

AGRO-ADVISORY TO GROWERS OF JUTE AND ALLIED FIBRES

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March 25 - April 8, 2022 (Issue No: 6/2022)



भाकृनुअप -केन्द्रीय पटसन एवं समवर्गीय रेशा अनुसंधान संस्थान
ICAR-Central Research Institute for Jute and Allied Fibers

An ISO 9001: 2015 Certified Institute

Barrackpore, Kolkata-700121, West Bengal

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**Agro-advisory to Farming Community of Jute and Allied Fibres
(March 25 to April 8, 2022)**

I. Likely weather in the coming week in jute and allied fibre growing states

| State/Agro-climatic Zone/Region | Weather Forecast |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gangetic West Bengal (Murshidabad, Nadia, Hoogly, Howrah, North 24-Prganas, Purba Burdwan, Paschim Burdwan, South 24-Parganas, Bankura, Birbhum) | No rainfall is expected during 25-28 March, 2022. Maximum temperature (Tmax) is expected to be around 35-38°C, and minimum temperature (Tmin) of around 22-25°C. |
| Sub-Himalayan West Bengal (Cooch Behar, Alipurduwar, Jalpaiguri, North Dinajpur, South Dinajpur and Malda) | No rainfall is expected during 25-28 March, 2022, 2021. Maximum temperature (Tmax) is expected to be around 31-33°C, and minimum temperature (Tmin) of around 17-20°C. |
| Assam: Central Brahmaputra Valley Zone (Marigaon, Nagaon) | Thunder shower is expected during 25-28 March, 2022 (total rainfall up to 10 mm). Maximum temperature is expected to be around 30-32°C, minimum temperature of around 18-19°C. |
| Assam: Lower Brahmaputra Valley Zone (Goalpara, Dhubri, Kokrajhar, Baongaigaon, Barpeta, Nalbari, Kamrup, Baksa, Chirang) | Thunder shower is expected during 25-28 March, 2022 (total rainfall up to 3 mm). Maximum temperature is expected to be around 30-32°C, minimum temperature of around 17-18°C. |
| Bihar: Agro-climatic Zone II (Northern East) (Purnea, Katihar, Saharsa, Supaul, Madhepura, Khagaria, Araria, Kishanganj) | No rainfall is expected during 25-28 March, 2022. Maximum temperature is expected to be around 32-36°C, minimum temperature of around 20-22°C. |
| Odisha: North Eastern Coastal Plain (Balasore, Bhadrak, Jajpur) | No rainfall is expected during 25-28 March, 2022. Maximum temperature is expected to be around 36-40°C, minimum temperature of around 21-22°C. |
| Odisha: North East and South Eastern Coastal Plains Region (Kendrapara, Khurda, Jagatsinghpur, Puri, Nayagarh, parts of Cuttack, and parts of Ganjam) | No rainfall is expected during 25-28 March, 2022. Maximum temperature is expected to be around 35-38°C, minimum temperature of around 21-23°C. |

Source: IMD (<https://mausam.imd.gov.in/>) and www.weather.com

II. Agro-advisory for jute crop

1. Timely sown jute crop (March 25 to April 10)

- Complete the land preparation and sow the crop immediately. To get good yield and quality fibre, use JRO 204 (Suren) variety of jute seed and treat the seed with Carbendazim (Bavistin) 50 WP (2g per kg seed), at least 4 hours before sowing. If JRO 204 variety is not available then JRO 524, IRA, Tarun and NJ 7010 variety can be grown for fibre production. These can also be used as leafy vegetable purpose if harvested at early stage.
- Sowing should be done in line through ICAR-CRIJAF Multi-row seed drill and required seed rate will be only 350 - 400 gm/bigha (0.133ha). Line sowing with row spacing of 20-25 cm and sowing at depth of 3 cm are recommended.
- In case of extreme emergency and non-availability of seed drill machine, broadcasting of the seed with maximum seed rate of 800g /bigha followed by weeding operation with ICAR-CRIJAF Nail Weeder strictly at field capacity is recommended for maintaining the proper spacing. CRIJAF Nail Weeder operation at 5-8 days after sowing both under irrigated and rainfed conditions, maintains 5-6 per cent more moisture in root zone (0-15 cm), keeps the soil (0-10 cm) cooler by 1-3 °C, helps to fight early drought stress by young jute seedlings even under no rain fall condition upto 30 days.
- Laddering of field after sowing which will act as dust mulch for conservation of soil moisture which will be helpful for better germination of seed.
- For medium and high fertility land, the recommended fertilizer will be N:P₂O₅:K₂O : : 60:30:30 kg/ha. For low fertility land it will be 80:40:40 kg/ha. Nitrogen needs to be applied in 2-3 spilt doses. However, phosphorus and potash should be applied as basal. Farmer can also refer Soil Health Card for actual NPK application as per their soil test.
- Under irrigated condition, spray Pretilachlore 50EC @ 3 ml/L water after 48 hrs of sowing with irrigation to control weeds. Under rainfed condition (no irrigation), spray Butachlore 50EC @ 4ml/L water after 48 hrs of sowing to control weeds.
- If drought like situation persist 5-6 DAS, sprinkler irrigation can be given. Where moderate to heavy rainfall is forecasted, wait for irrigation application to crops.



Step-1: Land preparation and application of basal dose of NPK fertilizer



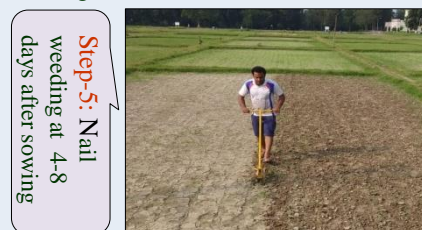
Step-2: Seed treatment with Carbendazim (2g per kg seed), at least 4 hours before



Step-3: Line sowing of carbendazim treated jute seed using CRIJAF Multi-row seed



Step-4: Under irrigated condition, spraying of Pretilachlore 50EC @ 3 ml/L water after 48 hrs of sowing with irrigation to control weeds. Under rainfed condition, spray Butachlore 50EC @ 4ml/Litre water after 48 hrs of sowing to control weeds.



Step-5: Nail weeding at 4-8 days after sowing

III. Agro-Advisory for Allied Fibres

A) SISAL

Introduction: Sisal (*Agave sisalana*) is a xerophytic semi-perennial, leaf fibre producing plant. Sisal fibre is commonly used in the shipping industry for mooring small craft, lashing, and handling cargo. Presently the main sisal producer and exporter is Brazil and main importer is China. In India, sisal is mainly grown in arid and semi-arid regions of Andhra Pradesh, Bihar, Orissa, Karnataka, Maharashtra and West Bengal. The yield of sisal in our country is very low, due to lack of proper management. The total area under sisal cultivation is 7770 ha out of which 4816 ha is grown under soil conservation purpose. Suitability to the Indian climate with little water requirement and maintenance, makes sisal a fit crop for sustainable development in the country particularly in rural India. Sisal, a CAM plant, can be successfully grown in 40-45°C with 60-125 cm rainfall. The cultivation of sisal and its allied activities will augment the employment opportunities and livelihood security of tribal/local farmers through generation of man days (113 man-days/ha) and promotion of cottage industries through value addition. Besides, sisal is efficient in reducing runoff by 34.6%, soil loss by 61.9% and conserve soil moisture.

Maintenance of Secondary Nursery

- Nursery should be made weed free and drainage facility should be made to avoid water stagnation. Spraying with Metalaxyl, 25%+Mancozeb 72% WP (0.25%) should be taken up as a preventive measure against disease for obtaining healthy sucker. Application of sisal compost will be helpful for supplying nutrient to the soil as well as for suppression of weed growth due to its herbicidal property. Out of 80,000 bulbils raised in one-hectare nursery, if properly maintained, farmers can get minimum 72,000-76,000 suckers. It is assumed that mortality of bulbils in secondary nursery is 5-10 percent. The top dressing with nitrogen fertilizer should be completed at the earliest for proper growth of the plantlets. The above practices are same for Hybrid sisal.

Collection of Sucker from Main Field

- In addition to growing of bulbil in primary nursery followed by secondary nursery to produce the sucker as planting material, sisal sucker can also be collected from the main plantation. Generally, 2-3 suckers are produced per annum, which is also a potential source of planting material and can be directly planted in the main field. These suckers are uprooted after the onset of the monsoon. The old roots should be trimmed and damaged withered leaves also should be removed before planting. Care should be taken so that bole (crown region) of the plant is not damaged during trimming of old roots.

Maintenance of New Sisal Plantation

- Weeding should be done in 1-2 years old sisal plantation to reduce competition for nutrient and water. Spraying of Copper oxy-chloride @3.0 g/lit or Mancozeb 64% + Metalaxyl 8% @ 2.5 g per litre of water in case of appearance of first symptom of the zebra disease or alternaria leaf spot of sisal should be taken up. Application of sisal compost 2 ton/ha with 60:30:60 kg/ha should be taken up immediately for optimum growth and yield. Fertilizer should be applied by making ring around the sisal plant at least in the first year of plantation.



Pit digging and planting of suckers in double-row system

Intercultural operation in secondary nursery

Extraction Fibre from sisal leaf

Drying of sisal Fibre

Sisal plantation in the Main field

- ❖ Suckers raised in the secondary nursery or collected from sisal plantation should be planted in main field after trimming/ pruning of older lower leaves and roots after treatment with Mancozeb 64% + Metalaxyl 8% @ 2.5 g per litre of water for 20 minutes. Suckers should be planted in a hole made in the center of the pits with the help of sharp pointed wood/ho. The suckers should be planted in such a way that neck region is at ground level.
- ❖ The suckers should have length greater than 30 cm, weight of at least 250 g and having 5-6 leaves. Suckers having any disease and/or stress symptoms should be avoided for planting.
- ❖ Sisal compost or FYM @ 5 tonnes/ha and N: P₂O₅: K₂O:: 60:30:60 Kg/ha should be applied for rapid development of sisal plant. Nitrogen should be applied in two equal splits: 50 % during pre-monsoon period and rest during post-monsoon period and the post-monsoon dose should be started immediately taking the advantage of soil moisture.
- ❖ Farmers who have not prepared main field for sisal plantation till now, may go for planting without further delay selecting well drained field having minimum soil depth of 15 cm. The entire should not be ploughed, when sisal plantation is taken in sloppy land.
- ❖ Demarcation of land for the main field, cleaning of bushes, removal of weeds and pitting of 1 ft³ size with spacing 3.5 m + 1m × 1m for Double-row sisal plantation should be done and about of 4500 suckers per hectare are required. However, even planting can also be taken at spacing of 3.0 m + 1m × 1m under adverse situation with plant population of 5000 per hectare.
- ❖ Pit should be filled up with mixture of soil and sisal compost or FYM for making soil porous. Lime should also be applied as soil amendment @ 2.5 tonnes per hectare in acidic soil and the filling of soil in the pit should be 1-2 inch above the ground level for proper establishment of the suckers.
- ❖ Sisal suckers should be planted across the slopes and parallel to the contours to check soil erosion. Suckers should not be kept in heap and should be kept in single layer under shade for better survival. The planting of the suckers is to be completed within 45 days of collection. Atleast 100 suckers per hectare should be kept as reserve for gap filling to maintain required plant population.
- ❖ Sisal Suckers raised in the secondary nursery should be preferred as planting material compared to sucker obtained from sisal plants from main field to have uniform crop stand.

Collection of bulbils

- ❖ Growth of Sisal plant is terminated with emergence of flowering stalk know as pole. Each pole contains about 200-500 bulbils, consisting of 4-7 reduced leaves. The same should be collected and raised in primary nursery as planting material

Harvesting of Sisal Leaves

- ❖ The harvesting leaves should be completed without further delay as rising temperature will affect negatively the sisal fibre recovery. Harvesting of leaves should be taken up in afternoon hours and extraction should also be completed in the same day. Spraying of Copper Oxychloride @ 2-3 g/litre water may be taken up against disease infestation after harvesting of leaves.

Intercropping in sisal plantation for additional income

- ❖ Lifesaving irrigation, mulching, plant protection measures may be taken for the fruit plants like sapota, guava and cashew grown in the interspace of sisal for enhancing production and farm income.



Intercropping 1. Guava 2. Sapota 3. Cashew

Sisal based Integrated Farming System

Integrated Farming System in Sisal Plantation can be adopted successfully as a profitable venture in Tribal and Drought Prone areas for employment generation, enhancing farm income and sustainable agriculture. The efficient use of available resources will help in generating adequate income due to integration of various farm enterprises and recycling of crop residue and by products within the system itself. Various animal components and crop components along with base crop sisal can be successfully integrated in Sisal based IFS system.

1. Backyard poultry can be incorporated by rearing 100 nos. improved breeds of chicks like Vanaraja, Red Rooster and Kadaknath with net profit of Rs. 8,000-10,000 /- per annum.
2. Farmers can add net profit of Rs. 25,000/- per annum by taking dairy activities with two cows and the cows can be fed with different fodder crops including the other crop residues taken in interspace of double row sisal plantation.
3. An additional net income of Rs. 12,000-15,000 /- per annum can be generated by rearing 10 nos goats.
4. Mushroom Cultivation with six beds can also be taken up with the toe fibre and paddy straw of aerobic rice, grown in the interspace of sisal, resulting in net income of Rs. 12000/- per year.
5. The vermicomposting can be taken up utilizing the sisal waste, other crop residues and leftover material of mushroom cultivation for raising different intercrops as well as for the main crop sisal, thereby reducing the cost on fertilizer and improving soil health with additional net income of Rs. 14,000 /per annum.
6. As sisal is generally grown in sloppy and undulated land, rain water can be profitably harvested. Moreover, taking into consideration of irregular and scanty rainfall and lack of persistent and sustained irrigation facilities, the construction of rainwater harvesting structures can empower sisal growers by providing additional net income through multiple uses of the harvested water. The water harvesting structure should be constructed at the lowest corner of the field in an area of 0.1 Hectare out of 1-hectare total sisal plantation. The dimensions of the structure if 30 m x 30 m x 1.8 m with embankment width of about 1.5 m. The harvested rainwater in this tank can be utilized in multiple way and has following advantages:
 - ❖ The harvested water can be utilized for providing supplementary irrigation at critical stage of intercrops as well as base crop sisal for getting additional income and to increase the production and productivity of the sisal-based cropping system.
 - ❖ The stored water can be utilized for proper washing of fibre during extraction process of sisal.
 - ❖ Profit of about Rs. 15,000-20,000 /- per annum can be generated through dike height horticulture such as papaya, banana, coconut, drumstick and other seasonal vegetables:
 - ❖ Composite Pisciculture actives can be taken up in water harvesting structures by rearing catla, rohu and mrigal, by which the farmers can earn Rs. 10,000-12,000 /- per annum.
 - ❖ An additional income of about Rs. 8,000 per annum can be obtained by rearing 100 nos ducks in the water body.



Sisal based Integrated Farming System at Bamra, Odisha

B) RAMIE



- ❖ Farmers may start new plantation during this period. Stage back operation is recommended for old plantation followed by application of fertilizers and irrigation for uniform growth and better yield.
- ❖ Use good quality rhizomes/ plantlets of R1411 (Hazarika) variety of ramie. Seed treatment with any systemic fungicide before sowing is recommended.
- ❖ Sowing should be done in line and required seed rate will be only 6-8q rhizome/ha or 55,000 – 60,000 plantlets or stem cuttings/ha.
- ❖ Land should be prepared by 3-4 cross ploughing followed by planking. Make a furrow of about 4-5 cm deep. 10-12 cm length pieces of rhizome/ plantlet/ stem cutting are to be planted in the furrow at a distance of 30-40 cm by keeping the row to row distance 75-100 cm in order to get the optimum growth and productivity.
- ❖ Inter row space may be utilize for intercropping with any short duration crops (locally preferred) compatible with ramie. Inter cropping with pineapple, papaya, coconut, areca nut etc is recommended for higher income.
- ❖ Integrated applications of organic (FYM or Ramie compost as per availability) and inorganic sources of nutrients are recommended for balanced nutrition to the crop and for maintaining good soil health. Application of 20:10:10 kg NPK/ha after 40-50 days of planting is recommended. Subsequently 30:15:15 kg NPK/ha after each cutting is recommended. Apply 10-12 t FYM before 15-20 days of planting as per the availability.
- ❖ The crop is very sensitive to water-logging, therefore provision of drainage may be kept and field should be well drained during heavy rains.



Ramie plantation



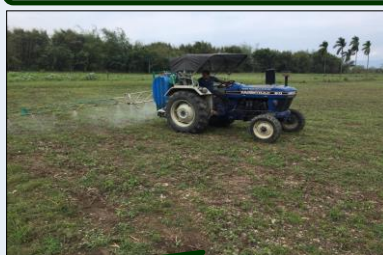
Harvesting of ramie crop



Ramie fibre extraction



Weeding by Jungle Jim after harvest of ramie



Spraying of non-selective herbicide like Paraquat or Glyphosate



Ramie fibre after extraction (un-degummed)

C) FLAX



Introduction: Flax (*Linum Ussitatisimum* L.) fibre is pale yellow, cellulosic (70%), luxurious, thermo regulating, non-allergenic, antistatic and antibacterial fibre. Cultivation of flax require temperate, free from heavy rains and frost. It grows in between 50^o F to 100^o F. The type of soil for fibre flax is loamy soil. In our country such climates and soils usually prevails in foot hills and intermediate hill zone of Himalayan region comprising states of Jammu and Kashmir, Himachal Pradesh, Uttrakhand, northern part of Uttar Pradesh, West Bengal and some parts of North-East region. In India, flax cultivation is yet to take off substantially despite of having conducive agro-climatic conditions in different regions. This is due to unavailability of location specific high yielding varieties and also improved production technology.

- ❖ The fibre crop matures in around 120-130 days and is harvested before maturation of capsules. The optimum stage for harvesting is the time when 2/3rd of the plant portion of the crop turns yellow and 2/3rd leaves have fallen.
- ❖ Harvesting is done by pulling out the plants from the ground. Plants are tied in small bundles of 15-20 cm diameter for retting. Early harvesting may result in tender and fine fibre with low yield, while late harvesting may result in more yield but relatively poor quality of fibre.
- ❖ After harvesting retting is traditionally carried out by placing the bundles in water pond and keeping them dipped properly through heavy weight so that bundles can absorb the moisture. Bundles are kept side by side horizontally and immersed in water 20-25cm deep with bamboo or stoned or wooden logs.
- ❖ The retting process is completed within three days (72 hours). Flax fibre is extracted from the bast or skin of stem of the flax plant.
- ❖ The upper tender portions of retted plants are cut so those capsules are removed from plants. After that flax fibre is ready for scotching, which is a process in which the fibres get separated from stem. It may be done manually, where the small bundle of dried stalk are beaten by hand mallat (mungri), which leads to splitting of wooden part of the stalk and fibre can be separate easily.
- ❖ It also can be done by mechanical method, where the flax stalks go through the scutching machine developed by CRIJAF (ICAR), for extraction of flax fibre. The machine is indigenously designed on the principle of passing a handful flax stalk through fluted rollers to break the woody core into straw and separate the fibre in a short time. The fibre is then worked through a comb for separating long fibres from short ones. The separated fibre strands are then rolled into bundles.



Harvesting stage



Harvesting of flax



Retting process



Flax fibre

In-situ Jute Retting Tank based Self Reliant Eco-farming System

- ❖ Keeping in view the erratic distribution of rainfall, non-availability of community retting tank, declined per capita availability of water resources, high cost of cultivation and labour and dryness of rivers, ponds/canals, farmers face problems of proper retting of jute and mesta. Due to retting with poor quality water of community pond and sometimes with insufficient water, quality of fibre is affected and is not internationally competitive.
- ❖ To overcome such problems, in-situ retting tank based farming system model can be adapted by the farmers before rainy season to make jute and mesta farming more profitable. Since the rainfall of jute growing states are high, ranges from 1200 to 2000 mm and 30-40% of the rainfall goes as runoff, some portion of runoff water can be harvested by constructing a tank in the lower most corner of the the field.

Dimension of the Pond and Retting Process for one acre of harvested raw jute

- ❖ The pond dimension of 40 ft × 30 ft × 5 ft was sufficient for retting of jute harvested from half acre of land at a time. Jute harvested from one acre can be used for retting easily in two cycles. The pond bund should have sufficient width (1.5-1.8 m) to grow plants like papaya, banana and vegetables. The total area of farming system which includes digging and bund area will be 180 m². If farmers want to afford more land under farming system, pond dimension of 50 ft x 30 ft x 5 ft can be adopted
- ❖ Provision should be made for appropriate lining of in-situ retting tank with LDPE agri-film of 150-300 microns to minimize the seepage and percolation loss, particularly in light textured soil.
- ❖ Three jaks should be prepared at a time and each jak should consist of three layers. Gap of 20-30 cm from jak to the soil bottom and 20-30 cm water above the jak should be maintained.

Advantages of in-situ retting tank

- ❖ The cost of transporting the harvested jute bundles to the conventional retting spot (about Rs. 4000 - 5000/ acre) can be saved by constructing in-situ retting pond.
- ❖ By using CRIJAF Sona, retting can be completed with in 12 to 15 days compared to 18 to 21 days under conventional retting. CRIJAF Sona @14 kg per acre should be used for retting purpose. During 2nd cycle retting, dose of CRIJAF Sona can be reduced to 50% by which Rs. 400/- can also be saved.
- ❖ Fibre quality can be improved by at least one to two grades because retting will be performed in freshly harvested rainwater and also with free flowing rainwater of the rainy season.

In addition to retting of jute and mesta, the harvested water can be utilized in multiple ways

1. Dyke based horticulture (papaya, banana, seasonal vegetables (Profit of about Rs. 10,000-12,000/- per tank **2.** Rearing of air breathing fish like telapia, magur and singhi, 50-60 kg **3.** Apiaries (Profit from honey around Rs. 7000/- per tank) and also honey bees will help in pollination **4.** Mushroom cultivation and vermicomposting. **5.** Approximately 50 nos. ducks can be reared in the pond which result in additional income of Rs. 5000 /-. **6.** After retting, the water can be utilized for providing supplement irrigation to crops in jute based cropping sequence resulting additional income of Rs 4000/acre.

Thus, by loosing jute of Rs. 1000 to 1200 after construction of in-situ retting tank in the field, farmers can earn about Rs. 30,000/- in that area from multiple farming with saving of transport cost another about Rs. 4000-5000/- This technology will also be helpful in reducing negative impacts from extreme weather events like drought, cyclone, flood etc.

In-situ Jute Retting Tank based Self Reliant Eco-farming System

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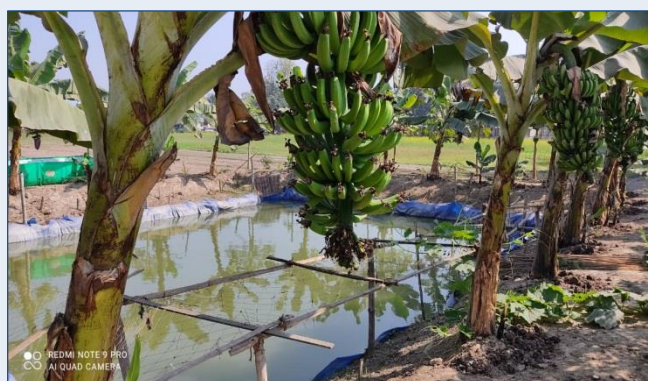
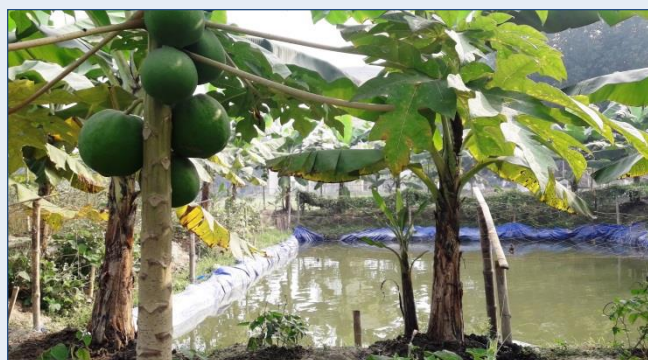
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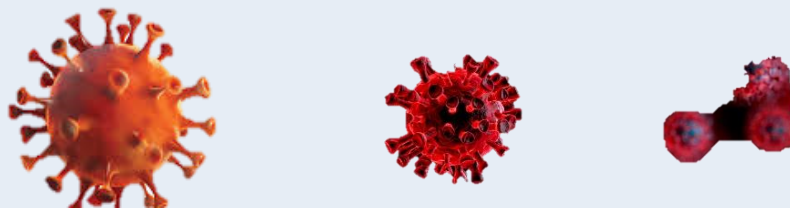


In-situ Jute Retting Tank based Self Reliant Eco-farming System

- ❖ Jute Retting
- ❖ Fish culture
- ❖ On-dyke Vegetable farming
- ❖ Vermicomposting around retting tank

- ❖ Duckery
- ❖ Apiculture
- ❖ Fruit (Papaya and Banana)

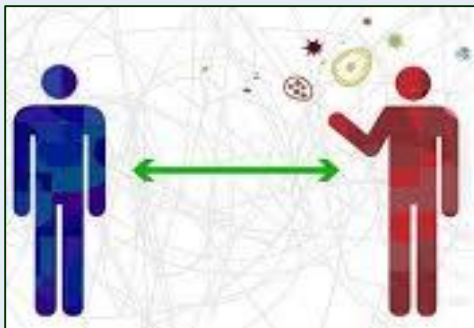
IV. Safety and Preventive Measures to be Taken to Prevent Spread of COVID-19 Virus



- 1) Farmers should follow social distancing, safety measures and to maintain personal hygiene by washing hands with soap, wearing of face mask and protective clothing at each and every step in the entire process of field operations like land preparation, sowing, weeding, irrigation.
- 2) Proper sanitation and cleanliness of machine like sickle, seed drill, nail weeder, irrigation pump, tilling equipment, tractor etc. are to be maintained especially when machines are shared and used by farmer groups.
- 3) Also maintain safe distance of 6 feet during rest, taking of meals, seed treatment at home, loading/unloading of manures and fertilisers.
- 4) Engage only familiar persons to the extent possible and after reasonable enquiry as to avoid the entry of any suspect or likely carrier during field activity.
- 5) Collect the seed, fertilizer, pesticides and other inputs from known shop and after returning from market immediately wash your hands and exposed parts of the body. Always use face masks while going market for seed purchase.
- 6) Install **Aarogya Setu** app in your mobile to know the essential health services related to COVID-19



V. Advisory for jute mill workers



- The workers staying inside the mills may be engaged in multiple numbers of short duration shifts (with minimum number of workers/shift) for running the mills in staggered manner.
- In general adequate numbers of washing points are to be given inside the mills so that the workers can wash hands more frequently. During the duty the workers should not smoke.
- The toilets must be cleaned, sanitized for more number of times to check the spread of virus infection.
- The workers are advised to use gloves, face mask, shoes, proper protective clothing while working in the mill.
- Inside the mill, the working points to be relocated so that sufficient distances are maintained among the workers as per the need of social distancing to suppress the transmission of the virus.
- The workers who are exposed to working surfaces more frequently, most of the time touch and handle important points of machines like switches, levers etc. should be extra precautions in hand sanitization and hand washing with soap. Besides, such surfaces and machine parts should be cleaned with soap water to remove the infective virus.
- The aged high risk workers should be allowed to work in more isolated places inside the mill premises so that their chances of exposure to others is reduced to great extent.
- The mill workers must avoid gathering during tiffin/lunch hours, must maintain 6-8 ft distance between two individuals and wash their hands properly before taking foods.
- The workers must report the doctor or the mill owners immediately in case any type of symptoms related to the COVID infection

Wish you all a healthy and safe stay

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