

An Appraisal of Ceylon's Cotton Crop

I. P. S. DIAS

(Agricultural Research Officer, Hambantota, Ceylon)

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THE origins of the cultivation and use of cotton (*Gossypium* species) is shrouded in antiquity. According to Brown its first use as a fibre in cloth weaving probably antedates history. From these pristine times, its importance as a fibre crop has grown and it continues to hold its importance in spite of the recent inroads made by synthetic textile fibres.

The literature on cotton in Ceylon also reveals repeated attempts in the last few centuries to harness it into the agricultural economy of the Island. However not much success appears to have attended these efforts. It has only been in the last two or three decades that the crop has had some impact as an agricultural cum industrial potentiality. These turn of events the fortunes of this crop in Ceylon also coincide with the commencement of the first sustained effort of the Department of Agriculture to produce a suitable variety, from 19 strains of medium and long staple cottons imported from India and Africa during the period 1937-1941. Consequent on replicated trials with these varieties, BP 79 emerged as a promising strain and was recommended for cultivation in 1944. Thereafter the progress of cotton cultivation in the Island for the next seven years as reported by Fernando is as follows :—

Season		Acreage	Yield (Seed Cotton)	Cwt./Ac
1944/45	(experimental plots at Wirawila) ..	5 ..	— ..	—
1945/46	(seed multiplication at Wirawila) ..	8 ..	— ..	—
1946/47	(first advent of cultivators) ..	16 ..	— ..	—
1947/48	..	372 ..	— ..	—
1948/49	..	2,650 ..	10,000 cwt. ..	3.77
1949/50	..	3,737 ..	2,800 cwt. ..	0.74
1950/51	..	3,280 ..	10,000 cwt. ..	3.05

In subsequent years the fortunes of the cotton crop in Ceylon received a further shot in the arm with the selection of another medium staple strain—HC-101—significantly superior to BP 79 in

both yield and lint characteristics as well as ginning percentage. This was a straight selection from an introduced cotton variety—5143C and completely replaced BP 79 in 1958 *.

CURRENT STATUS OF THE CROP

Hambantota has been the premier cotton growing district in the Island. In 1955 for instance the cotton crop is referred to as having been exclusively grown in the Southern Division of the Island.† However since then with the advent of a better variety and a better price (guaranteed), its cultivation has extended to other districts such as Moneragala, Puttalam, Badulla, Ratnapura, Matale, etc., but yet in none of these areas is the crop as extensively cultivated as in the Hambantota District. Thus an appraisal of the crop in the Hambantota District could very well serve as a yardstick to its current status. The following acreage and yield data for the Hambantota District in the last five years should reflect its present status.

<i>Season</i>		<i>Acreage†</i>		<i>Yield § (Seed Cotton)</i>	<i>Cwt./Ac.</i>
1960/61	..	2,342	..	2,108 cwt. ..	0.90
1961/62	..	219	..	703 cwt. ..	3.21
1962/63	..	2,387	..	8,972 cwt. ..	3.76
1963/64	..	1,411	..	3,405 cwt. ..	2.41
1964/65	..	2,305	..	1,890 cwt. ..	0.82

The above figures with HC-101 are of about the same magnitude as those with BP 79 reported earlier. With acre yields of seed cotton varying from as little as less than a hundred weight to around 3 cwt., the picture which emerges is hardly encouraging.

ANALYSIS OF THE CAUSES OF LOW YIELDS PER ACRE

An examination of the causes which have lead to these poor performances would no doubt reveal two major causes : (a) that practically 100 per cent of the cotton acreage comprise small chena holdings where there is little or no crop after care such as fertilising, weeding and pest control. Even if one were to assume that a newly cultivated

* Administrative Report of Director of Agriculture for 1958.

† Administrative Report of Director of Agriculture for 1955.

‡ Figures made available by District Agricultural Extension Officer, Hambantota.

§ Based on quantity of cotton purchased by Asst. Commissioner, Co-operative, Development, Hambantota.

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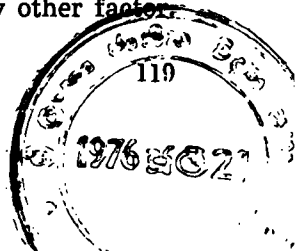
chena would take care of plant nutrition, still competition from pests and weeds can and do take alarming proportions. With reference to pest control Thevasagayam and Mohideen report per acre yields of 1766 lb. on Endrin treated plots as opposed to 1006 lb. on control plots, in experiments conducted at Maha-Illupallama.

The importance of intensive crop care with relation to crop yields would also find illustration in the following yield figures of the Cotton Research Station, Hambantota, over a period of 19 years, as opposed to district figures.

<i>Season</i>	<i>Yield/A</i> <i>(Seed Cotton)</i> <i>lbs.</i>
1946/47	.. 174
1947/48	.. 336
1948/49	.. 1,568
1949/50	.. 566
1950/51	.. 1,920
1951/52	.. 276
1952/53	.. 796
1953/54	.. 672
1954/55	.. 763
1955/56	.. 773
1956/57	.. 1,086
1957/58	.. 1,035
1958/59	.. 359
1959/60	.. 956
1960/61	.. 845
1961/62	.. 517
1962/63	.. 608
1963/64	.. 322
1964/65	.. Nil

The extents grown seldom exceeded 10-15 acres and largely comprised experimental plots. However it is interesting to note that in the years 1948-49 and 1950-51 when the research station recorded high yields, the district too had a big harvest, but the per acre yields of the district were way below those of the research station, no doubt spotlighting the lack of intensive after care of the crop at district level.

(b) The second major factor influencing the marginal nature of the cotton crop is no doubt due to the cultivation of this crop under rainfed conditions during the period of the N. E. Monsoon (October-February) the crop being thus exposed to the vagaries of the weather. Cotton is most sensitive to extreme variations in soil moisture and many workers are of the opinion that soil water conditions have a greater bearing on boll shedding, for instance, than any other factor.



The tremendous influence that the amount and distribution of rainfall has on yield performance could again be amply demonstrated with reference to the history of cotton cultivation in the Cotton Research Station, Hambantota. The years 1947-48 to 1951-52 show yields of seed cotton alternating from low and mediocre yields to exceptionally high yields for rainfed crops. The weekly distribution of rainfall during these years when placed side by side with the phasic development of the crop as shown on page 121 makes a very interesting study indeed. If the rainfall distribution for the 3 poor to mediocre years be analysed, one does not fail to observe that in 1947-48 practically the whole of the bolling period of the crop has been drought ridden with 6 continuous weeks of no rain whatsoever ; in addition the picking period has been extremely wet. Then in the year 1949-50 too, we see two rainless periods of 2 weeks and 3 weeks, again mostly during the bolling period with once again a little wet conditions at picking time. In the 1951-52 poor year as well, we find a repetition of inadequate rainfall both in the flowering and bolling period. Here too there are two periods of ineffective rainfall, where in one instance only 0.16 inches were received over a period of four weeks and in another period of four weeks only 0.11 inches of rain fell. When these bad years are compared with the rainfall distribution in 1948-49 and in 1950-51, where per acre yields of seed cotton as high as 1568 lbs. and 1920 lbs. respectively were reached, one does not fail to notice the impact that a well distributed rainfall could have on the prosperity of the crop. In 1948-49 drought conditions of any magnitude were experienced only in the last three weeks of the bolling period and that too after 2.55 inches in the previous week. In 1950-51 on the other hand there was almost near perfect rainfall distribution during the entire period of cropping. It is pertinent to indicate that grown as a rain-fed crop during the period of the N. E. Monsoon, the crop can and does suffer from excessive moisture as well in seasons of heavy rainfall.

The above analysis should therefore very forcefully bring home the inherent reasons for the very unpredictable behaviour of cotton cultivated as it is in cherias under rainfed conditions. With reference to cotton cultivation Cardozier defines drought conditions as periods of at least 2 weeks when not more than 0.25 inches of rainfall is received. This statistic would no doubt be influenced by both soil and climatic conditions. It however could find local significance by virtue of most of Ceylon's cotton crop growing on light soils under relatively high temperature regimes. In this regard also what Saunt says of cotton growing in Queensland, Australia could probably be equally well said of Ceylon's cotton crop—"when cotton growing

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was limited to Queensland, erratic distribution rather than total amount of rainfall was the main cause of poor yields except on very rare occasions." What then is the future of Ceylon's cotton industry limited as it is by conditions which make the very cultivation of the crop so unpredictable? A successful cropping programme must needs be an essential pre-requisite to a successful textile industry.

	1947/48	1948/49	1949/50	1950/51	1951/52
October	.. — 0.54 0.77 0.90	— 0.17 8.01 6.32	.. 0.15 — 0.21 0.87	0.19 0.04 1.74 1.01	.. 0.37 0.43 — 0.34
November	.. 1.40 0.56 2.56 0.43	— 0.64 6.50 2.26	0.76 1.41 1.53 0.79	— 5.25 1.45 3.26	1.62 2.59 1.30 0.01
December	.. 2.41 0.97 0.70 0.50	3.01 1.18 0.52 0.21	1.85 2.65 0.47 3.17	1.45 0.02 — 1.04	0.09 — 0.06 4.08
January	.. 0.43 0.07 0.13 1.01	— 5.04 — 1.12	— — 0.67 —	— 3.26 6.93 0.96	3.99 0.14 0.70 1.30
February	.. 0.04 — — —	— 2.55 — —	— — 0.68 0.55	— 2.15 — 2.28	— 0.11 — 0.68
March	.. — — — 0.08	— — — 0.63	— — — —	— 0.09 — 0.49	— — — 1.79
April	.. 3.30 0.05 1.35 0.30	2.46 3.24 1.26 —	1.00 0.35 — 4.18	0.74 0.94 1.60 0.95	0.24 — 1.97 0.17
Yield (lb./ac.) Seed Cotton 336	1,568	.. 566	.. 1,920	.. 276	

1. Germination to appearance of first forms.
2. Appearance of first forms to flowering.
3. Boll period.
4. Picking period.

NEW HORIZONS

Consequent on the alarming fall in foreign assets in recent years, the Government of Ceylon has been taking concerted steps to arrest the drain on foreign exchange. With this end in view the business of making the country self-sufficient in her textile requirements has been one of the efforts of successive Governments. Thus the National Textile Corporation came to be established in recent years, charged with the production of cotton and manufacture of textiles. Since then, in addition to the premier Wellawatte Spinning and Weaving Mills other ambitious textile mills have been and are being erected. In addition the industry is gaining ground as a cottage venture as well. With a view to solving the problem of unemployment 1,000 more such cottage weaving centres are envisaged. However in spite of all these measures the drain on foreign exchange in respect of yarn, thread and cloth continues. The customs returns for the last three years are indeed revealing.

		<i>Value in Rupees of Imports</i>		
		1962	1963	1964
1. Yarn and thread of all descriptions	..	11,497,125 ..	7,897,122 ..	7,944,286
2. Different types of cloth	..	98,985,306 ..	65,974,314 ..	132,881,111
TOTAL		110,482,431	73,871,436	140,825,397

The chief reason for this situation is without any doubt the fact that the country's production of cotton lint has not kept pace with the country's mounting textile requirements. Even in the best of years the production of lint has been a little over half a million pounds, whereas our imports of yarn and thread alone in the last three years have ranged from 1,318,139 pounds to 1,898,150 pounds. There is also no doubt that this situation will continue to exist as long as the status of the crop remains a rainfed chena one. Besides, as far as chenaing is concerned, the fact that on the basis of at least a five-year cycle, not more than 6,000 acres could be chenaed a year in the premier cotton growing district of Hambantota, imposes a ceiling on the amount of lint that could be produced.*

* From the minutes of the meeting of the Advisory Committee on Cotton Cultivation held in the Hambantota Kachcheri on 12.1.62.

COTTON UNDER IRRIGATION

Consequent on the above limitations to the successful production of adequate quantities of cotton lint and also spurred by the ear-marking of 15,000 acres of irrigable land under the Uda Walawe Project, data is presently being sought by the Department of Agriculture on the subject of raising cotton under irrigation farming. In this connection the first replicated trials (a variety and a spacing trial) were conducted by the author in March, April, 1965. The trials were sited at the Government Cattle Station, Ridiyagama, and were conducted on a heavy alluvial type of clay.

These trials even though conducted under numerous privations such as inadequately preparatory tillage, untimely irrigations, etc., yet gave a lot of hope to be optimistic about the future of irrigated cotton. Over a net harvested extent of 0.94 acres in these two trials, an overall yield of 1,813 pounds of seed cotton was obtained. This works out to 1,929 pounds of seed cotton per acre, and was contributed to by plot yields (1/60 acre plots)—on an acre basis—of as low as 1,178 pound to plot yields of as high as 3,364 pounds of seed cotton per acre.

During the 5½ month duration of the crop, six irrigations (furrow system of irrigation) were given supplementing 11.57 inches of rain fall received over 24 days. Effective pest control was achieved by routine 3 weekly spraying, with Endrin (two ounces in one gallon water). During this period also, even though high winds were a regular feature, the incidence of blowing off of seed cotton was negligible.

These initial experiments therefore leave no doubt of the potentialities of cotton under irrigation in the Hambantota District. Regular yields of 15-20 cwt. per acre of seed cotton should be real possibilities under conditions of good culture and adequate pest and disease control. No attempt should however be made to literally extend the experience on 0.94 acres of experimental cotton to a gigantic 15,000 acres as envisaged under the Uda Walawe Project. Depending on the organisation of a project of this magnitude, one could foresee many a sizeable problem for which possible solutions have to be thought out at the very beginning.

In addition of course a host of other information needs also to be obtained by further experimentation to obtain data on such matters as—

- (a) suitable varieties for irrigation culture ;
- (b) best time of planting during the period January to August ;
- (c) optimum irrigation quanta and intervals ;
- (d) suitable cultural and fertiliser practices, etc., etc.

As far as some of the above matters are concerned, for instance with reference to varieties, so far under a rainfed regime whatever success the Department of Agriculture has had, has been with medium staple cottons. It would be pertinent to Ceylon's textile industry to know whether irrigation farming would promote the success of some of the long staple varieties. Again the meagre evidence so far on rainfed cottons, indicates little or indifferent response to the use of artificial fertilisers. Would this not be different under irrigation? And now to probe some of the agricultural problems that would be legitimate off-spring of a 15,000-acre irrigated cotton project.

PROBLEM AREAS

As far as the author is able to project himself to a future of 15,000 acres of irrigated cotton in a colonisation set up, he envisages four problem areas which would need to be catered for, to ensure the agronomic and economic well being of the cotton industry. These areas of concern could be enumerated as follows :—

- (a) Seed Production.
- (b) Pests and Disease.
- (c) Possible Soil Salinity.
- (d) Socio-Economic Problems.

SEED PRODUCTION

The production and supply of good quality cotton seed would no doubt primarily determine the success of any future cotton industry. Degeneration through natural crossing and contamination through mixing has been known to ruin varieties beyond recognition—thus the importance of a well organised and sustained programme of seed production and supply.

For the maintenance of purity of any variety the currently adopted replicated progeny row technique could be adopted. Now with the anticipated 15,000 acres of irrigated cotton ear-marked under the Uda Walawe Project, it is anticipated that a total quantity of around 375,000 pounds of cotton seed would be needed for sowing the crop. This requirement is based on a seed rate of 25 pounds per acre (Christidis and Harrison report seed rates varying from as little as 8 pounds per acre in India to rates as high as 105 pounds per acre in Egypt).

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This seed requirement could be raised over 3 generations of the crop, beginning with the bulked seed of the replicated progeny row plots as S1 Seed. The seed production scheme simply schematised could work out as follows :—

<i>Acres</i>		<i>Generation</i>		<i>Seed Production</i>
2.5	..	Foundation	..	1,875 lbs. S1 Seed
75	..	S1	..	56,250 lbs. S2 Seed
500	..	S2	..	375,000 lbs. S3 Seed

Pre-requisite to the successful production of good quality seed in a scheme such as the above should be that the 2.5 acres of land carrying the replicated progeny rows be in the nature of an isolated cotton garden, with no other varieties of cotton occurring within a mile of the area.

The S1 and S2 Seed could very well be cultivated in the general cotton area. It would however be preferable to have this cultivated extent of 575 acres as a State Project, so that the necessary stringent measures may be adopted for the raising of good quality S3 seed for eventual distribution to cultivators. An alternative method of raising this seed, would be to confine this acreage to a group of cultivators who would be prepared to observe the necessary standards of cultivation and who would be agreeable to close supervision and direction by trained officers. In a scheme such as this the cultivators could be paid an extra premium for their seed cotton. In the above scheme, seed production has been computed on a basis of around 10 cwt. of seed cotton per acre. This should be a very easy target with irrigated cotton, given correct cultural care and effective pests and disease control.

In this scheme of seed production, it is of utmost importance to ensure non-mixing of generations and varieties in the process of ginning, bagging and storage. This aspect cannot be too strongly emphasised. A review of the literature also shows that the storage conditions of cotton seed has a significant influence on seed viability. Two important considerations, as reported by many workers, are to hold the moisture content of the cotton seed at less than 12 per cent. and to avoid excessive stacking of cotton seed bags in storage. While under good conditions of storage cotton seed has been known to retain its viability for years, it is also known to deteriorate very fast under conditions of bad storage.

PESTS AND DISEASE

With the environmental hazards eliminated by the establishment of irrigation and given quality seed of proven varieties, there is no doubt that the success of the crop thereafter would solely hinge on the effectiveness of pests and disease control. Plagued as it is by numerous pests and diseases, constant research should be a must in this area of the crop, if Ceylon's future cotton industry is to flourish on a sound economic footing.

SOIL SALINITY

Under any major irrigation set up, the hazards of soil salinity should always receive due cognisance. This same consideration ought to be applied to cotton as well, even though this crop is classified as being good in its tolerance of saline conditions. Thus there should be provision for a set up catering to routine periodic checks for evidence of soil salinity, so that the necessary corrective measures may be adopted before any such condition deteriorates. While on the subject of soil salinity, it would not be out of place to touch on the subject of catering to effective land drainage, since salinity could most inexpensively be taken care of by efficient systems of land drainage. Besides, irrigation and drainage are irrevocably tied together the one determining the other. This could be particularly important with cotton which is intolerant of wet feet, even though such conditions are unlikely to be serious, in the "Yala" season.

SOCIO-ECONOMIC PROBLEMS

The author assumes that irrigated cotton under the Uda Walawe Project would be on a basis of land colonization. He also presumes that the crop would be cultivated during the period of January to August and that the method of irrigation would be the furrow system. With these assumptions in mind, he foresees a number of working or organisational problems, which he would classify as being of a socio-economic nature, for which, solutions are best sought for and remedial measures adopted as far as possible at the very outset. These socio-economic problems may be categorised and discussed as follows :—

1. *Land Preparation*

Assuming that each allottee would be given about 5 acres irrigable cotton, one can immediately foresee that from a technological point of view it would not be quite feasible for each allottee to proceed to lay out his land for furrow irrigation independent of his immediate

neighbour. This is to say that each irrigation basin needs to be laid out for furrow irrigation as one compact unit. Thus as a solution to this problem it would be ideal if land preparation up to the time of planting be done by a central authority under competent direction. For this service the colonist could be charged a fee in a similar way as contract ploughing of paddy fields is done presently. In addition, of course, a great deal of synchronisation of activities within each irrigation basin would be essential, for the success of all allottees in each basin. It might even be pertinent to consider the cultivation of each irrigation basin co-operatively.

2. Pests and Disease Control

Even though this subject is of a technical flavour, yet it merits discussion under socio-economics, since with the presumption that 3,000 colonists would be growing 15,000 acres of cotton, it would amount to a waste of time, effort and money for X to adopt the best measures of pests and disease control while his immediate neighbour Y remains unconcerned. Besides it is unlikely that the routine protective sprayings that the cotton crop calls for would be effectively carried out by the average colonist. Again for effective pest control in cotton power spraying is very desirable and I cannot see an average colonist purchasing and maintaining a power sprayer. Thus in this phase of maintenance of the crop, it would again be best to have some private or public organisation charged with the entire gamut of pests and disease control of the total extent of cotton. The colonist could be charged some fixed fee for services rendered.

3. Time of Planting and Question of Land Use in the Maha Season

These two questions while again being fundamentally technical problems, could all the same have social bearings too, in view of a possible 3000 minds and possibly as many ideas. Unfortunately no research data on these two aspects is available to date and all that becomes possible at this stage is some surmising.

Under the existing varietal set up, the "Yala" cotton crop would be one of around five months' duration. Under irrigation this five-month crop could be fitted from any time between the end of January and the end of August. A crop to be harvested in August could be sown as late as the end of March, while a crop sown as early as the end of January would be ready for its first pick by the beginning of June. In normal rainfall years in the Hambantota District, the months of June, July and August should be ideal picking months.

Note.—The term Yala is used for convenience. The period from January to August would not strictly fall in the conventional Yala season.

In the absence of research data it is not known whether there could be any marked crop response to a variation in sowing data between the end of January and the end of March. Barring any such significant differential crop response to date of sowing, it would be technically preferable to sow at the end of January than at a later period. This is because preparatory tillage in January (after the tail end of the Maha rains) would be a much sounder proposition from a point of view of soil conditions. Later in the season the soil is likely to be rendered too dry and would need to be irrigated before tillage, if a seed bed of acceptable tilth is to be obtained. The importance of this consideration should indeed be sizeable in a 15,000 acres project.

In the context of an irrigated "yala" cotton crop, research data is also wanting as to the matter of land use in the Maha Season. Depending on the period of duration of the "Yala cotton crop, this problem could resolve itself into one of two possibilities.

- (a) If the duration of the cotton crop extends from late March to August, then a full Maha Season (under rainfed conditions or supplemental irrigation) becomes possible, with however the disadvantage of having to cope with preparatory tillage for cotton under dry soil conditions. With a full Maha Season, any number of crops varying from vegetables, dry chillies, highland rice, etc. become possible to be alternated with cotton.
- (b) If however the "Yala" cotton crop is sown in late January, then the Maha Season needs to be terminated in early January, which would rule out crops such as cereals, dry chillies, etc. Vegetable cultivation would yet be possible. Future research findings will have to indicate the best courses out of these alternatives.

It also may be that an alternative to both (a) and (b) could be the resting of the land in the Maha Season under a green manure crop, with the colonist being found alternative productive employment in subsidiary cotton industries such as ginning, yarn making, etc. or even in the actual manufacture of textiles within the Uda Walawe Project itself. In the context of alternative employment, the industrial potentialities of cotton seed itself should not be lost sight of. With 15,000 acres of irrigated cotton, an estimated 10-15 million pounds of

cotton seed per year should be likely. Subsidiary industries based on cotton seed oil as well as cotton seed cake could become very real possibilities

The proof of the pudding is in the eating. And so it is that in the final analysis the cotton grower who would be the hub of the whole industry, should find the whole venture profitable. To this end the effective organisation of credit and marketing facilities should be a *sine qua non* to the ultimate success of the cotton industry in Ceylon.

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**PER ACRE ESTIMATES ON COSTS AND RETURNS OF COTTON CULTIVATION
(BASED ON A FIVE ACRE ALLOTMENT):**

A. IRRIGATED CONDITIONS:

Operations	Labour Units/Acre	Cost/Acre	
		Rs.	c.
1. Land Preparation (ploughing, harrowing, ridging):	Tractor hire	..	70 00
2. Sowing	4 Women	..	10 56
3. Fertilizing			
(a) at planting	1 Man	..	3 16
(b) at square formation	1 Man	..	3 16
4. Weeding, thinning & filling of vacancies	8 Women	..	21 12
5. Pest Control (average of six sprayings):	3 Men	..	9 48
6. Second Weeding	6 Women	..	15 84
7. Third weeding (if necessary):	4 Women	..	10 56
8. *Irrigation (average of six applications supplementing rainfall):	12 Men	..	37 92
9. †Watching	30 Men	..	94 80
10. ‡Harvesting	35 Women	..	92 40
11. Cleaning & Processing	5 Women	..	13 20
12. Bagging	4 Men	..	12 64
13. Uprooting & burning stubble	4 Men	..	12 64
			407 48

*Based on gravity irrigation. Cost should be considerably more for lift irrigation.

†Based on the need for watching for 150 nights (approximate duration of crop) spread over 5 acres.

‡Based on an acre yield of 15 cwt of seed cotton with about 50 lbs of seed cotton harvested per woman day.

NB.—The per acre costs on irrigation and watching are likely to be considerably less on a bigger allotment.

COSTS ON MATERIALS/ACRE:

	Rs.	c.	Rs.	c.
1. Seed—10 lbs/ac.	..	..	1	00
2. Fertilizer				
(a) 1 cwt Sulphate of Ammonia	..	..	13	50
(b) 1 cwt Super Phosphate	..	..	27	05
(c) $\frac{1}{2}$ cwt Muriate of Potash	..	..	9	00
3. Insecticide (1 gallon Endrin)	..	..	36	00
4. Gunny bags (30 Nos.)	..	..	15	00
5. Land rental	..	..	50	
				102 05
Costs on operations	..	..	407	48
Costs on materials	..	..	102	05
Total cost	..	..	509	53
Expected yield—15 cwt seed cotton/acre.				
Return at Rs. 57/- per cwt (G. P. S. Price for Grade I)	..	..	855	00
Total costs	..	..	509	53
Net Profit/Acre	..	..	345	47

On a 5 acre allotment, the seasons profit would be 345.47×5 i.e. 1,727.35. The estimated 15 cwt seed cotton per acre could be also considered a conservative one under irrigated conditions.

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B. CHENA COTTON :

Operations			Labour Units/Acre	Cost Rs. c.
1.	Jungle felling		8 Men	25 28
3.	Burning		3 Men	9 48
3.	Fencing (Stockade fence)		8 Men	25 28
4.	Sowing		4 Women	10 56
5.	One weeding, thinning & filling vacancies		4 Men	12 64
6.	Pest control (average of 6 sprayings)		3 Men	9 48
7.	*Weeding		30 Men	94 80
8.	†Harvesting		11 Women	29 04
9.	Cleaning and processing		3 Women	7 92
10.	Bagging		2 Men	6 32
				240 80

* Based on the need for watching for 150 nights (approximate duration of crop) spread over 5 acres.

† Based on an acre yield of 5 cwt. of seed cotton with about 50l bs. of seed cotton harvested per man day.

N.B.—On a well burned chena the need for fertilizing is not likely to arise, while weeding costs would be also a minimum.

COSTS ON MATERIALS/ACRE :

	Rs. c.
1. Seed—10 lbs./acre	1 00
2. Insecticide (1 gallon Endrin)	36 00
3. Gunny bags (12 Nos.)	6 00
4. Land rental	50
	43 50

	Rs. c.
Costs on operations	240 80
Costs on materials	43 50
Total cost	284 30

Expected yield—5 cwt. seed cotton/acre

	Rs. c.
Return at Rs. 57/- per cwt. (G. P. S. Price for Grade I) ..	285 00
Total costs	284 30
Net profit per acre	0 70

The above estimates reveal the subsistence nature of the chena crop as opposed to the more profitable intensively cultivated irrigated crop. Again, while the chena crop would depend on the vagaries of the weather, the irrigated enterprise would be free of such hazards.