Indian Journal of Agricultural Sciences **86** (3): 369–72, March 2016/Article
https://doi.org/10.56093/ijas.v86i3.57017

Traditional cultivation of sunnhemp (*Crotalaria juncea*) in eastern India

BABITA CHAUDHARY[1], M K TRIPATHI[2], S K PANDEY[3], HEM RAJ BHANDARI[4], D R MEENA[5] and S P PRAJAPATI[6]

Central Potato Research Institute Campus, Modipuram, Meerut, Uttar Pradesh 250 110

Received: 7 September 2015 ; Accepted: 23 October 2015

ABSTRACT

Traditional farming method plays an important role in human civilization. Indigenous knowledge is declining because of new agricultural technology has replaced traditional cultivation. But in the some part of country like Eastern Uttar Pradesh and Northern Madhya Pradesh (Bundelkhand Region), social/tribal communities are keeping preserve the traditional knowledge. A survey was made in the villages of five districts of Eastern Uttar Pradesh (Mahoba, Banda, Rath, Chitrkoot and Hamirpur) and one district of Northern part of Madhya Pradesh (Chhattarpur). The study was conducted on indigenous knowledge of sunnhemp (*Crotalaria juncea* L.) fibre cultivation in Bundelkhand region in India where the social/tribal communities are still preserving the traditional cultivation of sunnhemp as fiber crop.

Key words: *Crotalaria juncea,* Fibre cultivation, Fibre use, Indigenous knowledge, Sunnhemp

India is the largest producer of sunnhemp (*Crotalaria juncea* L.) fibre followed by Bangladesh and Brazil. Sunnhemp is cultivated almost in all the states of country but leading sunnhemp growing states in India are Uttar Pradesh, Madhya Pradesh, Odisha, Bihar, Maharashtra, Rajasthan, Jharkhand, Punjab, Haryana and West Bengal etc. It is occupying about 65.5 thousand hectares area with a production of about 38.0 thousand tonnes per annum. Besides acreage under fibre crop a vast land area per annum is covered under sunnhemp for green manuring with an objective to add organic matter and fix atmospheric nitrogen into the soil. Prior to 1960's,the crop was traditionally grown for fibre and fiber had been exported to other countries. The area under sunnhemp cultivation as fibre was more than 200 thousand ha of land with an annual fibre production of about 78-80 thousand tonnes, but over the passage of time its area and production is declined.Because, after green revolution the rice-wheat cropping system took over the traditional sunnhemp areas. In spite of many advantages of sunnhemp cultivation, lack of organized market for sunnhemp, low market value and introduction of synthetic fibre at cheaper rate in competitive market, the demand of natural fibre declined drastically, which slashed area and production of sunnhemp to a very low level. Over and above its competition with plastic ropes and twines, heavy incidence of pests and diseases on sunnhemp impeded its growth and yield very adversely. As farmers says availability of retting water is a serious problem for steeping and retting of harvested sunnhemp over and above labour, and capital intensive operation of retting and fibre extraction.

Despite having many valuable uses, acreage under this crop has drastically reduced in past decades. The unavailability of good quality seeds is one of the important reasons for reduced popularity of sunnhemp (Chittapur and Kulkarni 2003). In absence of small scale industries at village level, most of the sunnhemp fibre is consumed for traditional uses only which fetch very low profit. Keeping in view the progressive decline in area and production of sunnhemp especially during last 3-4 decades and present research aimed to investigate traditional fibre extraction knowledge of sunnhemp cultivation and their uses in rural areas of Bundelkhand region.

MATERIALS AND METHODS

A survey was accomplished during October 2013 to know the current status of indigenes knowledge of sunnhemp cultivation as fibre crop. A total thirty three villages of different districts of Eastern Uttar Pradesh (Mahoba, Hamirpur, Banda, Rath and Chitrkoot) and Northern Madhya Pradesh (Chhattarpur) were visited to know the traditional knowledge of sunnhemp fibre cultivation (Table 1). The sample comprised ninety two farmers of tribal/social communities and information collected and documented as local name of the farmers, uses of fiber, habitat and status of

[1]Senior Scientist (e mail: babchaudhary4@yahoo.com), ICAR-Central Potato Research Institute Campus, Meerut, UP 250 110; [2]Principal Scientist, Sunnhemp Research Station (ICAR-CRIJAF), Pratapgarh, UP; [3]Senior Scientist, Central Research Institute for June and Allied Fibres (ICAR)m Barrackpore, WB; [4]Scientist, Central Seed Research Station for Jute and Allied Fibres, Burdwan, Budbud, WB; [5]Technical Assistant (T-4), [6]Technical Assistant (T-3), Sunnhemp Research Station (ICAR-CRIJAF), Pratapgarh, UP

Table 1 Name of villages of Uttar Pradesh and Madhya Pradesh

Village	District	State	No. of farmers
Dhura	Chhattarpur	Madhya Pradesh	3
Ranipur	Chhattarpur	Madhya Pradesh	2
Gaj	Chhattarpur	Madhya Pradesh	2
Pai	Chattarpur	Madhya Pradesh	4
Pipet	Chhattarpur	Madhya Pradesh	5
Khajuraho	Chhattarpur	Madhya Pradesh	3
Rajnagar	Chhattarpur	Madhya Pradesh	2
Naugaon	Chhattarpur	Madhya Pradesh	3
Nathpur	Chhattarpur	Madhya Pradesh	2
Bilbai	Mahoba	Uttar Pradesh	4
Tinoli	Mahoba	Uttar Pradesh	4
Kabrai	Mahoba	Uttar Pradesh	3
Sijhari 1	Mahoba	Uttar Pradesh	5
Srinagar	Mahoba	Uttar Pradesh	2
Kabrai	Mahoba	Uttar Pradesh	3
Sijhari	Mahoba	Uttar Pradesh	3
Tindouli	Mahoba	Uttar Pradesh	4
Barat Pahari	Mahoba	Uttar Pradesh	2
Rapura kalan	Mahoba	Uttar Pradesh	1
Sadar	Mahoba	Uttar Pradesh	2
Bhavhoya	Hamirpur	Uttar Pradesh	4
Bharsaoa	Hamirpur	Uttar Pradesh	2
Bivad	Hamirpur	Uttar Pradesh	5
Bhodaha	Hamirpur	Uttar Pradesh	3
Bhovija	Hamirpur	Uttar Pradesh	2
Patna	Banda	Uttar Pradesh	4
Bhadokar	Banda	Uttar Pradesh	2
Parampurva	Banda	Uttar Pradesh	1
Subash Nagar	Banda	Uttar Pradesh	2
Kaharpur	Banda	Uttar Pradesh	1
Bounch	Banda	Uttar Pradesh	2
Kareti	Chitrakoot	Uttar Pradesh	2
Madhdevan	Chitrakoot	Uttar Pradesh	3
33	5	2	92

the areas. A discussion has made to gather maximum information about traditional knowledge of sunnhemp cultivation as fiber crop. Farmers have immemorial practice with rich indigenous knowledge and skill about fibre cultivation. Data on area under cultivation, time of sowing, time of harvesting, retting techniques and usage of fibre was recorded from selected farmers. The crop is grown sporadically in Eastern Uttar Pradesh and Northern Madhya Pradesh. Traditional fibre extraction practices were observed through interactions with tribal/local communities. They described many factors which are affecting the sunnhemp crop.

RESULTS AND DISCUSSION

The effort has been made to keep conserve traditional knowledge of cultivation of sunnhemp as fibre crop in rural areas of Bundelkhand region. The major districts of Bundelkhand region are Jhansi, Banda, Chitrakoot, Datia, Tikamgarh, Rath, Lalitpur Sagar, Damoh, Orai, Panna, Hamirpur, Mahoba, Narsinghpur and Chhatarpur. The population of Bundelkhand is dominated with backward communities, followed by scheduled caste and tribes. Cattle rearing are taken by large no. of peoples as source of livelihood. By and large the villagers of the Bundelkhand are poor, rural landless labourers. Thus the land holdings are marginal. The soil of bundelkhand is red soil group and locally known as rakar. These are not very appropriate for farming but only suitable for afforestation. These soils are also subject to severe hazards of erosion; therefore need to be conserved through embankments. *Kharif* crop is purely based on rains. Peas, peanuts, tilli, chana, maize, urad, moong and bajra are the major crops with wheat in irrigated areas. The villagers depend upon agriculture mining, employment on development work, collection of forest produce, like collection of flowers and fruits of mahuwa and chironji, collection of medicinal plants and tendu leaves (used in rolling beedi). Beside these activities, social /tribal communities are associated with cultivation of beetal leaves. The fields are covered with the bamboo sticks from all side generally known as 'Bareja'. With the different occupations the farmers are still cultivating sunnhemp as fibre crop for their daily need and they described many problems associated with sunnhemp fibre cultivation are given below. 1. The crop is traditionally grown during *kharif* season. But with the advent of green revolution, the acreage under sunnhemp crop reduced drastically and shifted towards irrigated transplanted *kharif* rice crop. The sunnhemp could not compete with the rice crop and thus rice occupied most of the traditional areas of sunnhemp. 2. The local communities told that the sunnhemp crop is very much susceptible to various insect pests and diseases in Eastern Uttar Pradesh particularly leaf curl virus, top shoot borer, hairy caterpillar and vascular wilt in etc. Due to attack of insect pest and diseases the yield obtained by farmers is very low which accelerated them to left the sunnhemp crop and move towards more remunerative crop. 3. Due to lack of high yielding varieties the productivity per unit area is very low which further compelled the farmers to shift towards some other alternative crops. If availability of high yielding quality seed may be assured then the area under sunnhemp could be increased. 4. Lack of mechanization in sunnhemp cultivation most of the operations are carried out manually and thus labour requirement is high which increases the cost of cultivation. Due to high cost of cultivation farmers get very low profit. 5. Prior to 1960's there used to be tanks and ponds in the villages which were used for retting by the farmers. But with the time these tanks and ponds have been converted either into cultivable land or into fisheries which has led the farmers to suffer for suitable retting tanks. 6. Sunnhemp fibre is still treated as a buyer's commodity as the market purely depends on the wish and pleasure of the traders. There is neither assured market nor minimum support price for the sunnhemp fibre. The farmers quite often face problem of selling their produce in the market and are deprived of remunerative prices of

the fibre. 7. With the introduction of synthetic fibre at cheaper rate the demand of natural fibre declined drastically. The synthetic fibres are easily available in the market. 8. Due to traditional method of cultivation, new generation farmers are not interested in sunnhemp farming. The traditional method of harvesting and in particular retting and extraction of fibre seems them unhygienic due to which they are not interested in sunnhemp cultivation. 9. In absence of small scale industries at village level, most of the sunnhemp fibre is consumed for traditional uses only which fetch very low profit. 10. Nilgai is also a serious problem in most of the sunnhemp growing areas particularly in northern India and these likes sunnhemp very much. These are found in large group and mostly attack the crop at night and graze them completely.

Indigenous method of fibre cultivation

The steps of traditional cultivation of sowing, harvesting, retting, drying, fibre extraction and useage of fibre are given below:

Sowing time and seed rate: In Eastern Uttar Pradesh under irrigated condition farmer sows the crop in second fortnight of April while in Bundelkhand region the crop is sown with the onset of monsoon under rainfed condition. Sometimes farmers grow the crop for green manuring under irrigated condition. Seed rate of sunnhemp varies with the method of sowing and the purpose for which the crop is to be grown. Farmer use broadcast sowing with highseed rate 60-70 kg/ha. After sowing, the soil is raked and laddered to put the seed 2-3 cm below the surface. The farmers try to grow generally improved genotypes like K-12 yellow, k-12 black, Ankur, Swastik, Shailesh, T-6, Chindwara, Belgaon, Nalanda sanai, M-19 and M-35, because insects-pests damage in improved cultivars are less. If they don't get seed of improved varieties then they go purchase seed from local market. A common weed Hirankhuri (*Convolvulous arvensis*) associated with sunnhemp which is weeded out manually, otherwise it will hamper the growth of crop and creates problem in extraction of fibre. They keeps crop free from weed up to 45 days after sowing.

Harvesting and retting: The crop gets ready for harvest in 90-100 days for fibre before flowering stage but in some part of Bundelkhand region farmers get fibre after seed maturing at 150-160 days of cropage. The crop is harvested with the help of sickle and plants are tied in small bundles of 15-20 cm in diameter to facilitate retting and washing. The upper tender portions of the plants are cut and used either as a fodder for cattle or incorporated into soil for green manuring. Bundles are then taken to the retting pond and rivers where these are sunk into water (20-25 cm) with the help of bamboo or stones or wooden logs for retting. The retting process requires generally 3-5 days depending upon prevalent temperature and crop age. But the farmers get retting after seed harvesting than bundles are sunk in the pond or rivers for approximately one month. The fiber quality of these plants is very coarse grade. After completion of retting process the farmers separate the bark from the sticks and the bundles are dashed against water for 3 to 4 times to remove excess lignin and then bundles are moved in water to and fro. Washed fibre bundles are stacked vertically for dripping of water from the sticks and fibres.

Fibre extraction and yield: Fibre can easily extract when washed bundles of sunnhemp are moist. Fibre from each plant is extracted/peeled off manually from bottom to top side in long strip. If the retting has been satisfactory, the fibre peels off smoothly from the inner stem. The extracted fibre is dried in the sun, put up in twists and bundles for marketing. The farmers gets yield ranges from 5 to 10 q/ha, while by using improved package and practices then they get about 10 to 12 q/fibre and 50-60 of sticks/per ha.

Uses of fibre and other occupation

The farmers/local /tribal communities have been abandon the cultivation of fibre due to scarcity of water and farmers are not getting price of their produce because most of the carpet industries are closed near Kanpur, Banaras and Bhadoi in Uttar Pradesh. Most of the new generation is shifting to the cities for earning money. Rest of farmers have been engaged themselves in making baskets from pigeonpea (*Cajanus cajan*) and lantana (*Lantana camara*) sticks on large scale or growing cash crops like pulses, soybean (*Glycine max*) and sesame or til (*Seasmum indicum*). They are cultivating sunnhemp fibre for making ropes, nets, sutli and hangings for their livelihood and sometimes they use flower buds in preparation of vegetable.

In view of the above, it is evident that the area of cultivation of sunnhemp as fibre has been shrinking very rapidly due to lack of organized market for sunnhemp fiber, lower price of fibre with the introduction of synthetic fibre at cheaper rate in competitive market. The demand of natural fibre declined drastically, which slashed area and production of sunnhemp to a very low level. As farmers says availability of retting water is a serious problem for steeping and retting of harvested sunnhemp over and above labour, and capital intensive operation of retting and fibre extraction. In absence of small scale industries at village level, most of the sunnhemp fibre is consumed for traditional uses only which fetch very low profit. The establishment of small scale industries will help the farmers in diversification of the products. The traditional culture of sunnhemp cultivation can save if the use of sunnhemp fibre in making ropes, twines, sacks, fishing nets and mats etc. involve intensive employment of rural labour, development of small scale industries at village level calls for future intensification of its cultivation for more and more generation of labour employment.

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