

AGRO-ADVISORY TO GROWERS OF JUTE AND ALLIED FIBRES

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**भा.कृ.अ.प. -केन्द्रीय पटसन एवं समवर्गीय रेशा अनुसंधान संस्थान
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**Agro-advisory to Farming Community of Jute and Allied Fibres
(June 08-22, 2022)**

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

State/Agro-climatic Zone/Region	Weather Forecast
<p>Gangetic West Bengal (Murshidabad, Nadia, Hoogly, Howrah, North 24-Prganas, Purba Burdwan, Paschim Burdwan, South 24-Parganas, Bankura, Birbhum)</p>	<p>Total up to 10 mm rainfall is expected during 8-11 June, 2022. Maximum temperature (T_{max}) is expected to be around 34-37°C, and minimum temperature (T_{min}) of around 26-27°C.</p>
<p>Sub-Himalayan West Bengal (Cooch Behar, Alipurduwar, Jalpaiguri, North Dinajpur, South Dinajpur and Malda)</p>	<p>Total up to 230 mm rainfall is expected during 8-11 June, 2022. Maximum temperature (T_{max}) is expected to be around 28-32°C, and minimum temperature (T_{min}) of around 21-23°C.</p>
<p>Assam: Central Brahmaputra Valley Zone (Marigaon, Nagaon)</p>	<p>Total up to 70 mm rainfall is expected during 8-11 June, 2022. Maximum temperature is expected to be around 28-32°C, minimum temperature of around 21-24°C.</p>
<p>Assam: Lower Brahmaputra Valley Zone (Goalpara, Dhubri, Kokrajhar, Baongaigaon, Barpeta, Nalbari, Kamrup, Baksa, Chirang)</p>	<p>Total up to 160 mm rainfall is expected during 8-11 June, 2022. Maximum temperature is expected to be around 28-32°C, minimum temperature of around 22-24°C.</p>
<p>Bihar: Agro-climatic Zone II (Northern East (Purnea, Katihar, Saharsa, Supaul, Madhepura, Khagaria, Araria, Kishanganj)</p>	<p>Total up to 100 mm rainfall is expected during 8-11 June, 2022. Maximum temperature is expected to be around 30-35°C, minimum temperature of around 23-25°C.</p>
<p>Odisha: North Eastern Coastal Plain (Balasore, Bhadrak, Jajpur)</p>	<p>Total up to 25 mm rainfall is expected during 8-11 June, 2022. Maximum temperature is expected to be around 38-40°C, minimum temperature of around 25-27°C.</p>
<p>Odisha: North East and South Eastern Coastal Plains Region (Kendrapara, Khurda, Jagatsinghpur, Puri, Nayagarh, parts of Cuttack, and parts of Ganjam)</p>	<p>Total up to 30 mm rainfall is expected during 8-11 June, 2022. Maximum temperature is expected to be around 35-39°C, minimum temperature of around 26-28°C.</p>

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

II. Agro-advisory of Jute

1. Those who has sown the crop between April 26-May 10: (Crop Age 45-60 days)

- During excess rain due to 'Norwester' / 'Cyclonic Depression' some field may be waterlogged that adversely affect crop growth. Remove excess water from field immediately by creating field ditches (20 cm wide and 20 cm depth) along the gradient at 10 m intervals. At optimum condition maintain plant population (55-60 plants/square meter).
- Closed tender leaves of 30-50 day old jute crop may damaged by grey weevils usually after rain. The damage portions in leaves broaden as the plant grows. Weevils are grey in colour with dark white spots, elongated head, visible on plants. Spray combination of (Chlorpyriphos 50EC+Cypermethrin 5EC) @ 1-1.5 ml/l or Chlorpyriphos 20EC @2ml/litre or Quinalphos 25 EC@1.25 ml/litre
- Alert about the initial infestation of hairy caterpillar after rain when the temperature raises with high humidity. Eggs and young larvae are seen in bunch on the leaf surface. The pest spreads quickly and damage the leaves. Monitor to spot early infestation. Remove the egg masses and newly emerged larvae in bunch. Spray lambda cyhalothrin 5EC@ 1.5 ml/lit or profenophos 50EC @ 2ml/l in extreme cases.
- If drought prevails mite infestation with the symptom of thickening and interveinal crinkling in the terminal young leaves which later turn coppery-brown. Avoid water stress and foliar spray of Fenpyroximate 5 EC @ 1.5 ml/litre or Spiromesifen 240 SC @ 0.7 ml/litre or Propargite 57 EC @ 2.5 ml / litre alternatively in rotation at 10 days interval if infestation persist beyond 10 days. In case of rain, wait for at least 5-6 days to initiate the Acaricide spray if symptoms initiates/persists
- Another insect, semilooper causes foliar damage in almost all the jute growing tracts. Slender, greenish larvae with light yellow head, narrow dark green dorsal lines are easily noticed when they crawl by producing a loop in the middle. The crop is most susceptible at 50-80 DAS. Damage starts in all cases from unopened leaves in upper part of the plant which represent the most susceptible portion. Damage is restricted to 9 fully opened leaves of the crop. The edges of the tender leaves are eaten, serrated, diagonal cuts occurs in apical leaves. Sometimes damaged stem induce branching. Whenever the damage by semilooper reaches 15% then any contact insecticide such as Profenophos 50 EC @2 ml/litre, Fenvalerate 20EC @ 1.0 ml/litre or Cypermethrin 25EC @ 0.5 ml/litre may be applied. The insecticidal sprays need to be targeted towards the apical portion of the plant rather than covering the whole plant.



Control of grey weevils with Spray combination of Chlorpyriphos 50EC+cypermethrin 5EC @ 1-1.5 ml/l or Chlorpyriphos 20EC @2ml/l or Quinalphos 25 EC@1.25 ml/l

Timely sown (50-60 days old) jute crop



Hairy caterpillar infestation with high temperature and humidity after rainfall. The pest spreads very quickly. Monitor to spot early infestation and remove the egg masses and newly emerged larvae in bunch. Spray lambda cyhalothrin 5EC @ 1.5 ml/lit or profenophos 50EC @ 2ml/l in extreme cases.

If damage by semilooper reaches 15% then any contact insecticide such as Profenophos 50 EC @ 2 ml/litre, Fenvalerate 20EC @ 1.0 ml/litre or Cypermethrin 25EC @ 0.5 ml/litre may be applied. The insecticidal sprays need to be targeted towards the apical portion of the plant rather than covering the whole plant.



A. Mite infested crop at 30-35 days after sowing

B. Avoid water stress, maintain soil moisture and foliar spray of Fenpyroximate 5 EC @ 1.5 ml/litre or Spiromesifen 240 SC @ 0.7 ml/litre or Propargite 57 EC @ 2.5 ml / litre alternatively in rotation at 10 days interval



Different stages of stem rot (A)-leaf blight, (B) stem rot and (C) root rot: Apply foliar spray of Carbendazim @ 2g/litre at 20 days interval



Immediately remove the stagnant water due to heavy rainfall

Damaged caused by hailstorm. If damage is > 50-60% re-sowing may be done otherwise improve the field condition through inter cultural operation



2. Jute crop sown during April 11-25: Crop Age- 60-75 Days

- During excess rain due to 'Cyclonic Depression' or monsoon rain many fields may waterlogged that adversely affect crop growth and predispose the crop to stem rot/root rot. Remove excess water from field immediately by creating field ditches (20 cm wide and 20 cm depth) along the gradient at 10 m intervals and improve the field conditions.
- The fall in temperature during developmental stage with greater cloudy days may adversely affect vegetative growth. In case of slow growth, one foliar application of urea @2-4 % may be given (urea @2% by high volume sprayer or @4% by low volume sprayer)
- Infestation of hairy caterpillar after rain when the temperature and relative humidity raises may occurs. Eggs and young larvae are seen in cluster on the leaf surface. The pest spreads quickly and damage the leaves. Early monitoring to spot early infestation is required. Remove the egg masses and newly emerged larvae in bunch. Spray lambda cyhalothrin 5EC@ 1.5 ml/lit or profenophos 50EC @ 2ml/l in extreme cases.
- On the other hand if drought prevails mite infestation with the symptom of thickening and interveinal crinkling in the terminal young leaves which later turn coppery-brown. Avoid water stress and foliar spray of Fenpyroximate 5 EC @ 1.5 ml/litre or Spiromesifen 240 SC @ 0.7 ml/litre or Propargite 57 EC @ 2.5 ml / litre alternatively in rotation at 10 days interval if infestation persist beyond 10 days. In case of rain, wait for at least 5-6 days to initiate the Acaricide spray if symptoms initiates/persists
- Another insect, semilooper causes foliar damage in almost all the jute growing tracts. Slender, greenish larvae with light yellow head, narrow dark green dorsal lines are easily noticed when they crawl by producing a loop in the middle. The crop is most susceptible at 50-80 DAS. Damage starts in all cases from unopened leaves in upper part of the plant which represent the most susceptible portion. Damage is restricted to 9 fully opened leaves of the crop. The edges of the tender leaves are eaten, serrated, diagonal cuts occurs in apical leaves. Sometimes damaged stem induce branching. Whenever the damage by semilooper reaches 15% then any contact insecticide such as Profenophos 50 EC @2 ml/litre, Fenvalerate 20EC @ 1.0 ml/litre or Cypermethrin 25EC @ 0.5 ml/litre may be applied. The insecticidal sprays need to be targeted towards the apical portion of the plant rather than covering the whole plant.
- Under warm and humid condition leaf infection by *Macrophomina phaseolina* may occurs which ultimately infect the stem through petioles and leaf margin causing stem rot diseases. One protective foliar spray with Mancozeb @0.2% or Copper Oxychloride @ 0.3% may apply. Waterlogging may increase the stem rot infection, therefore, proper drainage is essential.



60-70 days old
crop at
different
places of
North and
South Bengal



Under warm humid condition leaf infection by *Macrophomina phaseolina* may occurs which ultimately causing stem rot diseases. Protective foliar spray with Mancozeb @0.2% or Copper Oxychloride @ 0.25% may apply at 20 days interval. Avoid waterlogging and improve drainage



Hairy caterpillar infestation with high temperature and humidity after rainfall. The pest spreads very quickly. Monitor to spot early infestation and remove the egg masses and newly emerged larvae in bunch. Spray lambda cyhalothrin 5EC @ 1.5 ml/lit or profenophos 50EC @ 2ml/l in extreme cases.

If damage by semilooper reaches 15% then any contact insecticide such as Profenophos 50 EC @2 ml/litre, Fenvalerate 20EC @ 1.0 ml/litre or Cypermethrin 25EC @ 0.5 ml/litre may be applied. The insecticidal sprays need to be targeted towards the apical portion of the plant rather than covering the whole plant.



- A. Mite infested crop at 30-35 days after sowing
- B. Avoid water stress, maintain soil moisture and foliar spray of Fenpyroximate 5 EC @ 1.5 ml/litre or Spiromesifen 240 SC @ 0.7 ml/litre or Propargite 57 EC @ 2.5 ml / litre alternatively in rotation at 10 days interval



Immediately remove the stagnant water due to heavy rainfall



3. Timely sown jute crop (March 25 to April 10): Crop Age: 75-90 Days

- Under warm and humid condition leaf infection by *Macrophomina phaseolina* may occurs which ultimately infect the stem through petioles and leaf margin causing stem rot disease. Foliar spray with systemic fungicide like Carbendazim @ 2 g/litre may apply at 20 days interval. Waterlogging may increase the stem rot/root rot, therefore, proper drainage is essential. Remove the affected plants and plant with lanky growth which do not add any effective fibre yield. Avoid jute - potato rotation and apply lime in acidic soil @2-4 ton/ha before sowing.
- Infestation of hairy caterpillar after rain when the temperature and relative humidity raises may occurs. Eggs and young larvae are seen in cluster on the leaf surface. The pest spreads quickly and damage the leaves. Early monitoring to spot early infestation is required. Remove the egg masses and newly emerged larvae in bunch. Spray Lambda Cyhalothrin 5EC@ 1ml/lit or Indoxacarb 14.5 SC@ 1.0 ml/litre in extreme cases.
- Another insect, semilooper causes foliar damage in almost all the jute growing tracts. Slender, greenish larvae with light yellow head, narrow dark green dorsal lines are easily noticed when they crawl by producing a loop in the middle. The crop is most susceptible at 50-80 DAS. Damage starts in all cases from unopened leaves in upper part of the plant which represent the most susceptible portion. Damage is restricted to 9 fully opened leaves of the crop. The edges of the tender leaves are eaten, serrated, diagonal cuts occurs in apical leaves. Sometimes damaged stem induce branching. Whenever the damage by semilooper reaches 15% then any contact insecticide such as Profenophos 50 EC @2 ml/litre, Fenvalerate 20EC @ 1.0 ml/litre or Cypermethrin 25EC @ 0.5 ml/litre may be applied. The insecticidal sprays need to be targeted towards the apical portion of the plant rather than covering the whole plant.
- Under emergency condition when removal of stagnant water from low land jute field is not possible and the crop is 80-90 days old, famers may harvest the crop to realize 50-60 % of normal fibre yield. This exceptional practice may partly meet his investment on jute cultivation.



80-90 days old crop



Harvesting of 80-90 days old crop where removal of stagnant water is not possible under low land condition.

Integrated approach of control from next seasons: (a) application of lime in acidic soil @2-4 ton /ha (b) avoid Potato – Jute sequence (c) seed treatment with Carbendazim @2g/kg or *Trichoderma* @10g/kg seed (d) avoid water logging in the field (e) at initial stage foliar spray of carbendazim @ 2g/litre

III. Agro-Advisory for Allied Fibres

A) SUNNHEMP



1. Those who sown the crop in between May 11-25: (crop age- 30-40 days)

- Under water stress, one light irrigation is advocated. On the other hand if heavy rainfall occurs, immediate removal of water through proper drainage is required.
- One hand weeding after irrigation is required at 25 days after sowing for better growth and maintain plant population (55-60 plant/square meter).
- Under drought stress, flea beetle infestation may occurs which feeds on the leaves making small holes. Farmers to be vigilant on the infestation of hair caterpillar, if substantial infestation observed, spraying of Chloropyriphos 20EC @ 2ml/litre or any Neem based formulations @ 3-4ml /litre is recommended.



40 days old sunnhemp crop



Flea beetle infested crop



Wheel hoe for weed control and soil mulching of the crop of early stage 30 DAS

2. Sunnhemp crop sown between April 26-May 10: (crop age 45-55 Days)

- The farmers are advised to be vigilant on leaf curl and phyllody infection. If infection observed, uprooting and burning of heavily infected plants followed by spraying of Imidacloprid 17.8 SL @ 0.5-1ml/lit is recommended to minimise vector population.
- If dry condition persists flea beetle infestation may occurs which feeds on the leaves making small holes. Farmers are also advised to be vigilant on the infestation of hair caterpillar, if substantial infestation observed, spraying of Chloropyriphos 20EC @ 2ml/litre any Neem based formulations @ 3-4ml /litre is recommended
- Under extreme heat condition one irrigation is recommended



40-50 days old sunnhemp crop



Spraying in Flea beetle infested crop



Hairy caterpillar infested crop

3. Farmers sown the crop in Mid-April (Crop age: 55-65 days)

- Farmers are advised to be vigilant on the infestation of hairy caterpillar, if substantial infestation observed, spraying of chloropyriphos 20EC @ 2ml/litre any neem based formulations @ 3-4ml /litre is recommended.
- If drought condition persist and there is no likelihood of immediate rain one light irrigation may be provided.
- If waterlogging happens due to heavy rain, drain out the excess water immediately.
- There may be incidence of viral diseases like leaf curl and sunnhemp mosaic. Affected plant may be removed and destroy to prevent the further spread of the disease



55-60 Days old crop



Crop affected by vascular wilt



Spraying in hairy caterpillar infested crop

B) Mesta



Kenaf



Roselle

1. Those who has not yet sown the crop

- Farmers are suggested to go for land preparation and the sowing process of Mesta (Roselle and Kenaf) immediately. For Roselle, Variety like AMV-5, MT-150 and HS-4288 and for Kenaf variety like JRM-3 (Sneha) and JBM 81 (Shakti) should be used to get good yield. The seed should be treated with carbendazim @2g kg⁻¹ seed at least 4 hours before sowing.
- Seed Rate for Broadcasting should be 15 kg ha⁻¹ and 12 kg ha⁻¹ for Line sowing. Line sowing should be at spacing of 30 x 10 cm and at a depth of 2-3 cm to obtain desired plant population. 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.
- The recommended fertilizer for rainfed conditions is N:P₂O₅:K₂O::40:20:20 kg ha⁻¹ and N:P₂O₅:K₂O::60:30:30 kg ha⁻¹ under irrigated conditions. Nitrogenous fertilizer needs to be applied in 2-3 spilt dose. However, phosphorus and potash should be applied as basal along with 5t FYM/ha. Farmers can also refer Soil Health Card for actual NPK requirement as per their soil test report.
- Under rainfed conditions, pre emergence application of Butachlor 50% EC @ 4 ml/Litre water after 24-48 hrs of sowing to control weeds and pre emergence application of Pretilachlore 50 EC @ 3 ml/Litre water after 40-48 hrs of sowing to control weeds under irrigated conditions and spray solution of 500-600 litres water/ha is necessary.
- For crop insurance strip cropping (4:4) of mesta/roselle with ground nut, blackgram and maize are advocated



Land preparation and basal dose of NPK for mesta cultivation



Seed treatment with Carbendazim (1g per kg seed), at least 4 hours before



Open furrows developed by nine tyne cultivators for rainfed sowing for *in situ* soil water conservation

2. Sowing of mesta within First week of June (crop age 15-20 days)

- In broadcast mesta, CRIJAF Herbicide Applicator can be used for simultaneous weeding, thinning and line making using Glufosinate ammonium 13.5% (Sweep Power 6ml/Litre at 10-15 DAS).
- In line sown crop, spray Quizalofop Ethyl 5% EC or 10% EC @ 1.0ml or 0.7 ml/ litre at 10 days after sowing (DAS) followed by one manual weeding. For established weed control, use scrapper of CRIJAF Nail weeder at 10-15 DAS.
- If heavy rainfall occurs, proper drainage is essential for proper growth and seedling disease management.



Weeding in mesta field

3. Sowing of mesta in mid May (crop age 30-45 days)

- For grass weed control spray Quizalofop ethyl 5% EC @ 0.1% follow by one hand weeding. To remove established weeds operate CRIJAF nail weeder with scrapper or single wheel jute weeder. After weeding second top dressing of nitrogen @ 20kg/ha to be applied.
- Under warm and humid condition foot and stem rot may occurs which spread very fast with high rainfall. Avoid waterlogging and improve drainage. Spray Copper oxychloride 50% @ 4-5g/litre towards the basal region of the plant.
- Similarly, phoma leaf blight is a common disease which affect the leaf from margin and progress inwards. Under humid condition the disease spread fast and defoliate the plant. If substantial infection (>5%) is noticed spray Copper oxychloride 50% @ 4-5g/litre or Mancozeb @ 2g/litre.



40-50 days old crop



Foot and stem rot



Phoma leaf blight of mesta

C) 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.

Primary Nursery

- Generally bulbils are collected between March and May every year which varies from species to species and location. The collected bulbils after grading are planted in primary nursery having dimension of 1m width and length as per convenient considering the slope with spacing of 10cm x 7cm with escapement of 30cm x 30cm in the field.
- The mulching may be provided to check the weed growth and to reduce the water requirement resulting proper growth and development of desired suckers in nursery for planting in main field.
- Application of metolachlor @ 0.5 kg/ha at 1 DBP can control the weeds followed by 1 hand weeding will be helpful to keep the nursery weedy free for production of quality planting materials.

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.



Harvesting of leaves (A), fibre extraction (B), collection of bulbil and raising of primary nursery (C) and Spraying of Copper Oxochloride @ 2-3 g/litre water to control Zebra disease of sisal (D)

Maintenance of New Sisal Plantation

- Weeding should be taken up 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 should be taken up immediately for optimum growth and yield. NPK @60:30:60 kg/ha should be applied by making ring around the sisal plant at least in the first year of plantation after onset of monsoon.

Sisal plantation in the Main field

- Farmers who have not prepared main field for sisal plantation till now, may go for field preparation without delay selecting well drained 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/ha are required. However, planting can also be taken at spacing of 3.0 m + 1m × 1m under adverse situation with plant population of 5000/ha.
- 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.
- After onset of monsoon, 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/ litre of water for 20 minutes. Suckers should be planted in a hole made in the center of the pits. 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. Furthermore, 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. 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.
- 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.

Harvesting of Sisal Leaves

- Harvesting of leaves 3 years after plantation and in the 1st cutting, leaving 16 leaves, all leaves should be harvested whereas in the subsequent cutting 12 leaves are left. Farmers who have not harvested the leaves yet, can take up harvesting and extraction in afternoon hours and it should be completed immediately. Spraying of Copper Oxychloride @ 2-3 g/litre water may be taken up against disease infestation after harvesting of leaves. Extracted fibre after cleaning and drying should be bailed and stored properly.

Intercropping in sisal plantation for additional income

- Green manuring with sunnhemp in interspace of sisal may be taken up to improve the production and productivity of base crop sisal as well as to reduce the expenditure on fertilizer. Vegetable like cowpea can be taken as intercrop in the trellis system using sisal poles for additional income. Removal of sucker from banana crop raised in interspace of sisal and application of fertilizer to banana crop for better growth.



Intercropping 1. Sunnhemp 2. Banana 3. Cowpea

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

D) RAMIE



- As per forecast, medium to heavy/ thunder showers are very likely to occur in Assam (Barpeta district) , therefore, provision of draining out of rain water is very much essential as the crop is very sensitive to waterlogging.
- Timely harvesting of ramie crop is most important operation, which is to be done after every 45-60 days old plant. Stem colour turns green to brown beyond this period, which is indication of over maturity of fibre and poor quality as well. Ramie farmers must be attentive to avoid this situation.
- Stage back operation is recommended in old plantation for uniform crop stand and followed by application of recommended dose of fertilizers i.e. 30-15-15 kg/ha of NPK.
- For new plantation gap filling may be done if uniformity in crop stand is not achieved.
- Application of Quizalofop Ethyl 5% EC @ 40 g a.i./ha significantly reduces all grassy weeds. Application should be based on intensity of weeds more especially grassy weeds.
- Insect pests like Indian red admiral caterpillar, Hairy caterpillar, Lady bird beetle, Termites, Leaf beetle and Leaf roller may be seen in the field. Based on the incidence of these pests spraying of 0.04% Chlorpyrifos is recommended.
- Diseases like Cercospora leaf spot, Sclerotium rot, Anthracnose leaf spot, Damping off and yellow mosaic may be seen during these times. Based on the occurrence of these diseases foliar spraying of fungicides such as Mancozeb @2.5 ml/litre or Propiconazole @1 ml/litre is recommended.



Planting of rhizomes



New ramie plantation



Harvesting of ramie crop



Defoliation of leaves after harvesting



Ramie fibre extraction



Drying of extracted fibre after extraction (ungummed)



Water Harvesting for In-situ Retting and Sustainable Eco-farming

- ❖ 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.

Completion of retting pond before monsoon:

- ❖ To overcome the problems of insufficient retting water at harvesting time, farmers are advised to complete the preparation of in-situ retting tank before rainy season i.e. June in the lower most corner of the field so that rain water which goes as runoff (30-40% of the rainfall amounting around 1200-2000 mm) can be harvested and used for retting and make jute and mesta farming more profitable.

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 losing 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.

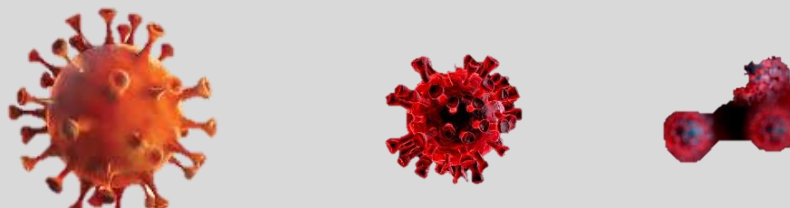


In-situ Jute Retting Tank based Self Reliant Eco-farming System

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

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

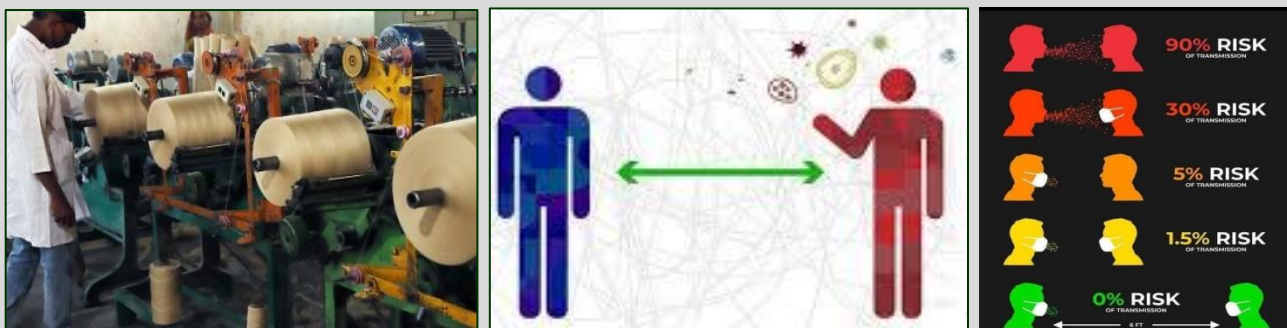
IV. Safety and Preventive Measures to be Taken to Prevent Spread of COVID-19 Virus



- 1) Farmers should follow physical 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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