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Jaf News

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FROM THE DIRECTOR'S DESK

In the back drop of global warming, climate change and competition from synthetic fibres, jute cultivation is going to be very challenging. These challenges always create opportunities for developing technologies through strategic and anticipatory research. It's very important to incorporate specific traits to develop the jute varieties more resilient to aberrations created by extreme weather condition. Besides it is time to enhance the carbon sequestration capacity through specific cultivar to make it a greener crop as an environment cleaner. The genome sequence information would pave the way for breeding new varieties in such desired direction. It is very important to make concerted and sustained efforts to promote the technologies for proper resource utilization, weed management, retting and farm mechanization. Along with the existing promotional activities taken up through extension centers, MGMG and Jute ICARE programme, the establishment of KVK II (North 24 Parganas) of the Institute give new thrust to extension programmes. At this juncture, special impetus is needed to enhance the income of jute farmers through promoting low cost technologies for jute cultivation which the Institute has prioritized in its future programme.

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Foundation Stone Laying of CRIJAF - Krishi Vigyan Kendra in North 24 Parganas

Hon'ble Union Minister of Agriculture and Farmers'Welfare, Sri Radha Mohan Singh unveiled the foundation stone of Krishi

Sri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare unveiling the foundation stone of KVK

Vigyan Kendra-II of North 24 Parganas district in the North Farm premises of ICAR-CRIJAF, Barrackpore on 13 February, 2017. The hon'ble minister also inaugurated the exhibition stalls of ICAR institutes and KVKs in the main campus of the institute. In his address, Sri Radha Mohan Singh greeted the gathering and said that the prime objective of KVKs is two-way interaction between the agricultural scientists and the farmers. Establishment of one more KVK in North 24 Parganas district will play important role for upliftment of the livelihood of the farmers. He also appealed farmers to actively involve in all development programmes like Soil Health Card Mission, Pradhan Mantri Fasal Beema Yojana and E-NAM. He reiterated that ICAR schemes like Mera Gaon Mera Gaurav (MGMG), Farmers' First, Oilseeds and Pulses

Sri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare addressing the farmers at ICAR-CRIJAF

Demonstration launched by Govt. of India will benefit the farmers. Dr Ashok Kumar Singh, DDG (Agril. Extension), Dr. Jiban Mitra, Director, ICAR-CRIJAF, Dr. S.K. Roy, Director, ICAR-ATARI (Kolkata) and Directors of other ICAR Institutes of Kolkata also participated in the programme.

Visit of Dr. J.S. Sandhu, Deputy Director General (Crop Science), ICAR, New Delhi

Dr. J.S. Sandhu, DDG (CS) visited ICAR-CRIJAF on 19 June, 2017. He addressed the scientists of the institute and underlined the issues like diversification of agriculture with inclusion of pulses, large scale production of microbial retting consortium - CRIJAF Sona at CRIJAF in PPP model, economic analysis of different technologies including farm machineries developed by the institute, submission of details technologies to DAC for wide popularization, diversified uses of jute, state specific strategies etc.

Dr. J.S. Sandhu, Deputy Director General (Crop Science) is interacting with scientists and staffs

Celebration of National Productivity Week

National Productivity Week (12-18 February, 2017) was celebrated at ICAR-CRIJAF on the theme 'From Waste to Produce through Reduce, Reuse and Recycle'. An essay competition was organised for the technical staffs, research fellows and young professionals of the Institute on 'Strategies for Small Scale Recycling and Reuse of Crop Products'. A panel discussion on 'Recycling and Waste Utilization of Fibre Crops' was organized involving multiple stakeholders including expert scientists from ICAR-CRIJAF, ICAR-NIRJAFT, representative from National Jute Board, Jute Industry, NGOs and progressive farmers.

Successful participants of essay competition being awarded by the Guest

Celebration of Foundation Day of ICAR-CRIJAF

The 65th Foundation Day of the Institute was celebrated on 9 February, 2017. Commemorative cake of Foundation Day was cut by Director, Dr. J. Mitra. He greeted all the staffs and their family members in this special occasion. Director, HoDs and other senior officials deliberated on the achievements and golden history of the Institute. The great contributions of retired scientists were also recalled. Sports and game competitions were organized among the staff and their family members and the winners were awarded with prizes.

Cake cutting by the Director, ICAR-CRIJAF during Foundation Day

Awarding the winners of sports and game competitions

Seed Day

Seed day was organized on 15 March, 2017 at ICAR-CRIJAF, Barrackpore with an aim to create awareness among farmers regarding quality seeds. On that occasion 550 kg of TL jute seed (JRO 204, 220 kg; S 19, 110 kg; JRO 524, 55kg; CO 58, 110 kg and Ira, 55 kg) produced under ICAR seed project were distributed among 110 farmers of MGMG programme implemented by ICAR-CRIJAF. Total 200 farmers participated in this programme.

Director, ICAR-CRIJAF addressing the farmers

Training on Skill Enhancement for Production and Processing of Fibre Crops

Training programme for technical staffs was organized at ICAR-CRIJAF on "Skill Enhancement for Production and Processing of Fibre Crops" during 17-23 January, 2017 by Dr. Mukesh Kumar, training coordinator. A total of 15 technical staffs were trained on various aspects of jute and allied fibre production and fibre processing.

Dr. P. G. Karmakar giving welcome address

Training on Computer Application Skill Enhancement

This training was organized during 16-18 March, 2017 for skilled support staff. 11 skilled support staffs participated in the hands-on training on fundamentals of computer system including hardware and software, introduction on networking system with emphasis on internet and local area network, creation of mail accounts using free electronic mailing system, use of Microsoft Office specifically Microsoft Word and Power Point; using ICAR and CRIJAF websites;

Director, ICAR-CRIJAF interacting with the participants of the training

operation of MISFMS portal to apply leave and generation of pay slips. Dr. Asim Kumar Chakraborty and Dr. Dhananjay Barman were the course coordinator and co-coordinator, respectively.

Training on Production Technologies for Jute

State level officers' training on "Improved jute production technology" under NFSM Commercial Crops (Jute) was organized on 27-28 January, 2017 at ICAR-CRIJAF. About 20 state level officers participated in the training programme. Another national level training on "Improved jute production technology" was organized on 7-9 February, 2017 at ICAR CRIJAF with 25 officials from various jute growing states.

Participants during the training programme

Trainers' Training on Improved Production Technology of Jute

Trainers' training on "Improved production technology of jute" was organized at ICAR-CRIJAF on 27-28 February and 8-9 March, 2017 in collaboration with National Jute Board and Jute Corporation of India for effective implementation of Jute ICARE programme in various jute growing states. 25 participants from various states participated in the programme.

The participants and resource persons during group photo session

Institute Research Council (IRC) Meeting

The Institute Research Council (IRC) meeting (2016-17) was conducted under the chairmanship of the Director, ICAR-CRIJAF to review the proposal of new projects as well as progress of the on-going in-house projects and achievements of externally funded research projects during 10-11 April, 2017. Director ICAR-CRIJAF complimented Dr. A.B. Mandal and Dr. A.K. Singh for getting two externally funded projects and requested the scientists to persue for externally funded projects. He also complimented the scientists for their commendable achievements and transfer of technologies especially in Jute ICARE programme. Dr. S.K. Sarkar, Pr. Scientist and In-Charge, PME Cell co-ordinated the meeting.

Presentation of research projects during IRC meeting

International Women's Day

In the occasion of 'International Women's Day' a training programme for empowering farm women was organized during 7–10 March, 2017 at ICAR-CRIJAF, Barrackpore.

Participants of International Women's Day-2017

The training was on "Value addition of jute fabrics for making decorative, fancy jute bags for entrepreneurship development" with the objective to improve the economic condition of farm women through skill improvement and formation of self-help groups. 20 farm women from Nadia district participated in this residential training programme.

Field Day at CSRSJAF, BudBud

Field Day was organized under TSP of NSP (Crops) at CSRSJAF, BudBud on 3 March, 2017. The tribal farmers (100 in number) from the districts of Burdwan and Bankura attended the field day. The technique of quality seed production and seed processing was demonstrated and deliberated during the field day.

Field visit of farmers at CSRSJAF, Bud Bud

Celebration of Hindi Workshop

The Hindi Cell of ICAR-CRIJAF, Barrackpore organized one day Hindi Workshop on 20 June, 2017 with major objectives to reduce the inertness among the employees to use Hindi in day to day official work. The Director, Dr. J. Mitra chaired the inaugural session of the workshop. Dr. Ramesh Mohan, Hindi Professor (Hindi Education Programme), MoH, Nizam Palace, Kolkata deliberated on Rajbhasha policies, rules, grammer etc. Dr. S.K. Pandey, Scientist In-Charge, Hindi Cell and Mr. Manoj Kumar, Assistant co-ordinated the programme.

Hindi workshop is in progress

Institute Management Committee (IMC) Meeting

The 33rd Institute Management Committee (IMC) meeting of ICAR-CRIJAF was held on 6 June, 2017 at Barrackpore. Sh.

Dr. Jiban Mitra, Director, Chairing the IMC meeting

Dr. S. Mitra, Pr. Scientist, presenting the research achievements during IMC meeting

Rajib Lal, CAO & member secretary welcomed Dr. Jiban Mitra, Chairman, IMC & Director, ICAR-CRIJAF and other members of the committee including farmer's representative. Various issues like purchase of equipment, minor works etc. were discussed in the meeting.

Celebration of *Swachh Bharat Pakhwada* in MGMG Adopted Village

Awareness programme on *Swachh Bharat Pakhwada* was organized on 20 May, 2017 among the jute farmers of MGMG adopted village at Goaldah in Swarupnagar block of North 24 Parganas district. About 60 farmers of Goaldah and nearby villages participated in the programme. Scientists of ICAR-CRIJAF emphasised about general cleanliness by the villagers and farmers, awareness of cleanliness among the students and children of the villages, educated the farmers about Good Agricultural Practices (GAP) or clean agricultural systems and also advised for mental cleanliness which not only creates a better human society but also helps one to work more efficiently to reach higher goal.

MGMG farmers participating in *Swachh Bharat Pakhwada*

Awareness about *Swachha Bharat* among the school students

Celebration of *Swachh Bharat Pakhwada* at the Institute

As per directives of Government of India, "*Swachh Bharat Pakhwada*" was organised at ICAR-CRIJAF, Barrackpore during 16-31 May, 2017. The campaign started with '*Swachhta Pledge*' to all the staff members administered by the Director. Various cleaning operations/programmes at institute including staff quarters premises, yoga therapy, quiz etc. were organised in well planned manner under the directives of Dr. S. Satpathy, Chairman, *Swachh Bharat Aviyan* Committee. The programme was co-ordinated by Dr. R.K. Naik, Sr. Scientist and In-Charge Estate and Maintenance Cell. Similar programme was also organised at sub-stations as well as Krishi Vigyan Kendra, North 24-Parganas.

Swachhta pledge administered by Director, ICAR-CRIJAF

Cleaning operation in main gate of Institute

Cleaning operation in laboratory

Trainers' Training-cum-Demonstration Programme on Improved Retting Technology of Jute

A trainers' training-cum-demonstration programme was organized at ICAR-CRIJAF, Barrackpore on 28 June, 2017. The training programme was sponsored under Jute ICARE programme on Improved Retting Technology of Jute. 12 Block Supervisors, 24 Master Trainers, Deputy Marketing Manager and Marketing Manager of JCI from West Bengal, Assam, Odisha and Bihar participated in this programme. During the training programme, the participants were oriented about improved retting technology of jute using CRIJAF Sona. A film was also shown to the trainees on this aspect. Dr. B. Majumdar, Principal Scientist (Soil Science), Dr. M.L. Roy, Scientist (Agricultural Extension). Dr. S. Sarkar, Principal Scientist (Agronomy) and Dr. S.K. Jha, Principal Scientist (Agricultural Extension) coordinated in successful completion of the training.

Participants with resource persons during group photo session

Farmers' Training Programme on Improved Production Technologies of Jute

A farmers' training programme on "Improved Production Technologies of Jute" was organized at ICAR-CRIJAF, Barrackpore during 25-28 April, 2017. This training programme was sponsored under ATMA by Assistant Director of Agriculture and Convenor, FIAC Chapra block of Nadia district. 12 farmers of Chapra block with their ATM, KPS and ADA participated in this training. During the training programme the participants were oriented about different aspects of improved production technologies of jute. Improved retting exercises for producing quality fibre from jute, organic farming practices and climate resilient practices for jute-based cropping system and seed production of jute and importance of using certified seeds were highlighted.

The participants during the inaugural session of the training

Farmers' Training Programme on Improved Retting Technology of Jute

Training programme on 'Improved Retting Technology of Jute' was organized by KVK for the farmers of North 24 Parganas on 24 June, 2017. 24 farmers and farm women from Barasat I block of North 24 Parganas participated in this programme. The participants were trained about improved retting technology of jute using CRIJAF Sona. The training was coordinated by Dr. M. L. Roy, In-Charge KVK and Dr. B. Majumdar, Principal Scientist (Soil Science) acted as resource persons. Packets of CRIJAF Sona formulation were distributed

Scientist delivering lecture during training

amongst the farmers. Trainees were also sensitized about Pradhan Mantri Fasal Bima Yojana (PMFBY), Pradhan Mantri Krishi Sinchai Yojana (PMKSY) and Swachh Bharat Mission.

International Yoga Day, 2017

'International Yoga Day' was celebrated on 21 June, 2017 at ICAR-CRIJAF. Sh. Anup Kumar Chakraborty, disciple of Yogaguru Baba Ramdev, trained the staff members about various *asanas* as well as *pranayamas* with their merits as

well as precautions. About 125 staff members participated in the programme.

Practicing yoga during International Yoga Day

Celebration of Republic Day

The Republic Day was celebrated in the campus of ICAR-CRIJAF with full enthusiasm. Dr. P.G. Karmakar hoisted the National Flag in front of the administrative building of the Institute followed by National Anthem. The Director and other staff members addressed the gathering and highlighted the importance of democracy. The Director also emphasised to maintain the rich heritage of the Institute and disburse the responsibilities towards the farmers in right manner.

Flag hosting by Director, ICAR-CRIJAF during Republic Day

29th Annual Workshop of AINP-JAF, 2017

The 29th Annual Workshop of All India Network Project on Jute and Allied Fibres (AINPJAF) was held (10-11 March, 2017) at ICAR-National Institute for Jute and Allied Fibre Technology, Kolkata. Dr. R.K. Singh, ADG (Commercial Crops), ICAR, New Delhi inaugurated the workshop as the chief guest and also chaired the Variety Release Committee. Dr. Jiban Mitra, Director ICAR-CRIJAF, Barrackpore welcomed the guests and participants. He emphasised for better execution of the projects to enhance the efficiency. Dr. A.N. Roy, Director, ICAR-NIRJAFT was also present in the inaugural session and stated the importance of fibre quality estimation.

Inaugural address by ADG (CC), ICAR During AINP workshop

Director, ICAR-CRIJAF addressing the delegates in AINP workshop

Jute and Allied Fibre Varieties Released and Notified in 2017

Tossa jute

BCCO 6 (Kisan Pat): Developed through pure line selection from an exotic accession OEX-05 by the AINP unit of BCKV, Kalyani (W.B.). It is recommended for entire *tossa* jute growing

BCCO-6 (Kisan Pat)

states for sowing in 2nd fortnight of April to May. Coppery red stem colour variety with average yield potential of 28.35 q/ha. Improved quality in terms of both fibre tenacity (21.18 g/tex) and fineness (2.81 tex).

KRO 4 (Gouranga)

KRO 4 (Gouranga): Green stem colour variety developed by crossing OIM-028 with JBO 2003H followed by pedigree selection at ZARS, Krishnanagar, Nadia, Directorate of Agriculture, Govt. of West Bengal. Adapted to entire *tossa* jute growing states especially, West Bengal, Assam, Bihar and Odisha for mid-March to mid-May sowing. A High yielding variety with average yield potential of 29.61 q/ha. It has field resistance to stem rot disease and major insect pests.

White jute

AAUCJ 2 (Kkhyati): A white jute variety with green stem evolved by crossing CEX-045 with CEX-050 followed by modified bulk pedigree method of breeding at RARS, Nagaon under AAU Jorhat. High yielding (27.95 q/ha) variety with 3.60 metre plant height and better tolerance to semilooper, yellow mite and stem rot of jute. Specifically adapted to Assam state but also thrives well in other white jute growing states i.e. West Bengal, Odisha and Uttar Pradesh.

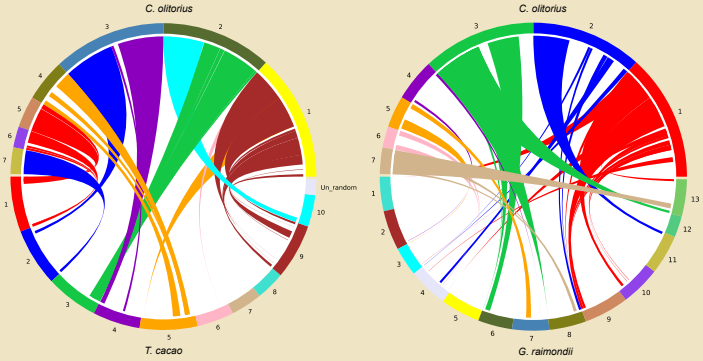
AAUCJ 2 (Kkhyati)

Sabyasachi Mitra and Surendra Kumar Pandey
AINP-JAF, ICAR-CRIJAF, Barrackpore

Whole Genome Sequencing of a Leading Indian *tossa* Jute Variety JRO 524

Scientists at ICAR-CRIJAF and ICAR- NRCPB, New Delhi have decoded the whole genome sequence (WGS) of a leading Indian *tossa* jute variety JRO 524, popularly known as 'Navin'.

The draft genome of JRO 524 resolved into 377.4 Mbp, with a *K*-mer-estimated genome size of 415 Mbp and 57,087 protein-coding genes predicted *ab initio*. Recent gene prediction using evidence from RNA-seq alignments as intron hints predicted a total of 47,434 protein-coding genes. In this *tossa* jute genome, ~50 % of repeat elements were found to be masked, which is much higher than that reported in its closest genome of cocoa (25.7 %). It was characterized further by much higher proportion of retro-transposons (45.7 %) than DNA transposons (5.5 %), which perhaps explains the wide spectrum of intraspecific genome size variation in *tossa* jute. *Tossa* jute genome was found to have maximum syntenic relationship with cocoa (*Theobroma*



Synteny mapping of the JRO-524 *tossa* jute genome with those of cocoa and diploid cotton

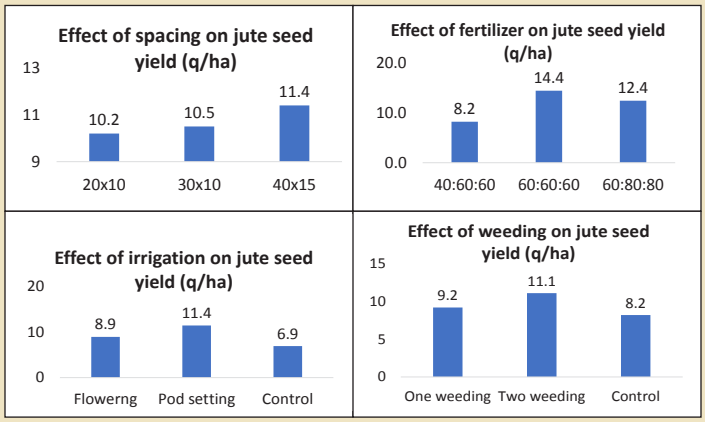
cacao) followed by diploid cotton (*Gossypium raimondii*).

The genome sequence information would aid in identifying genes controlling bast fibre quality traits (fibre fineness and tensile strength) and resistance to abiotic stresses, particularly drought and waterlogging (anoxia). Understanding the signal transduction pathways controlling anoxic stress responses in *tossa* jute, which is susceptible to waterlogging, remains one of the fundamental challenges for jute research.

D. Sarkar
ICAR-CRIJAF, Barrackpore

Agro-techniques for Jute Seed Production in Post-Monsoon Season

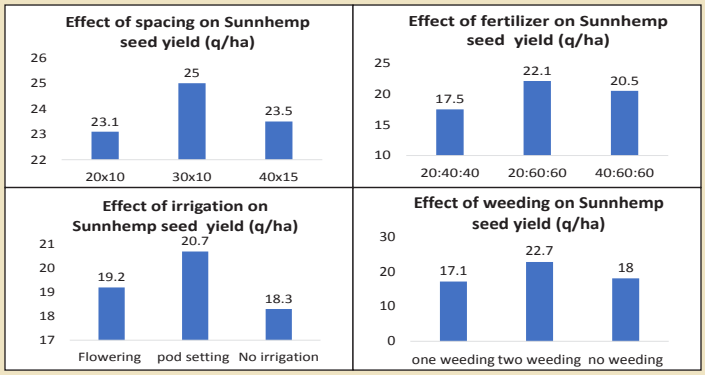
Effect of different agronomic practices like spacing, fertilizer, pesticide application, irrigation and weeding were tested in seed crop sown in the fourth week of September. The mean data of two seasons jute seed crop showed that higher spacing (40 cm x 15 cm) resulted in more seed yield (11.4 q/ha) than normal spacing (20 cm x 10 cm) of fibre crop (10.2 q/ha). Higher fertilizer dose (N:P:K:: 60:60:60) yielded significantly higher seed yield (14.4 q/ha) followed by NPK:: 60:80:80 (12.4 q/ha). Precisely this indicates that application of more nitrogen improves the growth and pod formation which translated into higher seed yield. Weeding significantly increased the seed yield (9.2-11.1 q/ha) than the control (8.2q/ha). Similarly one irrigation either at flowering or at pod setting resulted in more seed yield (9.8-11.4 q/ha) than control plot (6.9 q/ha). Application of carbendazim @ 0.1% at pod setting stage significantly improved the seed yield (10.1 q/ha) than control (8.3 q/ha). Application of fungicides reduced the disease incidence in seed and lowered the proportion of chaffy, discolored seeds. Although Mid-August is the ideal sowing time for seed crop, sowing in the 4th week of September reduced the chances of re-sowing and crop failure due to heavy rainfall and enhances 7-11 q/ha seed yield.



S. K. Sarkar
ICAR-CRIJAF, Barrackpore

Agro-techniques for Sunnhemp Seed Production

Effect of agronomic practices like spacing (20 cm x 10cm, 30 cm x 10 cm and 40x15cm), fertilizer application (NPK:: 20:40:40, 20:60:60 and 40:60:60) irrigation (at flowering or pod maturation stage), weeding (one weeding at 25 DAS, two weedings at 25 DAS and 45-50 DAS) and application of pesticide (profenophos @ 0.1% at 60-70 DAS and fungicide, carbendazim 50 WP @ 0.1% at pod setting stage) were evaluated in sunnhemp seed crop sown in the first week of October at ICAR-CRIJAF Research Farm, Barrackpore. The mean data of two cosecutive seasons showed that seed crop sown at 30 cm x 10 cm recorded maximum seed yield (25.0 q/



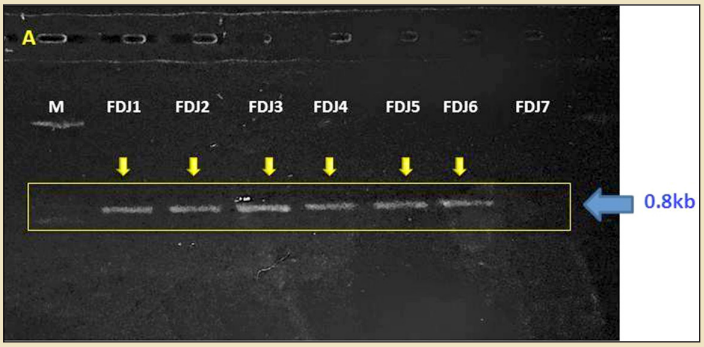
ha). Significant effect of higher fertilizer dose (NPK:: 20:60:60) was evidenced with maximum seed yield (22.1q/ha). Two weedings in seed crop significantly increased the seed yield (22.7 q/ha). Similarly one irrigation at pod setting resulted in more seed yield (20.7 q/ha) than control plot (18.3q/ha). Application of carbendazim 50 WP @ 0.1% at pod setting stage significantly improved the seed yield (24.8 q/ha), reduced discoloration and improved the germination and vigour. Seed production with above treatments enhanced the quality and seed productivity of sunnhemp (25 q/ha).

S. K. Sarkar
ICAR-CRIJAF, Barrackpore

In planta Floral-dip Transformation Protocol in Flax

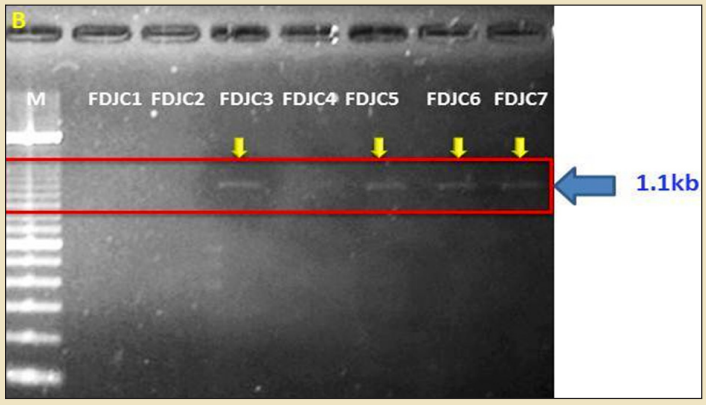
Through dispensing pBI121 for optimization and transfer of cry1A(b) gene for transgenic development via floral-dip transformation using Agrobacterium strain LBA4404 was undertaken. Primary inflorescence of flax (JRF2) was floral-dipped following modified protocol. The procedure was repeated in the succeeding day and the plants were maintained to seed maturity to raise succeeding generation for molecular analyses. After initial floral-dip transformation, the buds were analysed for transient expression of the transgene/s after 48h through GUS histochemical assay. Maximum buds displayed positive results, which confirmed transgene/s integration. Isolated DNA from buds showed appearance of PCR amplicons using compatible PCR confirmed successful introgression of the transgenes.

Different steps of floral-dip transformation, Legends: A. Buds dipped in IM containing Ag cells (O.D.$_{600}$, 0.5), B. Plants were tagged after floral-dip, C. Plants kept covered with black polyethylene bags O/N, D. Plants grown till maturity of the seeds, E. Matured plants with capsules derived from floral-dipped buds, F. Matured capsules, G. Threshed seeds



Legends: A. Lane1: Molecular 100 bp ruler, Lanes 2-8: PCR amplicon profiles for *npt II*. PCR amplification of *nptII* gene (0.8 kb) in pBI 121. 6 samples out of 7 showed corrected amplification

Differential GUS expression in floral parts of flax var. JRF2. Close-view of a single flower sowing distinct GUS stained reproductive parts



Legends: B. Lane 1: molecular 100 bp ruler, Lanes 2-8: PCR amplicon profile of *uid A*. PCR amplification of *uid A* gene (1.1kb) in pCAMBIA1301 harbouring cry1A(b). 4 out of 7 DNA samples showed correct amplification

A.B. Mandal
ICAR-CRIJAF, Barrackpore

Soil Quality in Jute Based Cropping Systems of West Bengal

Soil samples were collected from five years old jute based cropping systems *viz*., jute-rice-potato (J-R-P), jute-rice-onion (J-R-O), jute-rice-okra (J-R-Lf), jute-rice-mustard (J-R-M) from Hooghly district, jute-rice-coriander (J-R-Co), jute-rice-potato (J-R-P), jute-rice-mustard (J-R-M) and jute-rice-lentil (J-R-L) from North 24-Parganas district and jute-rice-mustard (J-R-M), jute-rice-lentil (J-R-L), jute-rice-garden pea (J-R-Gp) and jute-rice-wheat (J-R-W) from Nadia district for the study. Soils of Hooghly district recorded lower organic carbon (6.9 to 9.3 g kg^{-1}) and higher available nitrogen (300 to 385 kg ha^{-1}), phosphorus (148.4 to 188.4 kg ha^{-1}) and potassium (335 to 355 kg ha^{-1}) content as compared to Nadia and North 24-Parganas. Among all jute based cropping systems, J-R-P recorded highest organic carbon (14.1 g kg^{-1}) content followed by J-R-L (13.2 g kg^{-1}) in North 24- Parganas district and J-R-Gp (12.98 g kg^{-1}) of Nadia district. The soils of North 24-Parganas district recorded higher soil microbial biomass carbon (281.1 to 590.3 mg C g^{-1} oven dry soil) compared to Nadia (271.4 to 452.3 mg C g^{-1} oven dry soil) and Hooghly (191 to 295.1 mg C g^{-1} oven dry soil) district. Soils of Hooghly district recorded higher acid phosphatase activity while the soils of Nadia and North 24- Parganas districts recorded higher alkaline phosphatase, dehydrogenase, urease and FDHA in soil under different jute based cropping system. J-R-P, J-R-Co and J-R-Gp cropping systems can be recommended for maintaining soil quality and higher return respectively in Hooghly, North-24 Parganas and Nadia districts.

B. Majumdar, U.S. Manna, S. Biswas, Sonali P. Mazumdar
R. Saha and A.R. Saha
ICAR-CRIJAF, Barrackpore

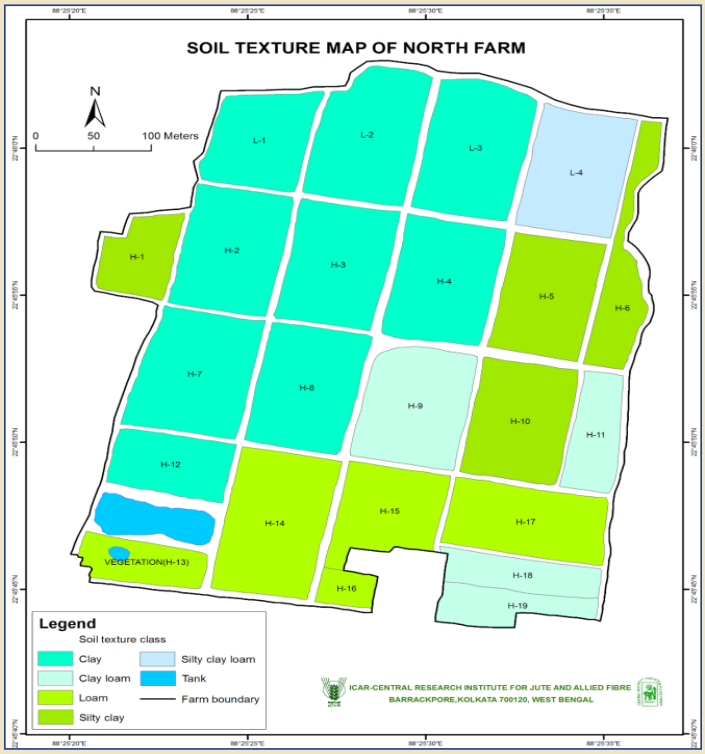
Effect of Sources of Nutrients on Soil Organic Carbon and Microbial Activity under Jute Based Cropping System

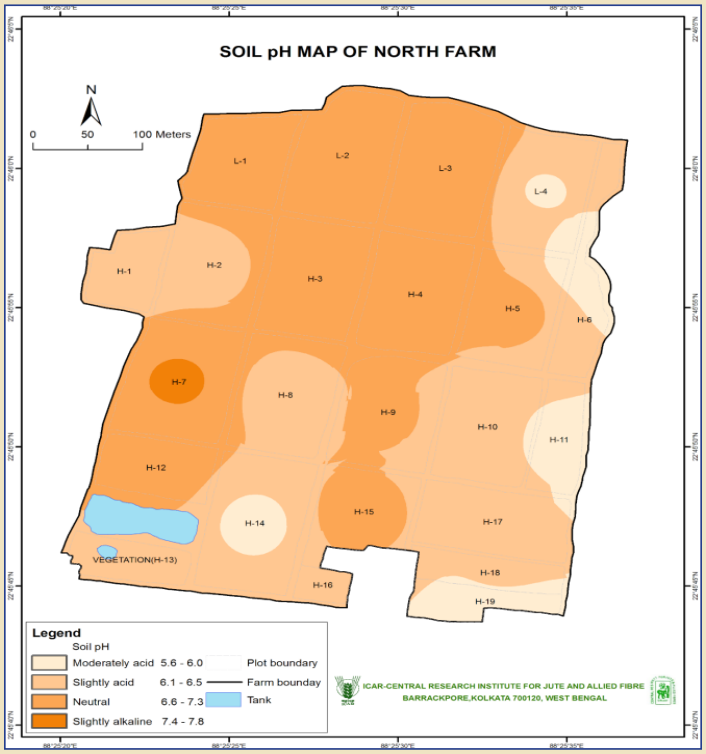
The effect of medium-term (6 years) application of organic and inorganic sources of nutrients on soil organic carbon (SOC), SOC stock, carbon (C) build-up rate, microbial and enzyme activities in jute-rice–lentil cropping system was tested on a sandy loam soil. Compared to the inorganic sources of plant nutrients, the application of farmyard manure (FYM) and combined application of FYM and bio-fertilizer improved the SOC content significantly ($p < 0.05$). The lowest ($p < 0.05$) SOC content (5.90 g kg^{-1} of soil) was observed in untreated control. The highest ($p < 0.05$) SOC stock (17.16 Mg C ha^{-1}) was observed in RDF with FYM and bio-fertilizer; followed by RDF with farmyard manure (FYM); (16.82 Mg C ha^{-1}). This finding is corroborated with the soil microbial biomass carbon content data having highest value in RDF with FYM and bio-fertilizer. The INM practice i.e. application of inorganic and organic sources of nutrients impacted soil enzyme activities significantly.

R. Saha, S.P. Mazumdar, A.R. Saha, D. Barman
Alka Paswan and B. Majumdar
ICAR-CRIJAF, Barrackpore

Study of Soil Profile and GIS Mapping of Surface Soil Properties at Farm Level for Jute and Allied Fibres Research

A detailed soil map of North Research Farm of ICAR- CRIJAF, Barrackpore was prepared by characterizing soil profile and generating spatial map of surface soil properties for jute growing alluvial soils. The study area of about 20 ha lies between 22°45'35"and 22°45'50" N, and 88°25'30" and 88°26'0" E. The study area comes under the sedimentary zone of the flood plain deposits of older alluvium and occurs above the level of present flood plains indicating that there have been differential movements between the Pleistocene and recent time. The differential relief is variable. There is a gentle slope from south to north direction. Physiographically the farm area is a part of the recent alluvial fans of Ganga riverine divided into alluvial plain medium land and alluvial plain low land. The main drainage channel is the *Nishuti Khal* that is flowing along the eastern side of the farm. Climate is warm and sub-humid. Five master soil profiles were identified by delineating its physiography, and studied up to 150 cm depth. For each soil profile, 6-8 distinct horizons were identified. The depth of the surface horizon was in general up to 13 cm and its OC ranged from 5.07 – 7.76 g/kg. Five textural classes were identified on surface soils such as clay, loam, silty clay, clay loam and silty clay loam. Surface spatial variability of the major soil factors was mapped using interpolation technique in GIS environment. This basic reference database would help to design and set up any type of experiment for agricultural research.





Spatial variability of soil texture and pH in CRIJAF North Farm.

D. Barman, Susanto Pal, and A.K. Chakraborty
ICAR-CRIJAF, Barrackpore

Infectivity of Entomopathogenic Fungal Bioagents on Yellow Mite

The infectivity of talc based formulation of 3 entomopathogens i.e., *Lecanicillium lecanii* (*Ll*), *Paecilomyces fumosoroseus (Pf)* and *Beauveria bassiana (Bb)* at $4X10^8$ CFU/l and $6X10^8$ CFU/l concentrations were evaluated against yellow mite under laboratory condition. In both the concentrations, *Pf* and *Bb* recorded significantly higher mortality of yellow mite than *Ll.* At 3-days post treatment (DPT) significantly highest mortality was observed in *Pf* (30.35%) followed by *Bb* (21.59%) and *Ll* (4.87%). Later on at 4 and 5-DPT period the level of mortality in *Pf* and *Bb* treated population was at par but significantly higher than *Ll*. At 5-DPT, *Pf* recorded maximum cumulative mortality (40.92%) at par with *Bb* (35.99%) and significantly higher than *Ll* (12.92%).

Post-treatment infection of entomopathogens on yellow mite of jute

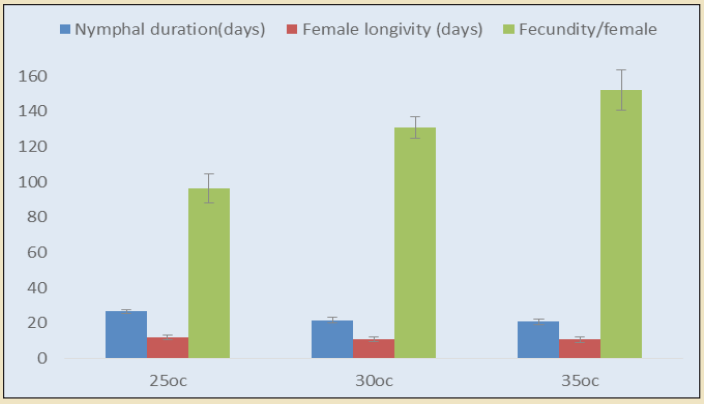
Bioagent	Mycosis/ mortality (%)								
	3-DPT			4-DPT			5-DPT		
	C1	C2	Mean	C1	C2	Mean	C1	C2	Mean
Bb	25.45	17.73	21.59^b	35.69	26.36	31.02^a	30.12	41.37	35.99^a
Ll	4.47	5.29	4.87^c	9.27	9.10	9.18^b	10.59	15.25	12.92^b
Pf	35.11	25.59	30.35^a	25.59	42.23	35.90^a	25.57	34.35	40.92^a
Mean	15.92^b	21.95^a		21.73^b	29.01^a		25.57^b	34.35^a	

Bb- *Beauveria bassiana*, Ll- *Lecanicillium lecanii*, Pf- *Paecilomyces fumosoroseus*, C1- $4X10^8$ CFU/l, C2- $6X10^8$ CFU/l

S. Satpathy, B.S. Gotyal and V. Ramesh Babu
ICAR-CRIJAF, Barrackpore

Effect of Temperature on Life Duration and Fecundity of Mealy Bug

The impact of variable temperature i.e., at 25, 30 and 35^{O}C on mealy bug, *Phenacoccus solenopsis* was studied under laboratory condition. There was significant reduction in nymphal duration with increase in temperature being 26.53±1.19, 21.69±1.40 and 20.73±1.70 days at 25, 30 and 35^{O}C respectively. The fecundity varied from 96.36-152.10 per female when reared at different temperature ranges. The female longevity varied from 10-12 days in this temperature range. The egg laying rate was significantly high (152.10/female) at 35^{0}C temperature and lowest (96.36/female) at 25^{0}C. With increase in temperature, although the fecundity was high, the overall population growth may not be proportional as the female longevity was significantly reduced at higher temperature.

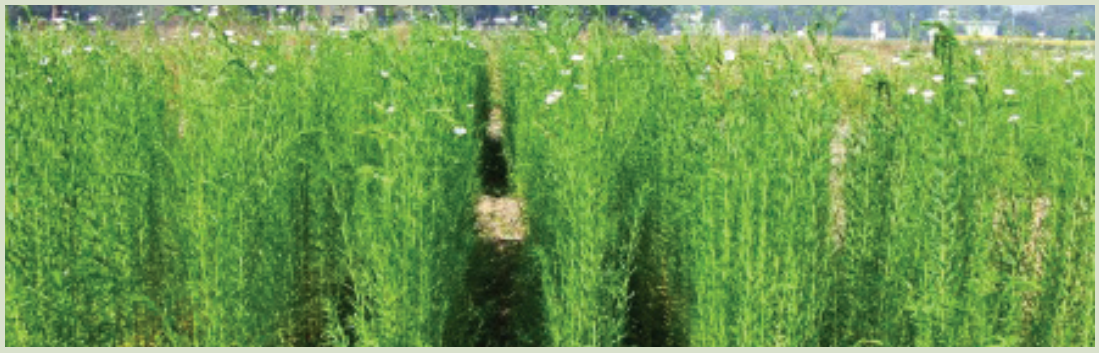


Life stage duration and fecundity of mealy bug at different temperature

S. Satpathy, B.S. Gotyal and V. Ramesh Babu
ICAR-CRIJAF, Barrackpore

Post-harvest Management of Flax

Generally fibre flax plants are harvested at the crop age of 100 - 120 days (at the yellow ripe stage of stem) by pulling manually from ground. The post-harvest operations for fibre extraction involves drying of straw, deseeding/rippling, sorting and bundling, retting, drying of retted straw, scutching and hackling. The scutching operation is the separation of the fibre from the straw and to clean and open. This is done by mild beating or scutching of retted and dried straw. ICAR-CRIJAF, Barrackpore has developed a machine for efficient extraction of flax fibre. The capacity of the machine is 5-6 kg fibre/h and can deal 140 kg of retted and dried straw in a day and produce 30-35 kg fibre. To extract fibre of one hectare it needs about 22 working days i.e. 44 man-days for its operation. The fibre extraction with the machine reduces drudgery and as well labour requirement. Scutching efficiency of this machine is more than the manual scutching machine. Flax fibre extraction with this machine was found economical and feasible. Dimension of the machine is 840 × 730 × 1120 mm (L x W x H) and weight is 158 kg.



Flax crop

CRIJAF Flax Fibre Extractor

R.K. Naik
ICAR-CRIJAF, Barrackpore

Cassava- A Miracle Crop for Providing Livelihood Security to Sisal Farmers

An experiment was conducted to evaluate the performance of cassava (*Manihat esculenta crantz)* as a filler crop in fruit-fibre system in sisal plantation at SRS, Bamra.

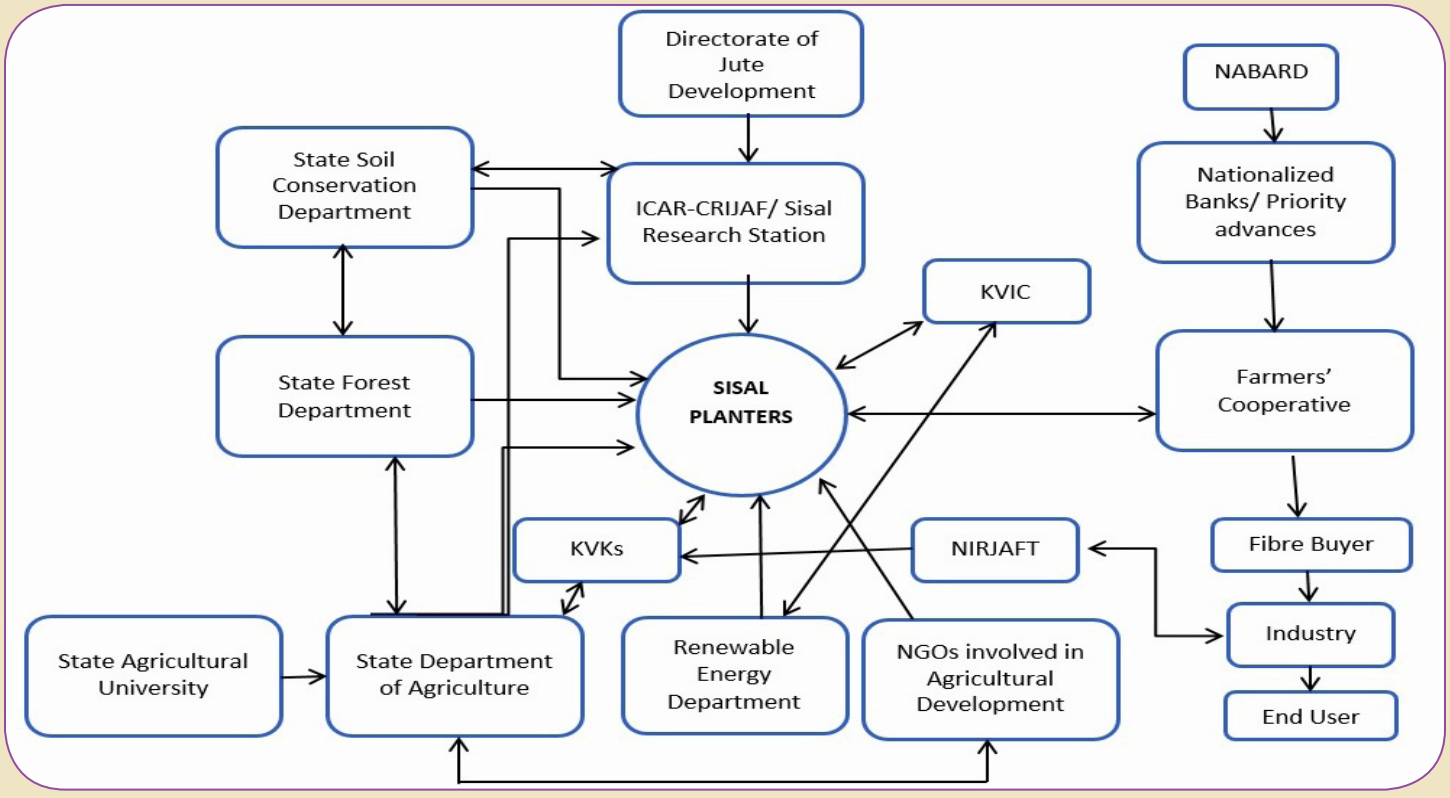
The crop was raised under high density planting with a

spacing of 75 cm x 75 cm between mango, sapota, custard apple and guava in double-rowed sisal plantation. The filler crop cassava had a positive impact on both sisal and growth attributing characters of fruit plants during pre-bearing stage. Tuber yield of 7.92 tons per hectare was recorded with an additional net profit of Rs. 8740 and benefit: cost ratio of 1.6 within a period of 6 months. This crop in fruit-fibre system has been proved commercially viable under rain-fed system in sisal plantations. The resource-poor sisal farmers can adopt cassava for additional income as it is also ideal for climate resiliency, multiple use and survival in marginal soil management condition.

M.S. Behera, D.K. Kundu and A.K. Jha
ICAR-CRIJAF, Barrackpore

Expansion of Sisal Area and Increase in Production through Effective Linkage among Institutions

There is an urgent need for revamping scenario of Indian sisal production system for enhanced productivity and make exportable surplus. Concerted efforts of institutions involved in sisal research, production, marketing and manufacturing



Schematic diagram of institutions and their interactions for expansion of sisal area

can sustain this sector. Sisal Research Station, Bamra is primary responsible for technology generation, extension of knowledge through training and demonstration to the TOT trainers from concerned line departments. Directorate of Jute Development (DJD) should emphasise on fund support for the promotional programmes in sisal. In this process of technology generation and extension, State Department of Agriculture has a major role to play. KVKs of the concerned districts should keep direct linkages among the planters, State Agriculture Department and Sisal Research Station for planting materials, training, motivation and extension of technical knowledge. KVKs also should be involved with the NGOs having objective of agricultural and rural development. State Department of Soil Conservation and Department of Forest may have a closer cooperation regarding expansion of sisal area.

KVIC (Renewable Energy Department and Organic Manure Programme) can contribute in proper biomass utilization of sisal for manuring and energy generation. A private industrial portal dedicated to sisal fibre (*www.sisal-fibre.com*) namely 'Indian Manufacturers and Exporters of Sisal Fibre' has been developed having registered office at New Delhi. The site is a platform for exchange of information among sisal fibre producers, manufacturers and exporters. The fund requirement for initial plantation establishment can be supported by appropriate schemes of NABARD and Nationalized Banks. Registered co-operatives/associations of sisal growers can give thrust to sisal marketing for better price and profit.

Sitangshu Sarkar, D.K. Kundu and A.K. Jha
ICAR-CRIJAF, Barrackpore

Barriers in Effective ICT Based Extension Services

ICT had penetrated in all walks of life, however, its use particularly by farmers to gain information on latest farming practices needs a boost. The analysis of barriers in penetration of ICT among rural farmers can help to accelerate the process of ICT based extension by addressing the reasons holding back the farmers from using ICT. The data was collected from Nadia, Hooghly, North 24 Parganas districts of West Bengal covering a total sample size of 120.

Low computer literacy (96.92%) was the highest indicated barrier followed by lack of training availability to learn about ICT (95.38%). Success of ICT is dependent on the knowledge of people on how to use devices and navigate the internet. Training of the farmers would definitely improve their knowledge and skills in using ICT and also develop confidence in them. Another major barrier indicated by farmers is lack of any privilege given to farmers to use ICT based extension services (92.3%) in terms of subsidies. Majority of the farmers had opined that the data charges for using internet were not affordable to them. The availability of low cost ICT gadgets along with rural broadband connectivity can make the farmers to access agricultural information by multiple ways at affordable cost.

Important barriers in ICT based extension

Barriers in effective ICT based extension services	Number	Percent
Individual barriers		
Lack of training availability to learn ICT	62	95.38
Lack of confidence to use ICT	55	84.61
Language barrier	48	73.84
Lack of skills to use ICT	44	67.69
Technological and policy barriers		
Lack of infrastructure development	48	73.84
Less availability of ICT in agriculture	39	60.00
Poor connectivity in rural areas	58	89.23
Low computer literacy	63	96.92
No privilege given to farmers to use ICT based extension contact	60	92.30

Shamna. A, A.K. Chakraborty, S. K. Jha and S. Kumar
ICAR-CRIJAF, Barrackpore

Constraints Analysis of Tribal Women in Agricultural Activities

Constraints faced by the tribal farm women of Makaltala and Farmania village, North 24 Parganas district were studied. The study was conducted on 60 farm women based on a structured questioner.

Lack of education (88.1 %) was the major constraint faced by tribal women followed by income insufficient (85.7 %), lack of child care facilities (83%) and lack of knowledge and skill (81%). Because of lack of education and lack of knowledge and skill the tribal women could not participate in farming activities which involves small machineries and implements and thus emerging as major constraints.

Constraints faced by tribal women in agricultural activities

Constraints	Frequency	Percentage
Lack of education	37	88.1
Income derived is too little	36	85.7
Lack of child care facilities	35	83.3
Lack of knowledge and skill	34	81.0
Lack of training	33	78.6
Doubts regarding the women capabilities	30	71.4
Loans are not sufficient	30	71.4
Family restriction a) husband b) elders	26	61.9
Partiality of government officials	26	61.9
Conflicts with other workers	24	57.1
Caste system in the village	23	54.8
Ego problems of men folk	20	47.6
Lack of freedom to take decision	18	42.9
Confining the role of women to household activities	17	40.5

Shamna, A, S. K. Jha and S. Kumar
ICAR-CRIJAF, Barrackpore

PUBLICATION

Research Papers

Barman, D., Kundu, D.K. Pal, Pal, S., Chakrabarty, S., Jha, A.K., Mazumdar, S.P., Saha, R. and Bhattacharyya, P. (2017). Soil temperature prediction from air temperature for alluvial soils in lower Indo-Gangetic plain. *International Agrophysics*. 31: 9-22. DOI: 10.1515/intag-2016-0034.

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Barman, D., Mazumdar, S.P., Shamna, A., Sarkar, S. and Majumadar, B. (Eds.) (2017). Improved Production Technology of Jute and Allied Fibres (In Bengali), ICAR-CRIJAF, Barrackpore, P. 53.

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Radio Talk

Dr. B. Majumdar, Principal Scientist participated as an expert in the "Khet khamarer Katha" programme for farming community of India and Bangladesh on a topic "*Pater Bhalo Falan O Unnoto Gunomaner Aansh*" broadcasted by the Maitree Channel of All India Radio, Kolkata on 15/05/2017.

COMMERCIALIZATION OF TECHNOLOGIES

MoU with M/s Next 2 Nature in presence of Director, ICAR-CRIJAF

- Non-exclusive license has been awarded to M/s Creative Displayer, Barrackpore for manufacture and sale of Single Wheel Jute Weeder for a period of 10 years w.e.f. 22 February, 2017.
- Firm M/s Next 2 Nature, Assam has been awarded the non-exclusive license for large scale production and sale of CRIJAF-SONA for a period of 10 years w.e.f. 25 February, 2017.

HUMAN RESOURCE DEVELOPMENT

Training/Meeting organised by ICAR-CRIJAF

Programme	Institute/ location	Date	No. of participants
'Skill enhancement for production and processing of fibre crops'	ICAR-CRIJAF, Barrackpore	17.1.2017 to 23.1.2017	20
State level officers training on improved jute production technology	ICAR- CRIJAF, Barrackpore	27.1.2017 to 28.1.2017	20
'Improved seed production technologies of sunnhemp' Trainers training programme on "Improved production technology of jute"	ICAR- CRIJAF, Barrackpore	27.2.2017 to 28.2.2017	29
National Level Training on improved production technology of jute and allied fibre crops	ICAR- CRIJAF, Barrackpore	7.2.2017 to 9.2.2017	25
Trainers' training on improved production technology of jute	ICAR- CRIJAF, Barrackpore	8.3.2017 to 9.3.2017	25
"Improved seed production technology of jute and allied fibres"	ICAR- CRIJAF, Barrackpore	16.3.2017 to 17.3.2017	25
"Computer Application Skill Enhancement of Skilled Supporting Staff of ICAR-CRIJAF"	ICAR- CRIJAF, Barrackpore	16.3.2017 to 18.3.2017	11
Training on "Maintenance and management of farm equipment" under Tribal Sub-Plan-TMJ.	ICAR-CRIJAF, Barrackpore	2.2.2017 to 4.2.2017	17
Field day on "Quality Seed Production of *Rabi* Crops under Tribal Support Programme of NSP (Crops)"	CSRSJAF, Bud Bud	3.3.2017	60

Seminar/Symposium/Conference/Workshop attended by the Scientists

Programme	Place	Name of the participant/s
International Symposium on "Eco-efficiency in Agriculture and Allied Research (EEAAR'17)"	BCKV, Kalyani 20-23 January, 2017	Dr. H.K. Sharma Dr. S.B. Chaudhary
2nd Workshop of Nodal Officers of ICAR Research Data Repository for Knowledge Management	ICAR-IASRI, New Delhi 24-25 January, 2017	A.K. Chakarborty
International Conference on "Bio-Resources, Environment and Agriculture Sciences".	Visva-Bharati, Santineketan 4-6 February, 2017	Dr. R. Saha Dr. A.K. Singh Dr. S.P. Mazumdar
National Conference on "Advances in Agriculture through Sustainable Technologies and Holistic Approaches".	International Centre, Goa 15-17 February, 2017	Dr. A.K. Singh
51st Annual Convention of ISAE and National Symposium on "Agricultural Engineering for Sustainable and Climate Smart Agriculture".	CAET, CCSHAU, Hisar 16-18 February, 2017	Dr. R.K. Naik
28th Technological Conference on "New Developments and Future Strategies for Jute Industry".	IJIRA, Kolkata 1 March, 2017	Dr. S. Datta
National Seminar on "Maximizing Fertilizer use Efficiency & Environmental Health for Posterity"	RKMVU, Narendrapur 8 March, 2017	Dr. D.K. Kundu, Dr. A.R. Saha, Dr. R. Saha & Dr. S.P. Mazumdar
29th Annual Workshop of All India Network Project on Jute and Allied Fibres (AINP on JAF)	ICAR-NIRJAFT, Kolkata 10-11 March, 2017	All Scientists of ICAR-CRIJAF
National Conference on "Enhancing Nutritional Security through Climate Smart Farming Practices".	RRS, UVKV, Kalimpong 17-18 March, 2017	Dr. S.K. Jha, Dr. B. Majumdar, Dr. R. Saha, Dr. R.K. De, Dr. M.S. Behera & Dr. R.K. Naik

International conference on "Contemporary Issues in Integrating Climate- The Emerging Area of Agriculture, Horticulture, Biodiversity, Forestry; Engineering Technology, Applied Science and Business Management for Sustainable Development" (AGROTECH-2017)	Kalimpong, West Bengal 11-12 May, 2017	Mr. H. Bhandari
National seminar on "Nutrients and Polutants in Soil-Plant-Animal-Human Continuum for Sustaining Soil, Food and Nutritional Security- way forward"	BCKV, Kalyani, WB 9-10 June, 2017	Dr. D.K. Kundu, Dr. A.R. Saha, Dr. R. Saha, Dr. M.S. Behera & Dr. A.K. Singh

Training undergone by the Scientists/Staff Members

Training Programme	Place & Date	Name of Participant
CAFT training programme on "Computational Approches for Next Generation Sequencing (NGS) Data Analysis in Agriculture"	ICAR-IASRI, New Delhi 8-28 February, 2017	Dr. S.B. Choudhary
Competency Enhancement Programme for "Effective Implementation of Training Function by HRD Nodal officers of ICAR"	ICAR-NAARM, Hybderabad 23-25 February, 2017	Dr. Pratik Satya
Winter School on "Advanced statistical techniques in genetics and genomics"	IASRI, New Delhi 2-22 March, 2017	Dr. H.K. Sharma

AWARDS & RECOGNITIONS

Awards

- Dr. Asit B. Mandal, Principal Scientist was awarded 'Life Time Achievement Award (2016)' conferred by Andaman Science Association on 18.03.2017.
- Dr. Ranjan Kumar Naik, Sr. Scientist (FMP), received the "Distinguished Service Certificate Award-2016" (in the category of Post-Harvest Engineering and Technology) conferred by Indian Society of Agricultural Engineers (ISAE), New Delhi during 51st Annual Convention of ISAE held at CAET, CCSHAU, Hisar, Haryana during 16-18 February, 2017.
- Dr. Ranjan Kumar Naik, Sr. Scientist (FMP), received the "K C Das Memorial Award" conferred by the Institution of Engineers (India), Odisha State Centre, Bhubaneswar for the research paper "Development of sisal fibre extractor for small farmers of Odisha" during 58th Annual Technical Session held on 19 February, 2017.
- The exhibition stall of Ramie Research Station, Sorbhog awarded with Third prize under the category of Traditional Farming Exhibition during *Exhibition-cum-workshop* on "Traditional farming and indigenous food of North East" held during 25-27 February 2017 at ICAR Research Complex for NEH Region, Umroi Road, Umiam, Meghalaya.
- The ICAR-CRIJAF sports contingent participated in ICAR Eastern Zone Sports Tournaments -2016, during 6-9 March, 2017 at ICAR-NRRI Cuttack and won the 1st position in volleyball. Among individual events, Uma Sankar Das won gold medal in high jump and long jump, Sanjay Sethi won bronze medal in high jump.

Recognition

- Dr. S.K. Sarkar, Pr. Scientist, ICAR-CRIJAF received 'Reviewers' Excellence Award' for the year 2016 from Agricultural Research Communication Centre (ARCC), Hariyana.
- Dr. Sitangshu Sarkar, Principal Scientist, ICAR-CRIJAF has been elected as Councillor (West Bengal) of Indian Society of Coastal Agricultural Research (ISCAR), Canning Town for 2016-18.
- Dr. Sitangshu Sarkar, Principal Scientist, ICAR-CRIJAF has been selected as Editorial Board Member (2016-20), for the journal of Indian Journal of Science and Technology and ARPN Journal of Science and Technology.

DISTINGUISHED VISITORS

Name of the Visitor	Affiliation	Date
Dr. S.K. Biswas	Former Director, DJD, Kolkata	17 January, 2017
Sh. Radha Mohan Singh	Union Minister of Agriculture and Farmers Welfare, New Delhi	13 February, 2017
Dr. A.K. Singh	Deputy Director General (Extension), ICAR, New Delhi	13 February, 2017
Dr. B.K. Das	Director, ICAR- CIFRI, Barrackpore	13 February, 2017
Dr. Gautam Roy	Director, ICAR- NIRJAFT, Kolkata	13 February, 2017
Dr. A.S. Panwar	Director, ICAR-IIFSR, Modipuram	22 February, 2017
Dr. R.K. Singh	Assistant Director General (Commercial Crops), ICAR, New Delhi	10 March, 2017
Sh. Arvind Kumar	Secretary, National Jute Board, Kolkata	04 June, 2017
Dr. J.S. Sandhu	Deputy Director General (Crop Sciences), ICAR, New Delhi	19 June, 2017

Sri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers' Welfare visiting the CRIJAF Stall on the occasion of inauguration of KVK

Dr. A.K. Singh, DDG (Extension), ICAR, addressing the farmers on the occasion of inauguration of KVK

Dr. R.K. Singh Assistant Director General (Commercial Crops), ICAR, New Delhi releasing CRIJAF Publication in AINP workshop

Dr. J.S. Sandhu, Deputy Director General (Crop Sciences), ICAR, New Delhi addressing the scientists of CRIJAF

New Assignment/Collegues

Dr. Jiban Mitra, Principal Scientist & Head, Crop Improvement Division took over the charge of Director, ICAR-CRIJAF on 01.02.2017 after superannuation of Dr. P. G. Karmakar.

Sh. Suman Roy, Scientist (Plant Physiology) has joined ICAR-CRIJAF on 14.03.17. Sh. Roy joined ARS in July 2014 and served in ICAR-VPKAS, Almora before joining this institute.

Promotion

Sh. Om Prakash Chowdhury,
Sr. Tech. Asstt. (T4)
Promoted to Tech. Officer (T5)
Date of promotion: 01.01.2017

Sh. Tridib Ghosh,
Upper Division Clark
Promoted to Assistant
Date of promotion: 31.01.2017

Sh. Soumya Sarathi Kundu,
Farm Manager (T5)
Promoted to Sr. Tech. Officer (T6)
Date of promotion: 06.01.2017

Sh. Soumya Roy,
Upper Division Clark
Promoted to Assistant
Date of promotion: 31.01.2017

Superannuation

Dr. P.G. Karmakar, Director
Date of Retirement: 31.01.2017
Place of Posting: Barrackpore

Sh. Haru Khara, SSS
Date of Retirement: 31.01.2017
Place of Posting: Barrackpore

Sh. Sentu Sarkar, SSS
Date of Retirement: 28.02.2017
Place of Posting: Barrackpore

Transfer

Name	Designation	Place of Posting	Date of Relief/ Joining
Dr. Pratap Bhattacharyya	Pr. Scientist	ICAR-NRRI, Cuttack	05.03.2017
Dr. Hemant Choudhary	Pr. Scientist	ICAR-CIFRI, Barrackpore	13.04.2017
Sh. Sushanta Dey	Personal Assistant	ICAR-CRIJAF, Barrackpore	09.06.2017

Carbon Sequestration Potential of Jute Crop: Major Challenges

Conservation of biodiversity and mitigation of the fallout of climate change are two major environmental challenges today. In the context, the relationship between plant biodiversity and soil organic carbon (SOC) sequestration has become a subject of considerable scientific interest. The Earth's terrestrial vegetation plays a pivotal role in the global carbon cycle. Increase in atmospheric concentrations of greenhouse gasses (GHG), of which the most common is carbon dioxide (CO_2), is considered to be the primary cause of global warming. C is accumulating in the atmosphere at a rate of 3.5 Pg (Pg = 10^{15} g or billion tons) per annum (Paustian *et al*., 2000). Current terrestrial (plant and soil) C is estimated at 2000 ± 500 Pg, which represents

25% of global C stocks. In this connection, agricultural lands have the potential to remove and store between 42 and 90 Pg of C from the atmosphere over the next 50–100 years (DOE, 1999).

Jute is considered as the golden fibre of India. It is eco-friendly, biodegradable and has much higher CO_2 assimilation rate which is creating an opportunity for the survival and growth of jute industry in the era of environmental concern. Global production of jute and allied fibres is around 3.0 million tonnes, 92.5% of which comes from India and Bangladesh alone. Jute growing tracts of India have been classified in to nine agro-climatic zones comprising the states of West Bengal, Assam, Odisha, Bihar, Uttar Pradesh, Meghalaya and Tripura. Over the last few years jute cultivation area has remained constant in India. Increased cost of production particularly due to enhanced cost of labour and fertilizers and lack of sufficient water for retting are the key factors that stand in the way of area expansion.

The most significant impact of the jute life cycle is carbon sequestration by green jute plants in vegetative stage. The daily potential biomass production of jute is 49.7 g m^{-2} (Palit, 1993). Studies revealed that CO_2 assimilation rate of jute is several times higher than that of trees. During the 120 days of jute growing season, 1 ha of jute plant can absorb about 15 MT of CO_2 from the atmosphere and liberate about 11 MT of O_2, the life supporting agent (IJSG, 2013). Thus jute plantation acts as a sink for carbon. GHG emissions from jute are negative on the account of large carbon sequestration at vegetative stage. The life cycle inventory analysis (LCIA) is an account of all mass and energy inputs and outputs to the life cycle systems. ICAR-CRIJAF is now going for detailed study in this line, which will ultimately help in public concern about the issue of global climate change for developing and implementing strategies of jute based agro-ecosystem management that will reduce carbon dioxide concentration in the atmosphere as well as improve soil fertility.

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