soil conditions are favourable an active man can finish hoeing of about 80 cents in an 8-hour day without much trouble.

The last but not the least suggestion is to improve the method of making jaggery. The improvements suggested are (1) milling of fresh mature canes to extract juice, (2) boiling of juice as quickly as possible without further addition of fresh juice to half-boiled juice, (3) removal of scum to purify the jaggery and to get good colour and (4) boiling in level-bottomed pans instead of the usual round bottomed pans in use.

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SUNN-HEMP

IN THE NORTHERN TALUKS OF GANJAM

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Introductory.—Sunn-hemp (*Crotalaria juncea*) has been under cultivation in the northern taluks of Ganjam from very early times. There is a considerable export of the fibre to foreign countries under the name Gopalpur hemp. The cultivation of this crop is in the hands of 'kevutus' or fishermen, other castes being prohibited by custom from growing it, though when the prices were tempting, others also occasionally took to its cultivation. Ghumsur, Aska and Chatrapur taluks and the estates of Kallikota and Atagada are the chief growing centres, the first of these being known to supply fibre of the best quality.

Varieties.—Two varieties are commonly grown, viz., 'sanno choni,' a local variety of 2½ months duration, and 'boddo choni', a Sambalpur variety of 3 to 3½ months' duration. The fibre of the latter is longer and whiter than that of the former, though coarser and weaker. The outturn, however, is larger.

Soil.—Light and well-drained soils in both dry and wet lands are sown to the crop but during years of high prices and good demand heavier soils are also sown. The produce of the lighter soil is fine, white and strong while that of the heavier soils is coarse, dull white and less strong.

Rotation.—On dry lands, sunn-hemp (usually sown in June), is followed by ragi, chillies or sweet-potatoes. On wet lands it is followed by paddy, which is itself followed by a pulse crop. The sowing is usually done earlier on wet lands, the local variety being usually chosen to facilitate an early harvest. Where transplanting of paddy is in vogue, as in parts of the Chatrapur taluk, but under a precarious irrigation source, and where the crop is liable to the grasshopper pest, the introduction of this crop will help the ryot in mitigating his losses.

Preparation of the land.—Two ploughings are usually given between March and May. Good surface tilth is considered sufficient, deep ploughing being deemed unsuitable. The H. M. Guntaka No. 1 will be therefore a suitable implement for preparing the land for this crop.

Manuring.—Eight to ten cartloads of cattle manure are usually applied. Heavier manuring is considered detrimental as it may induce rank growth and lodging.

Seed supply.—The seed of 'sanno choni' is produced locally, only the excess of requirements reaching the markets. The seed of the Sambalpur variety is obtained from Orissa and stocked for sale by merchants at Purushothapur and other places, local production not having been found generally feasible owing to the pods often dropping down before the seed matures, probably due to the effects of heavy rains. Owing to fluctuations in the area sown to this variety, the merchants find it difficult to adjust their stocks to the demand, which is very often over or under their expectations.

Sowing.—The seed is generally broadcast at 60–75 lbs. per acre according to the fertility of the soil. The seed is covered by ploughing twice and drawing a levelling board to compact the soil.

After cultivation.—No weeding or hoeing is done as the crop is sown thick and does not allow weeds to grow.

Pests and diseases.—The only pest of importance on this is the leaf-eating caterpillar (*Utethesia pulchella*), but as the growth of the crop is generally vigorous at the time it is usually grown, it is not generally damaged to any large extent. This pest however often causes considerable damage to the pods.

Harvest.—The crop flowers when about 4 feet high, within about 6 weeks after sowing, in the case of the local variety. The pods ripen in about 6 weeks more. The crop is generally harvested when the pods are fully ripe, in the middle of September in the case of the local variety, and early in October in the case of the Sambalpur variety, the crops being about 6 and 7 ft. high, respectively, at this time. If the bearing is not satisfactory the crop is harvested somewhat earlier. The best colour and fineness of fibre are obtained when the crop is harvested before the seed sets, but the fibre is weak. The best combination of fineness, colour and strength is obtained when the seed is set but before the seed is quite ripe. When the seed is ripe the fibre loses its colour and fineness, but gets stronger.

When allowed to seed, the crop is pulled out and the pod-bearing portions severed and collected into gunnies and threshed. The seed is then dried and mixed with ashes and preserved in straw bundles. The remaining portions of the plant are made into small bundles about 3 lbs. each in weight. The bottom portions of the plants in the small bundles are removed to a length of about 1″ and bigger bundles are made each consisting of 16 small bundles. These big bundles are then retted and fibre extracted.

Retting and extraction of fibre.—The retting is done in tanks or other places where clean water is available. The bundles of green stems are first stooked in groups of three with the lower one-third under water for a day and then laid flat on water and weighted down with lumps of earth for four nights. On the next day the bundles are taken out and each small bundle is beaten against water, with both the hands about three times, this being done from both ends of each bundle. Some of the green matter is thus removed. This is followed by rubbing each bundle (held in the left hand) with the right hand, and thus, further cleaning and washing of the stalks are done. Then the bundles are held at the bottom end between the thumb and the next finger and worked in water with a reciprocatory motion and the fibre thus separated from the stalks at the bottom up to a foot. The stalks are then stooked on the ground with bottom ends upwards, and allowed to dry partially.

The bundles are then taken up and broken at nearly half the length and placing each individual bundle between the knees the retter separates and strips the fibre from the lower end (top-side) and also removes the stalks which come off to the point at which they were broken. Then grasping the fibre close to the remaining portion of the stalks the bundles are heavily shaken with the result that these fall off automatically, thus liberating the hanks of fibre. The separated hanks of fibre thus obtained are hung up for a day either in the direct sun or underroof, according to the weather. After drying, the fibre is freed of dirt by vigorous shaking. The produce is now ready for the market.

Particulars of cost of cultivation (local variety) are noted below :—

Particulars of operations	Expenditure when labour is valued	Cash expenditure	Remarks
	RS. A. P.	RS. A. P.	
Ploughing, 4 pairs of cattle and 4 men	4 0 0	...	...
Levelling, 1 pair and 1 man ...	1 0 0	...	...
Manuring, 8 carts farm-yard manure.	4 0 0	...	...
Seed, 60 lbs. @ 1½ annas a lb. ...	5 10 0	...	...
Covering by ploughing twice drawing a levelling board, 3 pairs and 3 men	3 0 0	...	...
Harvest, bundling, carting, etc., 20 men @ 5 annas	6 4 0	3 2 0	The ryot does part of the work himself.
Retting and extraction of fibre, 20 men @ 5 annas	6 4 0	3 2 0	...
Rent on land	25 0 0	25 0 0	Rs. 35-0-0 per acre is paid, but as another crop is also raised, only Rs. 25 are charged to this crop.
Total ...	55 2 0	31 4 0	

Yield.—About 750 lbs. of fibre may be expected and, at Rs. 50 per candy of 500 lb., it is worth Rs. 75. The net profit in case the whole labour is valued will be about Rs. 20 and, when only the cash expenditure is taken into account, it will be about Rs. 44. In the case of the Sambalpur variety also the same figures hold good except that, on account of the seed having to be purchased at a cost of Rs. 6, the net profits are reduced by this amount.

Marketing.—There is a limited demand for the fibre locally for agricultural purposes and fishing nets. Most of the fibre, however, is exported to foreign countries, the centre of trade being Gopalpur. Messrs. Gordon, Woodroffe & Co. and Rally & Co. are the chief dealers. The ryot sells

the stuff to middlemen who often make advances to them and therefore dictate their own prices for delivery at Gopalpur to the agents of the firms named above. Here it is hackled further by hand, cleaned and pressed into small bundles of 200 pounds. Sometimes, when the market is dull, the ryots are obliged to take the fibre to Gopalpur for want of a middleman to purchase the stuff, and in this case he has to pay a godown rent to the agent. From Gopalpur the small bales are conveyed to Vizianagaram or Cocanada by train, via Jagannadhapuram the nearest railway station. At the above two places, the smaller bales are further pressed into bigger ones and exported to foreign countries. Though the fibre is thus not exported from Gopalpur direct as it once used to be, and has to be again taken to Jagannadhapur railway station, the whole produce goes there first, as the firms have their godowns and presses there. The total average quantity of fibre pressed and sent out from Gopalpur for the last 10 years is estimated as 1,500 candies of 500 pounds each per annum.

Conclusion.—From the figures given above, sunnhemp may be said to be a fairly remunerative crop under normal market conditions considering the ease with which it can be grown. Sunnhemp fibre compares favourably with other fibres, and no other country appears to compete with India in its production. It is therefore one of the crops which may with advantage be encouraged, of course, with such improvenients as may be possible, to make the commodity more easily marketable. As sunnhemp is also a good green manure or fodder crop, it can be used as such in case there is no demand for the fibre. It is very sparing in its demand on the soil and is, in fact, one of the best of recuperative crops.