

Cultivation Practices in Sandy Soils of Bapatla

by

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Bapatla, in Guntur district, is a small town on the East Coast, situated on the North-East line of the Southern Railway, five miles away from the sea. A strip of land about six miles in width along the coast is sandy in nature. The soils under continuous cultivation, adjoining the villages, have accumulated some organic matter. The water table is high, being four to six feet deep and in the rainy season it is very near the surface at two feet depth. In summer it may go down to eight to ten feet. The water is slightly brackish, but not injurious to crops. The soils are not fertile, but under irrigation respond well to manuring, organic and inorganic. The high water table is taken advantage of for the cultivation of crops in a large-scale sand culture. Temporary wells called "doruvus" are dug and water is taken from the "doruvus" with earthen pots for splash watering. (Vide plate 1). Cattle manure is the chief bulky manure in use, but it is always inadequate. Penning cattle and sheep is supplementary. These manures are applied only for paying crops in small areas to increase the yield. Sulphate of ammonia is used liberally for all crops, followed by profuse waterings. This is a tract where this fertiliser has been in extensive use since a long time and is locally termed as "super".

The salient features of the cultivation are regular splash watering throughout the growth period, with periodical top dressings of sulphate of ammonia, with or without basal dressings of cattle manure or sheep-penning. The cultivated area is confined to small holdings owned or leased, varying from 25 to 50 cents and intensively cultivated. The whole family works and earns a good wage throughout the years. The crops grown and the rotations followed are:

May to July—Paddy nurseries.

August to November—Virginia tobacco nurseries.

December to March—Ragi. or

December to June—Brinjal and Chilli—once in three years.

A small plot of few cents is set apart for jasmine which is retained for about ten years. Ragi and sometimes, vegetables like greens and cucurbits are also grown. Even the owner cultivators are sometimes forced to take out some land on lease. The lease ranges from eight annas to one rupee per cent.

Large holdings are few as it does not pay to hire labour and cultivate. It is also difficult to manure adequately. Hence, cultivation of rainfed crops viz. groundnut, cowpea, and horse-gram, is common. Their success depends upon the rainfall which is normally sufficient and fairly well-distributed as shown below, (Average of ten year period from 1943 to 1952):

South-West monsoon period—June to September—20.26" on 50 days.

North-East monsoon period—October to January—11.63" on 16 days.

Dry weather period—February to May—3.66" on 8 days.

Total rainfall for the year—35.55 on 74 days.

Under conditions of extensive cultivation in large holdings, the following rotation is common: June—July to September—October—groundnut or cowpea; October—November to January—February—Horsegram or cowpea. Late season cropping is confined to only such lands where there is some residual fertility left i. e. after the removal of casuarina, paddy and tobacco nurseries, or where sufficient manure was applied in previous years. Otherwise, it does not pay to grow two crops in a year. Casuarina plantations and raising of virginia tobacco seedbeds are taken up even with hired labour. Casuarina comes in such lands periodically, planted in July—August and is retained for seven to ten years.

Except in rainfed crops, in all other cases, the cultivation is rather peculiar, though simple. The cultivation details of the various crops are described hereunder.

1. Paddy Nurseries: The wetland area of Bapatla and the adjoining villages is situated towards the west, beyond the sandy soil belt. They are irrigable under the Krishna delta system. This area is at the tail-end of the irrigation channels. As such, water is usually received late in the season. There is no other source of water in the wetlands to raise the seed beds in advance. If nurseries are raised after the receipt of water in the irrigation canals, planting will be delayed. The wetland ryots are therefore compelled to go in for the seedlings that are grown in sandy soils. Nurseries are raised with the popular varieties and often fetch remunerative returns. The areas are small, with about five to ten cents in each holding.

The plot is ploughed twice with a country plough. No basal dressing is given. In rare cases sheep are penned at 2,000 sheep per acre. Seed is sown broadcast at 12 to 15 pounds per cent. The heavy seed rate is to minimise the area, to facilitate manuring and splash watering. The seed is covered by ploughing twice and levelled with a brush harrow. Sand is sprinkled in a thin layer to cover the exposed seed, and splash-watered twice a day. On the third day after sowing, sulphate of ammonia at two pounds per cent or powdered groundnut cake at six pounds per cent—usually

the former—is applied and the plot is lightly ploughed twice. This is a peculiar practice called “*muragadammu*” in this locality. It is intended to incorporate the topdressing applied and to bring up the deep-seated ungerminated seed to the surface. Then plots are formed four feet wide with pathways in between for watering. The beds are levelled and regularly splash-watered twice a day in the mornings and evenings. A fortnight later, another topdressing is given at half the first dose, with sulphate of ammonia. If found necessary, a light third dressing is given a fortnight after the second dressing to push up the seedlings. The seedlings will be ready for planting in 40 days but can be retained up to two months. Sheep-penned plots receive very light dressings of the fertiliser. Seedlings from two to two and a half cents would be sufficient to transplant an acre and usually fetch Rs. 15/-. Sowings commence from the last week of May and continue till the end of June, and the seedlings are pulled out in July—August.

2. **Virginia Tobacco Nurseries:** The sowing season commences from August and continues up to October to lift the seedlings from October till December. The nurseries are raised, on a large scale, even with hired labour. Ryots from the adjoining places come over here and raise the seedbeds on leased lands. The lease amount varies from Rs. 60/- to Rs. 100/- per acre. Seedlings grown in sandy soils are always preferred. They do not develop the tap root and the root system is in tufts, fibrous, and shallow. They establish very quickly and thrive better when transplanted. There is always a great demand for the seedlings from the black soil tracts of Guntur and Krishna districts, where virginia tobacco is extensively cultivated. It has been paying well to grow them.

The land is ploughed twice followed by a digging with spade. Then a third ploughing is given. Beds are formed four feet wide with pathways in between. Tobacco midribs are added as manure at 5,000 pounds (20 bales) per acre and over this, cattle manure is applied at five tons per acre. The beds are dug up to incorporate the manures, and levelled. Seed is sown at one tola per cent ($2\frac{1}{2}$ lb. per acre), mixed with sand and the beds are compacted by trampling. The beds are again covered over with 2,500 pounds (10 bales) of tobacco midribs and 3,000 pounds of dried casuarina leaf gathered from the plantations, to serve as a mulch. The beds are lightly watered with rose cans thrice a day (if there are no rains). For watering, eight men are required, with eight “*doruvus*” per acre. After three weeks, the surface casuarina mulch and tobacco midribs are removed during weeding, and a top dressing of sulphate of ammonia is given at 10 lb. per acre. A second dose is given at 20 lb. per acre a fortnight after the first and a third at 40 lb. per acre a fortnight after the second. Sometimes even four top dressings

are given, reducing the interval between the successive dressings. The beds are weeded twice. Seedlings will be ready in six to eight weeks and 6000 seedlings are required to plant an acre. They can be obtained from one to one and a half cents, fetching an average return of Rs. 25/- to Rs. 30/-.

3. **Ragi:** This is a staple food crop of the working classes. The main season is December—January to March—April. The seed-beds are dug twice with spade and cattle manure applied at 10 baskets per cent (about 300 lb.), and incorporated by spading. Seed is sown at two to three pounds per cent, raked up, levelled and watered once a day. A week after sowing, half a pound per cent of sulphate of ammonia is applied and repeated a week later. The top-dressing is followed by light watering twice a day for four days. The seedlings will be ready for planting in three weeks. Seedlings older than one month are considered inferior and are usually rejected. The main field is ploughed twice, manured with cattle manure at five to ten tons per acre or sheep-penned at 1,000 to 2,000 sheep per acre covered by ploughing and levelled. In dry sand, the seedlings are planted four inches apart and immediately splash watered, and continued once a day in the morning. (vide. plate. 2). But now and then watering is stopped for a day. A week after planting, sulphate of ammonia is applied at two pounds per cent followed by watering twice a day for four days. A second top-dressing is given at half the first dose at the time of flowering. Third dressing is rare and is given only if the crop is lagging behind. The crop matures in two months after planting. Four days prior to harvest, watering is stopped. During this period, the crop turns yellow and the earheads get hardened. The earheads are harvested all at one time. They are heaped for three days, dried, threshed and cleaned. The yields vary from 1,200 to 3,000 lb. per acre. The straw is fed to cattle either green or dry. The crop grows to a height of two feet (vide. plate. 3.), but the plants do not tiller. The cultivation just pays them their wages in kind.

4. **Groundnut:** Groundnut is cultivated in large holdings in the usual manner under rainfed conditions. The crop generally succeeds a casuarina plantation. Due to the accumulation of shed leaves, the crop comes up well without any manuring. The land is ploughed twice and is sometimes manured at about five tons per acre with cattle manure or lightly penned. The usual variety grown is the bunch variety. Kernels are dibbled in plough furrows in June—July with the commencement of regular showers. Seed



Plate 1



Plate 2



Plate 3

rate is 80 to 100 lb. per acre. One weeding is given in August when the crop is one month old, if necessary. The crop matures in September—October and the yield ranges from 1,000 to 2,000 lb. per acre.

5. **Cowpea** The cultivation is in the main season from June—July, but under favourable conditions it is also grown from October—November. The land is ploughed twice, either lightly manured at five tons cattle manure per acre or not manured at all. Seed is sown at 30 lb. per acre. Main season crops are harvested in November and the late season crops in February. The average yield is 400 to 600 lb. per acre.

6. **Horsegram:** This crop succeeds groundnut, cowpea, tobacco seedbeds, or casuarina, i. e. where there is some fertility to give a successful crop. The sowings take place from October to December. After two ploughings, 30 lb. seed is sown broadcast, covered and levelled. No other operation is done. The crop is harvested from January to March. The yield is 400 to 600 lb. per acre. Lands are leased out for groundnut, cowpea, and horsegram on a half and half share system, the owner supplying the seedmaterial. If manured, it is also done by the owner and in such a case the owner gets two-thirds and the tenant one-third.

7. **Green Chilli:** This is an important crop grown in all small holdings of five to ten cents area under intensive cultivation from January to June. The land is dug twice with spades and well manured with about half a ton of cattle manure per cent, and incorporated by digging. Four to six weeks-old seedlings are planted one foot apart. Splash-watering is given regularly once a day, but in midsummer watering is done twice a day. After planting, sulphate of ammonia is applied every fortnight at one pound per cent. For four days after the top dressing light watering is given twice a day in such a manner that the manure is not leached out into deeper layers but retained in the root zone. Every top-dressing of the fertiliser is followed by light sprinkling of sand taken from the sides of the "doruvus" at about 100 lb. per cent each time. This is another peculiar practice. Where cattle manure is available, powdered manure or powdered groundnut cake are also applied as top-dressings in between the fertiliser doses. A month after planting, pig dung is applied as top dressing at about 50 lb. per

cent, at the base of individual plants. Picking commences one month after planting. Picking green chillies is said to stimulate flowering and fruiting. On an average, three pickings are taken a month. The crop remains for four to five months after planting. From 12 to 15 pickings at an average of one maund per picking, 12 to 15 maunds could be easily expected, fetching at an average price of Rs. 2/- per maund, Rs. 24/- to Rs. 30/- per cent. In summer, there is a regular export of green chillies to the neighbouring places by rail and sometimes the price shoots up to Rs. 4/- to Rs. 5/- a maund.

8. **Brinjal:** The cultivation details are the same as for green chilli in all respects except that a wider spacing of 18" is given. Picking commences two months after planting and the main pickings are taken for four months from March to June. Normally 12 pickings each of one maund at Rs. 3/- per maund fetch Rs. 36/- a cent. There were instances where one maund was sold at Rs. 8/-.

9. **Jasmine:** It is a common practice in every small holding to set apart about two to five cents for jasmine. The plants are retained in the same plot for about ten years. Layers are taken from old plants. They are planted four feet apart (either way) in August - September, in shallow pits even without any manuring and watered once a day in the absence of rain, till they get established. Thereafter no care is bestowed till next February; when the leaf is stripped off, one basketful (about 50 lb.) of cattle manure is applied in the basins, dug around, and regularly watered. In three weeks the plants begin to flower and picking commences from early March. Watering is continued right through, manuring with one basket of cattle manure per plant once in three to four weeks. Application of sulphate of ammonia is not favoured, though there are instances where it is also applied. It is believed that the application of the fertiliser shortens the life of the plants. During the main picking season of March to June, 12 pickings could be obtained. Each picking gives 4 pounds of flowers per cent, costing Rs. 1/- to 1-8-0, and for the season about Rs. 15/- to 20/- may be got from one cent.

10. **Casuarina:** Casuarina cultivation is taken up on an extensive scale, since one decade and has been paying well, due to remunerative prices. The plantations are largely confined to the lands away from the villages and nearer to the coast. Seed is collected from mature fruits. Nurseries are sown in March-April at

2½ lb. seed rate per cent. The beds are watered once a day. No manure is applied. Seedlings will be ready for planting in July-August, with 1½ feet growth and are sold at Rs. 3/- to Rs. 5/- per 1000. The main planting season is July August. No manuring is adopted. Shallow scoops are made with spade. In the center of the scoop a hole is made with a crow bar and one or two seedlings are planted in each hole and pressed well. Spacing is 4½ feet both ways and 4000 seedlings are required to plant an acre. In the absence of rain, watering is given till they establish themselves. Gaps are periodically filled during the rainy season. The plantation receives watering again for two months in the first summer, thereafter no other care is taken, except engaging a watch collectively, which may come to a rupee per acre per year. The plantations are cut from the 7th to 9th year. About 3000 trees remain per acre, yielding 25 to 40 tons. In recent years, due to high prices, there is a tendency to cut even in 5 to 6 years. In such cases only 15 to 20 tons are obtained. The average price per ton is Rs. 30/- and goes up to even Rs. 60/- during January-February, the tobacco flue-curing season. Usually Rs. 100/- per acre per year is the net return.

11. **Cashewnut:** The cultivation of cashewnut is rather indifferent and confined to lands far away from the villages. In the month of July small pits are made 30 feet apart, and four to six months old seedlings are planted. In the absence of rain the plants are watered till they strike root. The plantations are not usually manured. Sometimes, the seeds are sown in the pits and covered with thorny twigs to protect the germinating nut from bird damage. The plants receive watering again during the first summer. No other operation is given. Watch is engaged during the fruiting season till the garden is sold outright for the usufruct. Fifty plants go to an acre. Inter-cropping with groundnut, cowpea, and horse-gram during the first three to five years is sometimes adopted with advantage. Bearing starts from the fifth year, but full bearing commences only from the tenth year. During the full bearing stage about 40 lb. of nuts are gathered from a tree costing about four annas a pound. The yield is half of this from the fifth to the tenth year. Cashewnut appears to be remarkably suited to poor sandy soils, and thrives well even under neglected conditions.

12. **Other miscellaneous crops of minor importance:** (1) Amaranthus is grown in small beds throughout the year. (2) "Gogu" is

sown along the borders in rows. The leaf is used as a salad and the plants are finally pulled out for fibre. (3) Cucurbits are raised in both the seasons. In summer, ribbed gourd, bitter gourd, snake gourd, and cucumber are grown.

(4) "Davanam" (*Artemisia vulgaris*): Small nursery beds are sown with seed at one tola per square yard, mulched with straw, and lightly watered with rose can. The mulch is removed after germination and initial growth, after a fortnight. Month-old seedlings with four to five inches growth are planted four inches apart in well prepared and manured beds and watered regularly. Cattle manure is applied as top dressing every fortnight. Sulphate of ammonia is also applied now and then followed by sprinkling of sand and profuse watering. Picking starts a month after planting and continued every ten to fifteen days. The main season is December to May. From 12 pickings of one maund each per cent valued at about Rs. 60/- (at Rs. 5/- a maund) is realised. The price goes up to Rs. 7/- or Rs. 8/- in some years. (5) "Maruvam" (*Origanum marjorana*): The cultivation is identical to that of "davanam", but no nurseries need be raised as the propagation is by cuttings which are planted six inches apart.

Conclusion: Similar soil and cropping conditions prevail in many places along the entire East Coast bordering the sea. In view of the high water table, the future line of improvement should be directed towards the reduction in the cost of watering by some means or other. Fixing cheap designs of filter points to suit the water table in conjunction with sprinkler irrigation outfit preferably with portable arrangement and worked by a small pumpset or electric motor would answer the need. Even if such units are beyond the means of small ryots, they may prove useful for raising tobacco seed beds. Well-to-do ryots may be able to bring more land under intensive cultivation or lease out lands to tenants with the equipment at enhanced rates.

Acknowledgement: My thanks are due to Janab Muhammad Khasim Adeni, Agronomist and Professor of Agriculture, College of Agriculture, Bapatla, for helpful suggestions in preparing this paper.