

Cultivation and Marketing of Virginia Tobacco.

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"Economics of Farming" is a subject not well known to many an Indian farmer. Of all crops, production of flue cured Virginia Tobacco, otherwise called cigarette tobacco, is one which should not be attempted or continued if once begun, without studying its economics. In the Madras Province as elsewhere in India, the crop was first introduced by the Indian Leaf Tobacco Development Co., Ltd., some 15 years ago in the black cotton soils of the Guntur district, where it has occupied the whole tract and has also extended to Nellore, Kistna and Godavari Districts. (Vide. *Report on the Marketing of Tobacco in India and Burma—Page 31—A. M. A. 10/1400 Central Government.*) The ryots know only how much they get over the acreage they plant. They do not know where they err and fail to get deserving profits ultimately. They do not care to know where and how money should be advanced and skilled labour be made available. In this article I propose to deal more with the economic aspects of flue-cured tobacco.

In the districts named above, this has become the main crop that pays the agriculturist in the shape of money owing to its universal demand. The value of all omissions and commissions in doing a right thing will tell upon the nett profits, hence cultivation and marketing of the crop have to be studied under eight heads:—

1. Nurseries.
2. Manuring and preparation of land.
3. Transplantation and gap filling.
4. Interculture.
5. Topping and suckering.
6. Harvest and flue-curing.
7. Grading and marketing.
8. Pests and diseases. (Non-recurring.)

Nurseries. In raising nurseries the following have to be attended to, manuring, preparation of beds to obtain a fine tilth, levelling beds with drainage channels around, sowing seed, hardening the beds, watering, rouging, thinning, repairing drainage, top dressing of manure and application of Bordeaux mixture at intervals. The different operations can be done by a fixed number of labourers engaged for the whole season. It has to be explained how several duties can be performed by one set. The work has to be done gradually and slowly with due care. The whole area should not be sown on one and the same day for the reason that pulling the seedlings for planting has to be done at the same time when land may not be ready. The grower may not be able to command sufficient labour in the busy season of transplantation and rains may not permit him to carry on transplantation

every day. So, it should be the look out of a nursery man to have seedlings on a small scale, say about 10,000 a day. If plants are available in the beds beyond the planting capacity of the grower, they over grow, which will eventually affect the quantity and quality of the yield. Watering seed beds should be done from 8 A.M. to 4 P.M. while the working hours are from 7 A.M. to 5 P.M.; every day we have an hour in the morning and one in the evening to divert the attention of the labourers for weeding etc. Besides on rainy days, when no watering is necessary, thinning out, repairing drains etc., should be attended to.

In 1939-40 I incurred the following expenditure, for raising nurseries in 25 cents of pure sandy soil and 20 cents of sandy clay soil. I engaged only two coolies per plot as water was available in the middle of each plot with a lift of 10 ft.

Cost of raising seed beds in 1939-40.

Particulars:	Rate.	Sandy soil 25 cents.		Sandy clay 20 cents.	
		Quantity.	Value Rs.,as.ps.	Quantity.	Value Rs.,as.ps.
Cattle manure	Rs. 0-12-0 per ct. ld.	6 cart loads.	4-8-0	4 cart loads.	3-0-0
Preparation of beds ...	Rs. 0-4-0 per head.	2 men on 8 days.	4-0-0	2 men on 8 days.	4-0-0
Collections of dry casuri- na leaves to cover beds.	do.	1 man on 1 day.	0-4-0	1 man on 1 day.	0-4-0
Sowing, watering etc. till pulling	do.	2 men on 90 days.	45-0-0	2 men on 90 days.	45-0-0
Cost of seed	Rs. 1-8-0 per lb.	8 ozs.	0-12-0	7 ozs.	0-11-0
Am. Sulphate-top dressing	Rs. 5-6-0 per cwt.	100 lbs.	4-12-0	80 lbs.	3-12-0
Total. ...			59-4-0		56-11-0

Number of seedlings obtained in proper season

(27-10-39 to 22-11-39) 1,22,700 90,700

Cost of 1000 seedlings 0-8-0 0-10-6

Inferences:— 1. Average cost of 1000 plants is 0-9-3.

2. Sandy soil is the best.

3. One cent of seed bed gives 5000 plants to plant one acre
planted at 3' apart.

The site for the nursery should be changed from year to year. Secondly the surface soil of the beds should be sterilised by burning trash over it before preparing it for sowing.

Manuring and preparation of land. It is important that the land should be thoroughly ploughed thrice, so that the artificial manure supplied to the land may be well incorporated into the soil and also a fine tilth is made for root development and preservation of moisture. Assuming that the previous manurial treatment and rotation are carried out as for any other crop, it is found necessary to apply artificial fertilizers to get mainly

the required quantity of Nitrogen, Phosphoric acid and potash. Most of the soils are deficient in these three plant foods. Hence artificial fertilisers are used. Some companies like Messrs. Parry & Co. and Shaw Wallace & Co. are the manufacturers of tobacco manure mixtures and the mixture costs Rs. 33 per acre. The analytical data of the fertilizer or the component ingredients are not revealed to the public, but is kept as a matter of trade secret. Hence I am not able to arrive at the proper value of the tobacco manure mixture. But reliable information on the subject of manuring of tobacco is available in (1) Indian Farming—September 1940, (2) Indian Farming—December 1940, (3) Indian Farming—April 1941, (4) Madras Agri. Journal—January 1941, (5) Madras Agri. Journal—March 1941, (6) J. A. R. I.—7—187 by Shaw & Kashi Ram., (7) Tobacco Culture by Taylor.

Expenditure per acre.

1. Cost of fertilizer (360 lbs.)	33 0 0
2. Clearing the land for cultivation	0 1 0
3. Drilling in the fertilizer with ground gorru for 1 day @ Re. 1/- per pair plus extra man sowing the fertilizer.	1 4 0
4. Three ploughings with country plough local rate (1 pair ploughs $\frac{2}{3}$ acre a day)	5 0 0
5. Harrowing finely with gorru twice and once with Guntaka and marking with the marker.	1 4 0
Total cost per acre.	40 9 0

Transplantation. Transplantation is to be done only in the evenings; Nothing can be done in the mornings except pulling the plants from the beds for evening work and this is done by seed-bed coolies without extra charge. Planting is done 3' apart from plant to plant and row to row, to encourage full development of leaf. Moreover a good spacing is very convenient for intercultural operations.

1. Five women transplant 5000 plants in one acre @ Re. 0-2-0 per day per head	0 10 0
2. Picking seedlings and supplying—one woman	0 2 0
3. Watering the plants if there be no rain that day or the previous day	1 4 0
4. Cost of seedlings per acre as arrived at before	2 14 0
Total cost per acre	4 14 0
5. Gap filling @ 10% of transplantation cost	0 8 0
Total cost per acre	5 6 0

Interculture. Intercultivation is done to eradicate weeds that come up after transplantation and create mulch which will not allow the sub-soil water to evaporate. Interculture commences a fortnight after transplantation by which time the plants take root firmly. From January to 15th March intercultivation should be done once in ten days. The cost of interculture is as follows :—

*1. Six times intercultivation at 4 annas per acre	1 8 0
2. Hand picking of weeds that remain around the plant after interculture 3 times @ 2 annas per acre	0 6 0
Total.	1 14 0

Topping and Suckering. In case of flue-curing tobacco, topping is not usually done. It should be done only when it is known that the soil contains phosphoric acid sufficiently or when the crop development is poor. If done otherwise, the crop produces dark and coarse leaf which is unfit for flue curing. Topping too high may not give the desired result. Whether high or low, the cost of topping and suckering is the same.

1. $\frac{1}{2}$ man for topping an acre @ 4 annas per man	0 2 0
2. Six suckerings in the year @ 4 annas each suckering per acre	1 8 0
Total cost	<u>1 10 0</u>

N. B.—The above cost includes removal of tops and suckers to the manure pit.

Harvest and Flue Curing. Priming is an operation done before harvest and intended to remove the bottom most perished leaves which are very light and poor in quality. Such stuff will not pay even the cost of curing. If priming is done, access to free air to the bottom of the plant is made and chances for the insects to hide underneath are reduced.

One man clears one acre in $\frac{1}{2}$ a day. Harvest of ripe leaves which have attained orange yellow colour, is done in two or three stages according to the number of leaves borne on the plant. The interval between two harvests will be about 15–20 days. Lower most leaves are removed first and at each harvest the number removed per plant would be about 8–10. The leaves are collected in the evenings, and carted to the site of the barn and are made ready overnight for loading the barn the next day.

Barn construction. The first step in flue-curing is to have a good barn. The inner dimensions of a double furnace barn and a single furnace barn are 20' × 20' × 18' and 16' × 16' × 16' respectively, the thickness of the wall being 1 $\frac{1}{2}$ '. The bottom most tier should be 7' above the ground level and the vertical distance between two tiers should be 2 $\frac{3}{4}$ ', and they are arranged 4 feet apart. Terraced roofing is said to be better than corrugated sheet of iron. The cost of barn construction is given with a view to arrive at its depreciation value which is 10% on the capital cost. The annual depreciation value is divided by the number of probable curings in a year which may be taken as eight. On arriving at such a value per curing it can be calculated for 1 candy (500 Lbs.) of cured leaf which is the product of 5 candies of green leaf, this being the average yield per acre. Thus we arrive at the depreciation value to be added to 1 acre crop. (Vide A. R. I. Bul. 187, page 16.)

Construction of a barn and other equipment on contract basis at pre-war rates.

Specification.	Double furnace Barn.	Single furnace Barn.
1. Foundation—2'— concrete lime mortar—Brick walls—20' × 20' × 18' × 1 $\frac{1}{2}$ ' thick-etc.	435 0 0	300 0 0
2. Causurina tier poles 22' long @ 1 $\frac{1}{2}$ rupees each.	45 0 0	30 0 0
3. Roofing with corrugated iron sheets.	135 0 0	95 0 0
4. Ventilators 12 (1 $\frac{1}{2}$ ' × 1').	30 0 0	25 0 0

5. Flues (24 gauge steel sheet)	60 0 0	30 0 0
6. Furnaces @ Rs. 135 each.	270 0 0	135 0 0
7. Wet and Dry bulb hygrometer.	12 0 0	12 0 0
8. Curometer.	2 8 0	2 8 0
9. Petromax light.	12 8 0	12 8 0
10. Salter's spring balance, 300 lbs.	22 0 0	22 0 0
11. Lathis $4\frac{1}{2}'$ long $\frac{3}{4}"$ diameter @ Rs. 12 per thousand.	36 0 0	36 0 0
12. <i>Misc. equipment.</i> Mats 50—Dietz lanterns 3—shovel, stirrer—time piece—torch light—leaf weighing baskets—thatched shed $25' \times 12'$ etc.	56 11 0	33 0 0
Total, Rs.	1116 11 0	733 0 0

N. B. Cost of pandals not included as they will be used for housing cattle in summer.

Calculation of Depreciation Value.

Particulars.	D. F. Barn	S. F. Barn.
1. Capital cost,	1116 11 0	733 0 0
2. Depreciation @ 10% per annum.	111 11 0	73 5 0
3. „ per curing (8 curings per year.)	14 0 0	9 3 0
4. „ per acre.	7 0 0	9 3 0

Yield in one acre is taken as five candies and D. F. Barn holds 10 candies and S. F. Barn 5 candies of green leaf.

Curing the Leaf. The next step is curing the leaf. A double furnace holds 5000 lb. of green, that is the yield of two acres; while a single furnace one holds only 2,500 lb., the yield of one acre. On this basis expenses for curing are worked out. Though the figures of the ratio of the cured leaf to green leaf is 1:4.1 as per my records (*Vide infra*), I adopt the general opinion that it is 1:5. My result was obtained by maintaining optimum relative humidity and temperature in the barn as far as necessary the leaf having been in good condition. The ratio varies from season to season, soil to soil, and also according to the precautions taken at the time of curing. The curing expenses are as mentioned below:—

Particulars	D. F. Barn 5000 lbs.	S. F. Barn 2500 lbs.
1. Leaf picking-stringing-loading, unloading and bulking @ 1-8-0 per candy—(500 lb.)	15 0 0	7 8 0
2. Two firemen for 5 days @ six annas per day	3 12 0	3 12 0
3. Curer for 5 days @ 1 per day	5 0 0	5 0 0
4. Coal with cartage 1 and $1\frac{1}{2}$ ton @ 14-8-0 per ton	18 2 0	14 8 0
5. Rope 2 maunds for 3 curings @ Rs. 5 a maund	3 5 0	1 10 0
6. Kerosene oil for 1 petromax light—2 nights— $1\frac{1}{2}$ as. a day	0 3 0	0 3 0
7. Kerosene oil for 3 Dietz lanterns for 5 days @ 0-4-0 a day	1 4 0	1 4 0
8. Torch 3 cells for 3 curings 0-9-0/3	0 3 0	0 3 0
Total curing cost,	46 11 0	34 0 0

In a D. F. Barn curing cost per acre yield 5 candies of green leaf	23 6 0
In a S. F. " " "	34 0 0
To the above add :—	

	D. F. Barn.	S. F. Barn.
Priming.	0 2 0	0 2 0
Depreciation.	7 0 0	9 3 0
Curing costs as mentioned.	23 6 0	34 0 0
Total.	30 8 0	43 5 0

Statistics of coal consumption.

Green leaf cured.	Coal consumed in lbs.
4586 lbs.	2278
5442 lbs.	2730
5415 lbs.	3026

7. *Grading and Marketing.* Grading is the final operation that determines the profit of the grower. Any slackness, intentional or un-intentional, will be an advantage to the purchaser since he will be ready to point out only defects to reduce the price on that score. The grading work is being done on a contract basis as follows :—

1. Grading and packing force 500 lb. of cured leaf @ Rs. 3 per candy of 500 lb.	3 0 0
2. Gunny—8 bales for 8 grades	1 0 0
3. String @ 0—1—0 per bale—8 bales	0 8 0
4. Supervising maistry over 10 graders—one day	0 4 0
5. Cart hire to market—6 miles	1 0 0
Charges for grading and marketing	5 12 0

While marketing, the purchaser offers a price and the seller may accept it if he likes. The rates are very fluctuating as may be seen from the following data.

1. The average price per candy of 500 lb.	Rs. 173 0 0	
2. The average return per acre (2500 lb. green leaf).	208 8 0	
3. The ratio of cured to green leaf	1:4:1	
4. The percentages of grades in cured leaf are as follows :—		
I Grade. 19.40%	III Grade. 16.70%	V Grade. Nil.
II " 35.50%	IV " 18.50%	VI " 9.90%
Total. 100.00%		

N. B.—Rate means cost of 500 lb. of cured leaf in the statement.

Grades,	Sale No. 1.			Sale No. 2.			Sale No. 3.		
	2620 lb. Green leaf.			2635 lb. Green leaf.			2667 lb. Green leaf.		
	Rate.	Wt.	Value.	Rate.	Wt.	Value.	Rate.	Wt.	Value.
	Rs	lb.	Rs. as.	Rs.	lb.	Rs as.	Rs.	lb.	Rs as.
1	298	227	135-5	340	85	57-13	315	59	37-3
2	174	135	46-14	199	213	84-9	138	333	91-12
3	201	143	57-8	186	125	46-7	190	55	20-14
4	55	44	4-13	60	55	6-10	92	255	46-15
5	125	17	4-4	—	—	—	—	—	—
6	55	35	3-14	66	93	12-5	78	60	9-6
Total	—	601	252-10	—	571	207-12	—	762	206-2

1934 lb. of cured leaf costs :— Rs. 666—8—0.

500 lb. of cured leaf costs. Rs. 176—0—0.

1934 lb. of cured leaf is obtained from 7952 lb. of green leaf.

Therefore the ratio of cured to green leaf is 1 : 4.1.

7952 lb. of green leaf paid Rs. 665—8—0.

2500 lb. of green leaf paid Rs. 206—8—0 from one acre.

Finally let us find out the nett profits per acre as follows :—

Particulars.	Receipt per acre.	Production cost.
	Rs. as. ps.	Rs. as. ps.
Average return for 1 acre—2500 pounds of green leaf	208 8 0	
Cultivation expenses per acre		40 9 0
Cost of seedlings and transplantation		5 6 0
Interculture		1 14 0
Topping and suckering		1 10 0
Priming, harvest (Flue-curing)		30 8 0
Grading and marketing		5 12 0
	Total	85 11 0
	Nett profit	122 13 0

If the leaf is cured in a single furnace barn the expenditure under curing is greater by about Rs. 12—13—0 i. e. nett profit will be less by this amount. In either case a deduction of land revenue has to be made as for the prevailing rate.

Pests and diseases. Besides various items of expenditure there is one other item i. e. control of insect pests, the cost of which depends upon the nature and extend of incidence.

During 1940—41 the nature of the crop was such that in spite of the most unfavourable year affected by abnormally heavy rains and insect damage the nett loss per acre came to Rs. 43. The average return per acre for both 1939—'40 and 1940—'41 comes to Rs. 40. Such bad years are very rare.

Though the nett profit per acre, i. e. Rs. 40, is higher than that for any other crop, considering the skill, intelligence, labour, time devoted and capital invested it is low for Virginia tobacco crop. It will be very profitable to grow this crop if the market and the quality of the produce are improved. It is worth doing. Though failures are sometimes inevitable, in favourable years it pays amply to meet the cash requirements of the agriculturists.