocks is very rarely seen with a farmer. The usual practice of a cultivator is to keep as much land as he can himself cultivate with his pair of bullocks and to rent out the rest. This seems to be the reason why no labour-saving machinery has ever been brought into this place. The chief method of renting lands is the system of *varam* by which the tenant bears all the expenses of cultivation with or without tax, and shares equally the produce with the land-lord, the whole of the straw being taken by the tenant. Slight variations in this system exist, when the landlord

undertakes some of the expenses as manure, or tax, for a larger share in the produce. The contract system by which the tenant agrees to pay a fixed amount (which is considerably less than half the produce in this locality) each year, himself enjoying the full produce and bearing all expenses, is rarely found. Farm servants are engaged as whole-time paid servants, or they get their food and clothing and a share of the produce, or simply a share in the produce.

(b) *Soils and cultivation methods.* The black soil requires a thorough soaking before it will raise a crop and thereafter needs no further rain; whereas the red does not retain moisture well and so wants frequent showers. Consequently on the black soils the sowing season may be deferred as late as October, when the land has received the heavy showers of the north-east rains, whereas on the red soils it must be begun in July or August, so that the crops may receive the benefit of all rains. Ploughing involves more labour in the black soil than in the red.

(c) *Wet cultivation.* Of the total cultivable area only 600 acres (16 per cent) are under wet cultivation. Paddy is the chief crop. Both transplanting and broadcasting are done. Often much time is wasted by putting off the preparation of the seedbeds and leaving the fields to soak before beginning to plough. A great deal of neglect is found, particularly in manuring. Fields at a distance from the village get practically no manure at all. Those nearer at hand are given village sweepings and farmyard manure, and sheep and goats are penned upon them once in 2 or 3 years. Only the fields next to the habitations are manured every year. After manuring, the land is flooded and the manure turned in. Then green manure is trodden in. Finally the surface of the field is levelled by *parambu*. The seedlings are then transplanted. Seed is usually soaked before being sown. The seedbed is sown thin and seedlings are planted out by twos or threes, but not in large bunches. Formerly, sometimes the young plants raised in a nursery were transplanted into a second nursery and afterwards retransplanted singly into the field. In this case the crops are good and the yield largest. Broadcasting is also done in two different ways. Here the expenses are light but the produce is not very remunerative. Fearing the failure of the rains the cultivators, of late, have more and more restricted themselves to broadcasting and stick to the 3 months' variety which suits this purpose best.

(d) *Garden lands.* The farmers having garden lands generally devote great care and attention to their cultivation. Water is available from the wells throughout the year and two or three crops can be raised. The outturn depends more on the cultivator's efforts. His main difficulties are the costliness of pumping water by the existing methods and the low output of the springs in hot weather. The chief

crops cultivated in the gardens are cereals other than paddy, and vegetables like chillies, brinjals and sweet potatoes.

(e) *Dry cultivation.* The method of cultivating dry crops seems unenterprising. First the stubble of the last crop is ploughed in. Then such manure as is available is spread, after which the land is ploughed 3 or 4 times with the usual wooden plough, which is somewhat bigger than that employed on wet-land. Lands away from the village are not manured but, now and again, left fallow to recuperate. As soon as sufficient rain has fallen, the seed is broadcast and the field again ploughed to cover the seed. Mixed crops are common. The pulses and castor are mixed and sown where groundnut, gingelly, cotton or one of the cereals is the main crop. The larger grains such as dhal, castor and beans, are dropped separately one by one in a furrow made by the plough and then. When the crop is about a foot high it is weeded by hand, a small hoe being used. Cholan and cumbu are first thinned with the plough. Neither process is carefully carried out and the fields are often choked with weeds.

Yields.

(a) *Wet lands.* The outturn of paddy, varies from 400 to 1000 Madras measures per acre in the different soils of the district. Almost all of the wet lands of this village are assessed at Rs. 5-10-0 or above per acre (only 2½ per cent. are assessed at Rs. 4-6-0) which shows their fertility is above average (see table III). The produce per acre therefore must be at least 630 Madras measures. In practice this is hardly reached except in small plots of half an acre or less in the better soils. In most of the rented lands it goes as low as 400 measures per acre and in owner-cultivated lands rarely above 600. This was not so 20 years back. Such high rates as 900 measures were, it is said, quite common, the highest limit attained being 1800 measures or more than double the 'grain value'.

(b) *Dry lands.* Cholan and cumbu, have been taken as the standard grains for dry lands, their outturn being 100 to 275 Madras measures per acre for the different soils of the district. These yields compared with those of wet lands are better. The reason is that dry cultivation is comparatively easy and there are no difficulties about irrigation, etc.

(c) *Garden lands.* No special rates are charged for lands converted into gardens and there is no standard available for purposes of comparison. When the same crops are grown in both garden and dry lands, the yield is naturally higher in the former on account of irrigation from wells. However, it is specially for such valuable crops as chillies, tobacco, onions, etc., that garden lands are prized and successful garden cultivation is still a rarity in the village.

Agricultural implements. The implements for tillage, cultivation and harvesting are the same as elsewhere and are obtained from Virudhunagar. Some are made by the local carpenters and blacksmiths and all others are mended or repaired locally. The wood of the Babul (*Acacia arabica*) tree is generally used for these implements. No special wood is bought from outside. There were 161 carts and 188 ploughs in 1920.

Fencing. The pan fields as a rule are always well fenced as the crop stands for three years and as the leaves are likely to be eaten away by stray sheep and cattle. Otherwise, with the exception of a few garden lands which are fenced with a line of thorny trees (*Pithecolobium dulce* Benth) or other bushes, no permanent fencing is found. Whenever necessary low mud walls were raised or thorny branches of the karuvel tree were fixed on the borders of pathways and nullahs easily accessible. Even this temporary fencing is not common at the present time. Considerable damage is done for want of fencing when second crops are raised in isolation.

Storing. After the grains are brought from the fields they are temporarily stocked in a corner to be dried in the sun on the roofs or house-fronts and winnowed later with the help of winds. Circular bins made of cumbu chaff called 'kulukkai' are generally used for storing small quantities. They are quite suited for the domestic requirements of a small family. Larger quantities are stored in overhead cellars. Every house possesses at least one such cellar. These are very dark, ill-ventilated and damp. Paddy and groundnuts often get spoiled by damp. Cotton is always kept in gunny bags in which rats and vermin do considerable havoc. Chillies are never accumulated in large quantities; they are disposed of at every collection. The pulses rarely require special storing arrangements. They are usually kept in covered earthen vessels, but small weevils develop in them and eat away the pulses if they are not periodically sun-dried.

Prices. Though prices have varied greatly since the time when the assessment was made, the standard food grains have never gone below the commutation rate. Cotton is not so paying as before, while the price of groundnut is so low that its cultivation is hardly worth the trouble. Chillies maintain good prices. The pulses and other vegetables vary in price within the usual narrow limits. Land in this village is usually selling at a higher price than its worth, on account of the Chettis competing to buy as much as possible. During the years that followed the war when agricultural produce was selling at high prices, wet lands were sold at Rs. 1500 and dry lands at Rs. 500 per acre. In the majority of cases the net income is slightly more than the assessment; often it is less. Incomes equalling the interest on the value of the land (capital) are very rare indeed. The tendency on the

part of the cultivators when high prices prevailed for agricultural produce was to increase the area of cultivation. The quality of cultivation never improved and no advance was gained in improved agricultural methods. On the other hand, neglect and deterioration are more rapid with low prices.

Holdings. The following table gives details of the holdings which are obviously far too high in a place where irrigation facilities are scanty, the rainfall so uncertain, and the soil not always the best. Most of these are made up of wet, garden or dry land, in the different soils. It is thus very rare that a holding is in one block. The bigger few under the last three items are not so fragmented.

Table VI. Holdings. (Fasli) (1328).

Pattas paying.	Number.			Extent.	
	Single.	Joint.	Total.	Acres.	Cents.
1. Rupee and less	60	66	126	40	05
2. Between Rs. 10 and 1	482	235	717	1487	51
3. " 30 " 10	127	57	184	1216	28
4. " 50 " 30	25	9	34	427	04
5. " 100 " 50	4	4	8	243	11
6. " 250 " 100	2	3	5	263	37
Total.	700	374	1074	3677	36

Only 47 holdings (4 per cent.) are above 10 acres each (items 4, 5 and 6). Holdings of 2 to 8 acres form roughly 62 per cent. (items 2 'single' and 3), and their extent is more than half of the total cultivable area. Most of these happen to be dry land alone, in which the produce is precarious. To make out a living for 3 or 4 members under conditions like these is most trying and bordering on despair. About 34 per cent. of the holdings (items 1 and 2 'joint') are below 2 acres each and belong to the class of owner-labourers.

Economic holding for the locality. The daily wages per head in this locality is 4 Madras measures of paddy, i. e., one day's subsistence. On this basis the annual requirement for a family of 4 members is 5160 measures, i. e., roughly the produce from 8 acres of good land. Dry lands without wells work out to a larger extent, but where there is a well 5 or 6 acres is the limit. In case of mixed holdings, more than 8 acres in all is necessary. As regards working capacity of the people, if all the members of this family work in the field, they are generally able to do optimum cultivation in about 10 acres of dry land without a well, provided it is not too fragmented. If there is a well, or in case of wet lands, 7 or 8 acres is the maximum. Such holdings do not form even 15 per cent. of the total.

(To be continued)