Evation

POST CONFERENCE REPORT

AGRI Vision 2022

2022

International Conference on
Agriculture for Sustainable Future

March 06-08, 2022, Ravenshaw University, Cuttack, Odisha, India

www.agrivision.in

Acknowledgement

*The financial assistance received from the Research & Development Fund of **National Bank for Agriculture and Rural Development (NABARD)**, towards the publication of book of abstract is greatly acknowledged.*

NABARD

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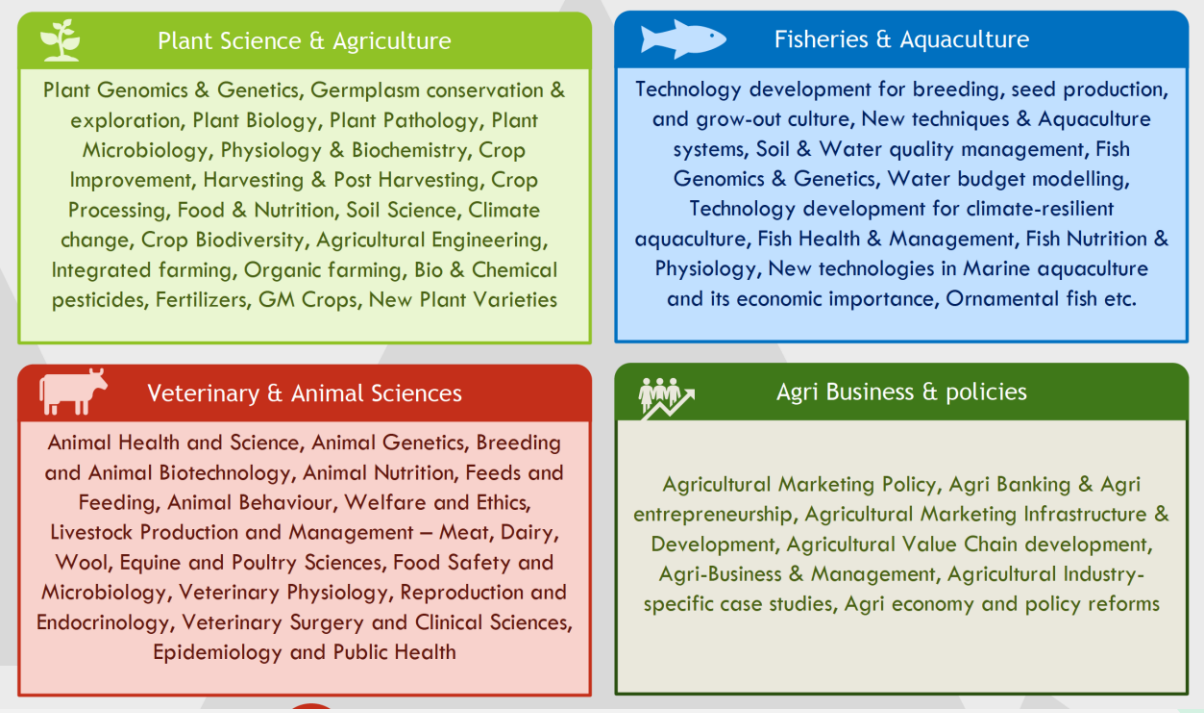
Post Conference Report: Agri Vision-2022

Brief Overview: Agri Vision-2022

Agri Vision-2022 (International Conference on Agriculture for Sustainable Future) has organized in association with the Department of Botany, Ravenshaw University at the Seven Pillars of Wisdom, Ravenshaw University, Cuttack, Odisha from March 06-08, 2022 in Hybrid mode (Physically + Virtually). The three days program was based on the theme "Integrated Strategies for Doubling Farmer's Income". Various stakeholders of Agriculture sectors such as Agri Scientists, Researchers, Research Scholars, Progressive Farmers, Graduate & Post graduate scholars, Policy makers from nodal agencies, Company representatives have attended this program. The Agri Vision 2022 was comprised of Plenary/Keynote speeches, Oral Sessions, Young Investigator Presentations, Poster presentations, Young Investigator Awards, Best Poster Awards, Best Oral Presentation Awards, Business Innovation Awards, Krushak Bandhu Awards, Goal Settler Awards, Dr. Sabuj Sahoo Memorial Lifetime Achievement Awards, Stall Exhibitions, Farmer-Expert interactions.

Sessions we covered at Agri Vision 2022

The scope of the conference was covered under major four sectors of Agriculture as below. The three days program was running parallelly in hybrid mode (Physically & Virtually) in two breakout sessions (Annex-1 & Annex-2). More than 800+ participants globally attended this conference directly/indirectly.



Organizing Committee Members & Supporters

We are thankful to the **Department of Botany, Ravenshaw University**, for collaborating with us and provide scientific supports to Organize Agri Vision 2022 smoothly. We acknowledge the unconditional scientific support and guidance of all our Organizing Committee Members of Agri Vision 2022, without whom we would not have been able to execute this conference.

Organizing Committee Members

A Special thanks to **Dr. Trilochan Mohapatra, DG, ICAR, & Secretary DARE New Delhi** for joining as Chief Guest, **Dr. Joykrushna Jena, DDG (Fisheries), ICAR, New Delhi, Dr. Pawan K. Agrawal, V.C. OUAT, Prof. Sanjay K. Nayak, V.C. Ravenshaw University, Dr. Ajay K. Parida, Director, ILS, Bhubaneswar, Dr. Ashok Kumar, Director, ICAR, NBPGR, New Delhi, Prof. B. C. Tripathy, Former VC, Ravenshaw University/ Prof. JNU, New Delhi, Dr. Padmini Swain, Director, ICAR-NRRI, Cuttack** for joining as Guest of Honour and inaugurating the Agri Vision-2022 including Stall Exhibitions. We are thankful to **Dr. Mrutyunjay Mohapatra, DGM, IMD, New Delhi,** and **Dr. Saroj Kumar Swain, Director, ICAR-CIFA, Bhubaneswar** for joining us during Valedictory Ceremony as Chief Guest and Guest of Honour to make this Conference a huge success.

Inaugural Ceremony: March 06, 2022, 4 PM

Dr. Trilochan Mohapatra
(Chief Guest)
DG, ICAR, & Secretary DARE
New Delhi

Dr. Joykrushna Jena
(Guest of Honour)
DDG (Fisheries), ICAR
New Delhi

Prof. Sanjay K. Nayak
(Guest of Honour)
VC, Ravenshaw University,
Cuttack

Dr. Pawan K. Agrawal
(Guest of Honour)
VC, OUAT
Bhubaneswar

Dr. Padmini Swain
(Guest of Honour)
Director, ICAR-NRRI
Cuttack

Dr. Ajay K. Parida
(Guest of Honour)
Director, ICAR-NBPGR
New Delhi

Prof. B. C. Tripathy
(Guest of Honour)
JNU, New Delhi

Dr. Ashok Kumar
(Guest of Honour)
Director, ICAR-NBPGR
New Delhi

Valedictory Ceremony: March 08, 2022, 4 PM

Dr. Mrutyunjay Mohapatra
(Chief Guest)
DGM, IMD, New Delhi

Dr. Saroj Kumar Swain
(Guest of Honour)
Director, ICAR-CIFA
Bhubaneswar

We are also thankful to **Shri Parshottam Rupala**, Union Minister, Fisheries, Animal Husbandary & Dairying, Government of India, **Er. Bishweswar Tudu**, Minister of State for Jal Shakti & Tribal Affairs, Government of India, **Dr. Arun Kumar Sahoo**, Minister, Agriculture & farmer's Empowerment, Fisheries & Animal Resources Development & Higher Education, Govt. of Odisha, **Dr. Trilochan Mohapatra,** DG, ICAR, & Secretary DARE New Delhi**, Dr. Mrutyunjay Mohapatra,** DGM, IMD, New Delhi, **Dr. Joykrushna Jena,** DDG (Fisheries), ICAR, New Delhi, **Shri Pratap Chandra Sarangi**, Member od Parliament, Lok Sabha, **Shri Pratap Chandra Sarangi**, Member of Parliament, Lok Sabha, **Shri Mahesh Sahoo**, Member of Parliament, Lok Sabha, **Dr. HK Pathak**, ICAR-NISAM, Baramati, **Dr. Pawan K. Agrawal,** V.C. OUAT**, Prof. Sanjay K. Nayak,** V.C. Ravenshaw University**, Dr. Ajay K. Parida,** Director, ILS, Bhubaneswar**, Dr. Ashok Kumar, Director,** ICAR, NBPGR, New Delhi, **Dr. Saroj Kumar Swain,** Director, ICAR-CIFA, Bhubaneswar for their welcome messages.

Participated Organizations

Delegates & Speakers

800+ Delegates & speakers from the below organizations participated actively (Physically and Virtually) in Agri Vision-2022.

- Gaston Berger University, Senegal
- India Meteorological Department, New Delhi
- National Academy of Agricultural Sciences, New Delhi
- ICAR-NRRI, Cuttack
- ICAR-NBPGR, New Delhi
- ICAR-IARI, New Delhi
- ICAR-CTCRI, Bhubaneswar
- ICAR-NIASM, Baramati
- ICAR-CMFRI, Cochin
- ICAR-CIWA, Bhubaneswar
- ICAR-CIFA, Bhubaneswar
- Institute of Life Sciences, Bhubaneswar
- SOA University, Bhubaneswar
- ICAR-IIOR, Hyderabad
- NABARD Regional Office, Odisha
- NIT, Durgapur
- IIT, Delhi
- SKUAST, Kashmir
- Tamil Nadu Agricultural University, Coimbatore
- NAFBI, Mohali
- CCS-HAU, Haryana
- KVCET, Chennai
- Indian Statistical Institute, Kolkata
- Ravenshaw University, Cuttack
- RD Women's University, Bhubaneswar
- Banaras Hindu University, Varanasi
- ICARDA
- Centurion University
- JNTU, New Delhi
- OUAT, Bhubaneswar
- University of Mysore, Mysore
- G.M. University, Sambalpur
- The Farm Enterprise, Odisha
- Botanical Survey of India, Shillong
- University of Horticultural Sciences, Bagalkote
- University of Agricultural Sciences, Dharwad
- D.D.U. Gorakhpur University, Gorakhpur
- Bhabha Atomic Research Centre, Mumbai
- University of Agricultural Sciences, Dharwad
- Madras Christian College, Chennai
- Raiganj University, Raiganj
- AEEC, UAS, Raichur
- SMVDU, Katra

Supporters (Sponsors/Exhibitors/Media Partners)

We are thankful to all the 23 sponsors/Exhibitors who supported our Conference.

- A Special thanks to the **Larsen & Toubro** for being the Bronze Sponsor
- The financial assistance received from the Research & Development Fund of **National Bank for Agriculture and Rural Development (NABARD)**, towards the publication of book of abstract is greatly acknowledged.
- We extend our thanks to the ICAR institutes & other organizations for the stall exhibition at the conference and providing us the speaker/knowledge support.
- Last but not the least, we are thankful to **Ravenshaw University** for their infrastructure support, our vendors (Printing, Publisher, Catering, Suppliers, Event management agency etc.) and Electronics media and Print Media for covering our conference.

Sponsors & Exhibitors

Agri Vision-2022: Awards

We recognized the achievers, extraordinary contributors, young researchers, research scholars, Agri start-ups and other stakeholders at our platform.

Dr. Sabuj Sahoo Memorial Lifetime Achievement Award

We initiated the Dr. Sabuj Sahoo Memorial Lifetime Achievement Award in the loving memory of Dr. Sabuj Sahoo, Utkal University, Odisha whom we lost due to COVID-19. This award recognizes the extraordinary contributor in the field of Agricultural science, Biotechnology & Life science whose research innovations & contributions have impacted the society.

Dr. Sabuj Sahoo Memorial Lifetime Achievement Awardees

- **Dr. Joykrushna Jena,** DDG (Fisheries), ICAR, New Delhi
- **Prof. B. C. Tripathy,** Professor, JNU, New Delhi
- **Dr. Ashok Kumar,** Director, ICAR-NBPGR, New Delhi

The Research Wizard Award

- **Dr. Shahnawaz Ahmad Dar**, SKUAST, Kashmir
- **Dr. Khirod Sahoo**, Ravenshaw University, Cuttack
- **Dr. Gyanranjan Mahalik**, CUTM, Bhubaneswar
- **Dr. Ravi Kishore Pamarthi**, ICAR-NBPGR, New Delhi
- **Harekrushna Swain, BIS- ECR, Shillong**

The Shining Star Award

- **Dr. Usha Kiran Betha**, ICAR-IIOR, Hyderabad
- **Chaitra C Kulkarni**, UHS, Bagalkot
- **Dr. Sudhir Rajput**, IAS- BHU, Varanasi
- **Dr. Manish Pandey**, BARC, Mumbai
- **Dr. Sutar Suhas Bharat**, CUTM, Bhubaneswar

Best Oral Presentation Award

- **Dr. Anjula Pandey,** ICAR-NBPGR, New Delhi
- **Dr. Kalidas Pati,** ICAR-CTCRI, Bhubaneswar

Young Investigator Award

- **Rupalin Jena,** ICAR-NRRI, Cuttack
- **S. R. Harish Chandar,** CUTM, Paralakhemundi
- **Srija Priyadarsini,** SOA University, Bhubaneswar
- **Prachitara Rout,** ICAR-NRRI, Cuttack
- **Sreemoyee Mitra,** ISI, Kolkata

Best Poster Award

- **B. Jyotirmayee,** CUTM, Bhubaneswar
- **Ipsita Iswari Das,** ICAR- CIFA, Bhubaneswar
- **Byomkesh Dash,** ICAR-NRRI, Cuttack
- **Dr. Vijay Bahadur Singh Chauhan,** ICAR-CTCRI, Bhubaneswar
- **Payal Kapoor,** NAFBI, Mohali

Krushak Bandhu Award

- **Mr. Dhirendrakumar Bhanubhai Desai**, Bharuch, Gujrat
- **Mr. Jyoti Prakash Mohanty**, Mallipur, Cuttack
- **Mr. Manoj Kumar Bisoi**, Samantarapur, Cuttack

Business Innovator Award

- **Dr. Sarat Kumar Sahoo,** Managing Director, Ruchi Foodline Limited

The Goal Setter Award

- Ms. Deepak Fertilisers and Petrochemicals Corporation Ltd

50+ Speakers

30+ Posters

48 Exhibition Stalls

150+ Farmers

8 Category of Awards

800+ Foot fall

3 Days Program

3 Days Net - working

Farmer to Expert Interaction

We organized a special interactive session where representatives from APEDA, ICARDA, Department of Biotechnology, Govt of India, National Medicinal Plant Board, Coconut Development Board, CTCRI, CIWA, CHES, CIBA, CMFRI, KRIBHCO, CIFA, CIBA, NBPGR, NRRI, Coffee Board, and OMFED, interacted face to face with 70+ progressive farmers from across Odisha and 50+ Agriculture students. Farmers and students asked various questions, put forward their problem statements and the expert provided the answer or solutions to their problems. We ran the session for 6+ hours and was the most attractive part of the three days long program. A special thanks to Mr. Sudhanshu Ranjan, Founder, The Farm Enterprise, Cuttack for sharing his life changing experience/success story after attending Agri Vision 2021 and deliver a talk on Integrated Farming and Rural Economy Development. Also, we are grateful to **Mr. Dhirendrakumar Bhanubhai Desai** from Bharuch, Gujrat for sharing his success story of Banana export to Middle East countries and delivering a talk on "Banana Cultivation by drip irrigation, Tissue culture Technology and Integrated Nutrition Management". Additionally, we are thankful to **Mr. Jyoti Prakash Mohanty** from Mallipur, Cuttack for sharing his success story on "Integrated farming, Horticulture, Floriculture and cash crops" and **Mr. Manoj Kumar Bisoi** from Samantarapur, Cuttack for sharing his story on "Integrated fish & pearl farming" during these sessions.

Gallery

All the photographs and selected Videos including the streaming, will be available in the Gallery section of the Agri Vision-2022 website.

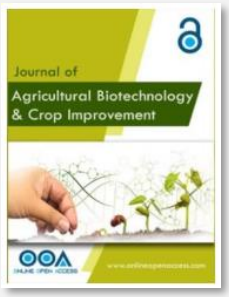
PS: https://agrivision.in/gallery-agrivision/

Scientific Abstracts

All the session abstracts of Agri Vision 2022 has been published in the website with ISBN no.
Ps: https://agrivision.in/3d-flip-book/agrivision2022/

Knowledge Partner: Online Open Access Journals

Evation Business Solutions entered into a new venture "Online Open Access (OAA) Journal" and hosted our new Open Access Journal: "**Journal of Agricultural Biotechnology & Crop Improvement**".



All the submitted abstract (the proceeding book) will be published in this journal as a special issue. The Agri Biotech journal is an Open Access journal and can be accessed online at: www.onlineopenaccess.com/agri-biotech

List of Issues/Action Points Emerging from Agri Vision-2022

Evation

AGRI Vision 2022

List of issues/action points emerging from the Conference:

Evation Business Solutions (P) Ltd. has successfully hosted the Agri Vision-2022 during March 06-08, 2022 at Ravenshaw University, Cuttack, Odisha, India. The Agri Vision 2022 was based out on the theme "Integrated Strategies for doubling the farmer's income". The 3 days programs highlighted with the below emerging points:

A list of issues/action points emerging from the conference noted as below:

1. Use of Trichoderma: A Bio control agent for a Sustainable Agriculture

By Dr. Arup Kumar Mukherjee, Principal Scientist, ICAR-NRRI, Cuttack

In a recent movement special emphasis has been given to double the farmers' income by using multipronged ap- proaches which include use of latest technologies, deploying microbial resources, reducing the use of different agrichemicals to minimize the cost of cultivation. They have given an attempt to use different biocontrol agents as a replacement of chemical pesticides which in turn will reduce the cultivations costs as well as will have minimum effect on the environment. This approach will not only save the farmers from using excessive and costly pesticides but also make the environment safe. They have identified different Trichoderma spp. which are having different beneficial properties. Two Trichoderma spp have been identified which are excellent growth promoters besides having biocidal effects. One Trichoderma species has been identified which helps faster decomposition of rice straw and this de-composted straw have excellent growth promotion qualities. Few have been identified to induce drought tolerance in rice. The detail mechanisms of growth promotion also have been identified using molecular tools. Whole genome sequence of The ICAR-NRRI identified Trichoderma erinaceum also has been uncovered. Finally, an Indian patent has also been awarded to the ICAR-NRRI.

1. ***NRRI Biostimulants-Th Species : Trichoderma harzianum:***

Developers : Mukherjee, A.K., Adak, T., Swain, H., Baite, M.S., Prabhukarthikeyan SR, Raghu S, Chattopadhyay K, and Rath, P.C.

Price : Rs. 40/- per 200gm., Rs. 120/- per kg

Preparation of formulation:

The Trichoderma harzianum is grown in potato dextrose broth. After 6-7 days when it is sufficiently sporulated the culture is mixed with Talc powder and carboxy methyl cellulose (CMC) to make formulation. The formulation should have at least 1X108cfu.

Recommendation

Used for growth promotion enhancing growth of root and shoot and ultimately higher yield.

Method of usage

Seed treatment: Use 10g/Kg for seed treatment. Soak the seeds in water for overnight. Decant the water completely and apply powder to the seed and mix thoroughly and after complete mixing air dry the seeds under shade for at least 1 hour and then go for showing.

Spray application: Use 10g powder in 1 liter of water- mix well and then spray. Use 200 liter of solution for 1 acre of land.

Advantages

(i) enhances germination reducing the germination time., (ii) promotes root and shoot growth, (iii) Induces resistance, (iv) Increase yield, (v) Easy to apply by the farmers

2. NRRI Biostimulants-Te Species : Trichoderma erinaceum

Developers: *Mukherjee, A.K., Adak, T., Swain, H., Behera, Shanti Prava, Dhua U., Jena M., Bagchi, T, Bhattacharya, P., Kumar, Awadhesh, Dangar, T.K. and Rath, P.C.*

Price : Rs. 40/- per 200gm., Rs. 120/- per kg

Preparation of formulation:

The Trichoderma erinaceum is grown in potato dextrose broth. After 6-7 days when it is sufficiently sporulated the culture is mixed with Talc powder and carboxy methyl cellulose (CMC) to make formulation. The formulation should have at least 1X108cfu.

Recommendation
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Advantages

(i) enhances germination reducing the germination time., (ii) promotes root and shoot growth, (iii) Induces resistance, (iv) Increase yield, (v) Easy to apply by the farmers

3. NRRI Biostimulants-Ta Species : Trichoderma atroviride

Developers : Mukherjee, A.K., Adak, T., Swain, H., Behera, Shanti Prava, Dhua U., Jena M., Bagchi, T, Bhattacharya, P., Kumar, Awadhesh, Dangar, T.K. and Rath, P.C.

Price : Rs. 40/- per 200gm., Rs. 120/- per kg

Preparation of formulation:
The Trichoderma atroviride is grown in potato dextrose broth. After 6-7 days when it is sufficiently sporulated the culture is mixed with Talc powder and carboxy methyl cellulose (CMC) to make formulation. The formulation should have at least 1X108cfu.

Recommendation
Used for growth promotion enhancing growth of root and shoot and ultimately higher yield.

Method of usage

Seed treatment: Use 10g/Kg for seed treatment. Soak the seeds in water for overnight. Decant the water completely and apply powder to the seed and mix thoroughly and after complete mixing air dry the seeds under shade for at least 1 hour and then go for showing.

Spray application: Use 10g powder in 1 liter of water- mix well and then spray. Use 200 liter of solution for 1 acre of land.

Advantages

(i) enhances germination reducing the germination time, (ii) promotes root and shoot growth, (iii) Induces resistance, (iv) Increase yield, (v) Easy to apply by the farmers

Intellectual Property Right: The product is from ICAR-NRRI so IPR issue is applied and it is exclusive to NRRI only.

For further enquiry contact :

Dr. P C Rath
Head, Crop protection Division
ICAR-NRRI, Cuttack-753006
e-mail ID: pcrath67@gmail.com
Mobile No. – 9437476827

2. Entrepreneurship development in tuber crops value addition

By Dr. M. Nedunchezhiyan, Head & Principal Scientist, ICAR-CTCRI, Bhubaneswar

Tuber crops are most important food crop after cereals and grain legumes. The tropical tuber crops, including cassava (Manihot esculenta Crantz), sweet potato (Ipomoea batatas), yams (Dioscorea sp.), taro (Colocasia esculenta), elephant foot yam (Amorphophallus paeoniifolius) and other minor tuber crops play a crucial role in providing food security for about 2.2 billion people in the World besides contributing to animal feeds and in- dustry. Among total World production, about 45%

of root and tuber crop production are consumed as food, with the rest converted as animal feed or industrial products. Tuber crops are important sources of starch after cereals. Cassa- va and sweet potato are the most important among the tuber crops. Cassava starch finds application in array of indus- trial products, textiles, corrugation box, paper conversion, liquid gum for domestic sector, paper industry etc. Besides food, sago industry is the major one.

A number of stable and marketable food products as well as less stable snack food can be made from tuber crops. Cassava rawa, semolina and fried cassava chips are successful stable products that can be made from cassava tubers. Besides, cassava flour fortified with cereals and legumes flours can be used for making extruded fried foods which also have good post product shelf life. Cassava starch is a valuable stock for bioethanol and biodegradable plastic production. Sweet potato is used as raw materials in the manufacture of products such as deep processing starch, alcohol, liquid glucose, high fructose syrup, maltose and for food processing fresh roots dry flour or starch can be used for noodles, fried chips and canned flakes production. In feed processing the main product is sweet flour used by the compound feed industry. The industrial utilization of sweet potato is rudimentary in India. Starch of colocasia and arrowroot is very fine and it is used in cosmetic and pharmaceutical industries.

Some of the High Yielding Cassava Varieties developed by CTCRI

H-165

H-165 is a popular industrial variety of tapioca. It is a high yielding hybrid variety with medium tall (1.5 - 2 m) plants. Starch content is 23 - 25% on fresh weight basis. It is easily harvestable with good tuber shape. Duration 8-9 months and average yield is 33-38 T / Ha. They are field tolerant to CMD, spider mite and scale insect. This variety is suitable for rotation cropping.

Sree Visakham

Sree Visakham is a high yielding hybrid variety of tapioca with non branching tall (2- 2.5 m) plants. Carotene content in tubers is 466 IU/100 gm. Starch content in fresh tubers 25-27 %. Maturity period is 10 months and avarage yield is 35-38 T/ Ha. They are less susceptible to spider mite and scale insect.

Sree Prakash

Sree Prakash is a high yielding variety of tapioca with short (1-1.5m) and non-branching plants. It is a selection from indigenous germplasm collection of cassava. Suitable for lowland cultivation. Maturity period is 7 months and avaerage yield is 30-35 T / Ha. Starch content is 29-31 % in fresh tubers.

Sree Vijaya

Sree Vijaya is a high yielding variety of tapioca with excellent cooking quality. Duration is 6 months. It is a selection from the germplasm of cassava. Recorded an yield of 25-28t/ha. Starch content is 27-30%. The tuber flesh colour is light yellow after cooking.

Sree Athulya

Sree Athulya is a high yielding (39.00 t ha-1) variety with high starch content (34.80%) and has been recommended for release and cultivation in the States of Tamil Nadu and Andhra Pradesh. The tubers are long cylindrical with brown skin and white flesh. The cultivar is suitable for starch extraction as well as cattle feed. It was recommended for Central release in the 21st meeting Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops held on 7th October, 2013.

Sree Rekha

Sree Rekha is a high yielding top crossed hybrid variety of tapioca with excellent cooking quality. They are suitable for upland and low land cultivation. Maturity period is 8-10 months and average yield is 45-48 T/Ha. They are field tolerant to leaf spot and spider mite.

Sree Padmanabha

Sree padmanabha is the first CMD resistant variety of tapioca. They are suitable for irrigated plains of Tamil Nadu and rainfed areas of Kerala. Maturity period is 270-300 days and average yield is 38 T/Ha.

Some of the High Yielding Sweet Potato Varieties developed by CTCRI

Sree Kanaka

Early maturing (75-85 days) sweet potato variety having cylindrical tubers with dark orange flesh colour and very high beta carotene.

Sree Arun

Sree Arun is a early maturing (90 days) variety of sweet potato with good cooking quality. They have pink skin and cream tuber flesh.

Sree Vardhini

Sree Vardhini is a high yielding variety of sweet potato. It is a selection from open pollinated seed progeny of S-13. Semi spreading variety. Early maturing (100-105 days) variety with dual purpose for human consumption and animal feed(foliage). It is a Carotene rich variety(1200 IU/100g) and average yield is 20-25 T / Ha.

H-41

H-41 is a high yielding hybrid variety of sweet potato with sweet, low fibre and excellent cooking quality tubers. Drought tolerant. Duration is 120 days and average yield is 20-25 T / Ha.

Gouri

Gouri is a medium duration variety with high carotene content(4.5-5.5 mg/100gm). It matures in 110-120 days and the average yield is 30 T/ha. This variety tolerates mid-season moisture and suitable for Kharif and Rabi.

Sree Bhadra

Sree Bhadra is a high yielding variety of sweet potato. It is a short duration clone (90-105 days). Semi spreading variety, broad leaves. Dark purple emerging leaves. Greenish brown vines. Tubers fusiform, short in shape, pink skin and cream flesh colour. Tuber contains 33% dry matter, starch 20%, total sugar 2.9%, carotene content 972 IU/100g.

Kalinga

Kalinga is a medium duration(105-110 days) variety of sweet potato with excellent cooking quality and high starch content(28%). It can be used as food,fodder and for starch extraction. They have purple red skin and cream tuber flesh.

Sourin

Sourin is a medium duration(105-110 days) variety of sweet potato with good cooking quality. They are suitable for rainfed and irrigated conditions and are good for sandy loam soils. They withstands mid season drought.. They have red skin and creamy white flesh.

Crop production Technologies: Cassava & Sweet potato

Cassava: Fertilizer recommendation

- High yielding varieties of 10 - 11 months duration yielding 30-35T/Ha
- Farmyard manure 12.5T/Ha. 100:50:100 Kg NPK / Ha.
- High yielding varieties of 6-7 months duration yielding 25-30T/Ha
- Farmyard manure 12.5T/Ha.;75:50:75 Kg NPK / Ha.
- Local varieties(20-25 T/Ha)
- Farmyard manure 12.5T/Ha.;50:25:50 Kg NPK / Ha.

Irrigation schedule

Supplementary irrigation at IW:CPE(Irrigationwater/ Cumulative pan evaporation) ratio of 0.70 during drought spell was beneficial in maximising productivity.

Intercropping

Short duration legumes like bunchy varieties of groundnut and vegetable cowpea are found ideal. Intercrop is dibbled while cassava is planted.

Rice-Cassava crop sequence

First crop rice (June to Sept) is raised as rainfed crop. Then short duration cassava is grown. This is practised when there is no assured source of irrigation. Cassava is harvested in April

Shoot number

Retain only two shoots in opposite direction by removing the excess ones at 30 days after planting along with intercultural operations.

Intercultural operations

First intercultural operation at 30-45 days after planting and the second one at one month after the first intercultural operation followed by earthing up.

Rapid test for Cyanogen determination

(For mainland of 1 ha nursery area of 5 gm Picric acid and 25 gm Sodium carbonate are dissolved in 1 litre of water. Filter paper is dipped into it. Then it is air-dried. Then it is cut into 2x20 cm strips. 1gm tuber is crushed in 25 ml water and put into 500 ml conical flask. Strip is hung from the stopper of the flask. Keep it overnight. Colour develops in the paper. Based on intensity of colour, content of HCN can be determined. Strip is cut into pieces and dipped in conical flask with 60 ml water. This is estimated calorimetrically by using green filter (625 nm wave length)

Sweet Potato: Special Practices

- **Upland condition**
  Planting: In the main field during June-July and in the nursery during March to May.

- When there is no other source of irrigation this is the only possible method.

- **Lowland condition**

Planting: during Jan- Feb, after the secondcrop of rice or after the harvest of tobacco. This helps to utilise the residual moisture after the second crop of rice and the organic matter and compost left by tobacco. Vine cuttings of 20 -30 cm length from the middle and top of the vines are planted in the field. Spacing in the mainfield is 60X20 cm. Plant population is 83000 / ha. Farmyard manure @ 5 T / Ha. NPK @50:25:50 Kg / ha.

Value Addition Technologies:

<u>Functional pasta from Cassava:</u>

Features

Protein- enriched sweet potato pasta Whey protein enriched pasta – Rich in immunoglobulin and lactoferrin, which promote the growth of beneficial bacteria (microbiota)

Defatted soy flour enriched pasta – Rich in isoflavones which protects against hormone-related disorders such as breast cancer and prostate cancers.

Fish powder enriched pasta – Rich in omega-3- fatty acids

Orange fleshed sweet potato pasta • High carotene retention – anti-oxidant properties • High protein content • Excellent cooking and textural properties. • Low glycemic index: Progressive starch digestibility over a period of 2hours. Enriched cassava pasta • Carotene enriched cassava pasta - anti-oxidant properties • Curcumin enriched cassava pasta - anti-inflammatory effects and antioxidant. • Chlorophyll enriched cassava pasta - wound healing, hormonal balance, deodorizing and detoxification of the body and promotes digestive health. • Betanin enriched cassava pasta - anti-oxidant properties.

Extruded Products From Cassava

- **Features**
  - At present no cassava extruded products are available in the market.
  - Extrusion of cassava gives a high expanded product with a bland taste. Cassava extrudates are totally oil free and hence has much dietetic value.
  - Cassava flour is a cheap raw material at the cassava growing belts.

Baked Products from Casava Flours:

At ICAR-CTCRI, gluten free cookies were prepared by replacing wheat flour up to 50% - 60% along with other ingredients like rice flour, tapioca flour, sweet potato flour, taro flour and sorghum flour. The cookies are available in various shapes and sensory quality is acceptable to the consumers.Gluten-free breads were prepared by substituting wheat with 50% sweet potato flour or 30% taro flour with acceptable sensory quality.

Starch Based Solid Adhesives from Cassava:

The product is pure white in colour, quite viscous and possesses excellent tack. It can be easily applied as it is free flowing. It can be used to paste different surfaces like ceramic-ceramic, wood-wood, glass-wood, cardboard-cardboard etc. The pasted materials possess good moisture resistance, but if dipped in water, they tend to separate. It can be used as an adhesive in various applications.

Fried Snacks Food from Tuber Flour:

Cassava Pakkavada: This is a hot snack food having good texture and taste made out of cassava flour. The other ingredients include maida, bengal gram flour, salt, chilli powder, asafoetida, baking soda and oil. The ingredients are thoroughly mixed and made into dough with hot water (50°C), proofed for 1h and then extruded through hand extruder having flat rectangular holes, into hot oil.

Cassava Sweet Fries: This is a sweet snack food made out of cassava flour, maida, baking soda and oil. The ingredients are mixed well and made into dough with hot water (50°C). The dough after proofing for 1h is hand extruded through die having round holes, into hot oil. The fried product is then coated with sugar by dipping for a few minutes in sugar syrup having thick consistency.

Cassava Nutrichips: This is a high protein snack food made out of cassava flour by mixing with other ingredients like maida, groundnut paste, egg, salt, sugar, sesame, coconut milk, baking soda and oil. After mixing the ingredients, hot water is added and mixed to form smooth dough. The dough after proofing is made into small balls which are then spread into sheets of 0.2cm thickness. This is then cut into dimon shape using a sharp knife and deep fried in oil.

Cassava crisps: This is a soft and good textured crispy snack food made from cassava flour, maida, rice flour, bengal gram flour, salt, baking soda, turmeric powder and oil. The dough made with hot water is proofed for 1h and then extruded through the small pore size die having round holes. The deep fried material is mixed with fried nuts, curry leaves etc. before packing.

Other products include: Cassava nutrichips (without egg), Cassava salty dimons, Cassava hot sticks, Cassava salty fries, Cassava sweet dimons etc. for which also formulations are available.

Cassava Chips with Improved Colour & texture:

Fried cassava chips presently available in the market are often too hard to bite and bear no comparison with potato chips. This leads to poor acceptability of the product and lower price. Research at ICAR-CTCRI has shown that excellent quality fried chips can be made from cassava tubers, by soaking the chips in acetic acid-brine solution for 1 h, parboiling for 5 min, surface

drying and deep frying in oil. This facilitates in the removal of excess starch and sugars from the cassava slices, with the result that light yellow crispy chips can be obtained, having soft mouth feel and good texture.

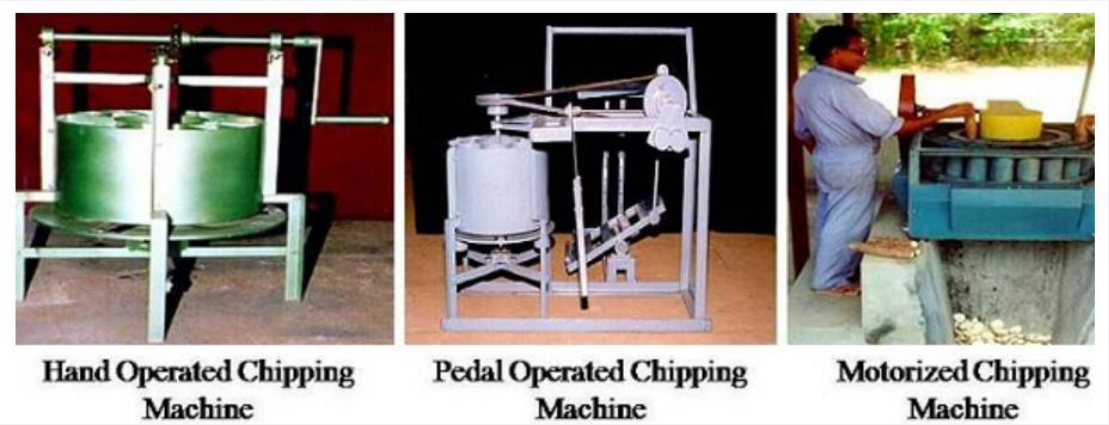
Products from Sweet Potato:

Sweet potato (Ipomoea batatas Lam.) is cultivated throughout the tropics and warm temperate regions of the world for its starchy roots, which can provide nutrition, besides energy. A number of novel food products with functional value are being developed worldwide. Sweet potato tubers with their low glycaemic index have additional value as a food for diabetics. There are a range of primary food products that could be made from sweet potato like chips, flakes, frozen products, French fries, puree etc., while it is also the raw materials for a host of secondary products like noodles, sugar syrups, alcohol, pasta etc. Sweet potato based composite flours have been used in many countries for making small baked goods like cakes, cookies, biscuits, doughnuts etc. Sweet potatoes are consumed at home level, mainly after cooking, baking or converting into fried chips. The roots are often converted to canned or pureed form, to enhance the shelf life.

Engineering/Technology services by CTCRI:

ICAR-CTCRI has developed three types of cassava chipping machines.

- **Hand-operated chipping machine**: Capital cost of the machine is approximately Rs 17850/-.
- **Pedal operated chipping machine**: Cost is approximately Rs 25000/-
- **Motorized chipping machine**:



Intellectual Property: All IP belongs to ICAR-CTCRI & its affiliate organizations.

3. Organic farming for sustainable agriculture

By Dr. Bijoy Kumar Sahoo, Dean-IAS, SOA University, Bhubaneswar

Now a days most countries are facing a major environmental challenge. It is a brainstorming question, how we can satisfy the needs of today's humanity while leaving the Earth in good condition for the generations that will inhabit it after us. The clear answer is sustainable production system. It is not a step backwards, but a progress for humanity: that of consuming not less, but better. The threat to chemical farming has shed light on the direction of organic farming and is the best natural tool to fight it. And before the ecosystem falls out of our hand, it is time to begin an ecological revolution. Organic farming is nature's way of farming with the adoption of our non-synthetic traditional agricultural knowledge i.e. farmer is just creating a composure environment where crops can grow. This farming method can overcome the ill effects caused by over the adoption of chemical farming and it shall increase the agricultural production and productivity in a healthy way without affecting the ecosystem balance for the growing population.

Growing demand for organic food is due to the increase in disposal income at urban along with the Government supports, innovative technologies & investments and these factors are the drivers for organic farming and its marketing. These drivers provide immense potential and scope for the Indian organic sector but there are many challenges faced at producers, processors and consumer level and this can be solved by the organized working of organics promoting agencies at all levels to get on a smooth track. Farmers and companies are under strict Government approved practices and regulation to produce certified organic products with the use of renewable resources and they need to take regular certification and inspection to maintain the quality. The perfect dissemination and implementation from consumers to producers need an extension to play its roles and methods to reach and help at every corner of Indian farming.

Source of Common Organic Manure

Some commonly Available Organic Biofertilizers that can be used:

KRIBHCO has developed multiple Liquid Bio-fertilizer products with tested results as below:

1. Phosphate Solubilizing Bio fertilizer (PSB)

It produce organic acids which help in dissolving soil phosphorus as well as applied phosphatic fertilizer in soil and make easy uptake by crop plants. In addition PSB also produce growth regulators which are beneficial to crop growth and strength. PSB can solubilize native soil phosphorus to the extent of two bags of SSP in case of high/medium phosphorus soils. The response further increases when organic contents of soil are improved through application of compost.

2. Liquid Consortia (NPK)

P & K components of NPK Liquid Bio Fertilizers produce organic acids which help in dissolving insoluble soil phosphorous & potash as well as applied NPK/DAP/ Single Super Phosphate (SSP)/ Muriate of Potash (MOP) etc. fertilizers in soil and make their uptake easy by crop plants. It encourages early root development & helps plant cell formation, consequently increases resistance towards diseases. Also ensure the developments of flowers, seeds & fruits in the crops. N components of NPK LBF fixes atmospheric nitrogen and provide nutrition to crop plants. In addition NPK Liquid Bio Fertilizers also produce growth regulators & biological active substance like vitamins & hormones which are beneficial to crop growth & strength. It also restricts the leaching of potassium & nitrogen in soil & reduced phosphorous fixation by 70-80% in the soil. Inoculation with NPK Liquid Bio Fertilizers helps augment minimum 10-12 kg N, 8-10 kg P205 & 6-8 kg K20 per acre/year. The response further increases when soil organic matter contents are improved with application of compost.

3. Acetobacter

Nitrogen is the major plant food which amounts to more than half of the total plant nutrients taken up by the crop. Acetobacter are entophytic bacteria can fix Nitrogen in many crops especially in roots, stems and leaves of Sugarcane crop. 500 ml of Acetobacter liquid Bio fertilizer contains 5 thousand crore bacteria which establish miniscule urea plants in roots, stems and leaves in Sugar cane crop when applied in one acre field. Each acre applied with 500 ml Acetobacter Liquid Bio fertilizer can add nitrogen equivalent to 2-3 bags of urea. The response further increase when soil organic matter are improved through application of compost.

4. Azospirillum

These are associative symbiotic soil bacteriawhich can fix Nitrogen in any soil and crop but preferred high moisture-living crops like paddy/jute except legume crop. 500 ml of Azospirillum Liquid Bio fertilizer contains 5 thousand crore bacteria which establish miniscule urea plants when applied in one acre field. Each acre applied with 500 ml Azospirillum Liquid Bio fertilizer can add nitrogen equivalent to one bag of urea. The response further increases when soil organic matter contents are improved through application of compost.

5. Azotobacter

These are free-living soil bacteria which can fix Nitrogen in any soil and crop but preferred for vegetables, fruits and field crops expect legumes/ high moisture-living crops like paddy and jute. 500 ml of Azotobacter Liquid Bio fertilizer contains 5 thousand crore bacteria which establish miniscule urea plants when applied in one acre field. Each acre applied with 500 ml Azotobacter Liquid Bio fertilizer can add nitrogen equivalent to one bag of urea. The response further increases when soil organic matter contents are improved through application of compost.

6. Rhizobium

Rhizobium Liquid Bio-Fertilizer are selected natural symbiotic soil bacteria which help in fixation of Nitrogen in legume crops. These bacteria when applied as per directions in the sown legume crop, make nodules on roots of the plants. 500 ml of Rhizobium Liquid Bio fertilizer contains 5 thousand crore bacteria. Each bacteria establishes one miniscule biological urea plant in the shape of root-nodule. Each acre applied with 500 ml Rhizobium Liquid Bio fertilizer can add nitrogen equivalent to one bag of urea. The response further increases when soil organic matter contents are improved through application of compost.

7. Potash Mobilizing Bacteria (KMB)

Potash is an important macro-nutrient required by crop for quality produce. It encourage early root development. Potash Mobilizing Liquid Bio-Fertilizer(KMB) produce organic acids which help in dissolving soil potash as well as applied potassium fertilizers in soil and make easy uptake by crop plants. Inoculation of K solubilize helps to augment 6-8 kg K per acre. In addition KMB also produce growth regulators which are beneficial to crop growth, strength and increase yield by 20-30%. This also keeps soil biologically active & maintain soil health. The response further increases when soil organic matter contents are improved through application of compost.

8. Zinc Solubilizing Bacteria (ZSB)

Zinc is becoming 4th important plant nutrient after N P K in the Indian soils & affects the nutritional quality as well as crop yield. Requirement of zinc in plant tissues is relatively in small concentration (5-100 mg/kg). Zinc Solubilizing Liquid Bio-Fertilizer (ZSB) produce organic acids which help in dissolving insoluble soil zinc salts as well as applied zinc fertilizers in soil and make easy uptake by crop plants & it also influence the bio-availability of zinc to plants, keep soil biologically active & maintain soil health. ZSB can solubilize native soil zinc and helps to augment 1-2 kg Zn per acre. The response further increases when soil organic matter contents are improved through application of compost.

Organic Products Certification

Promotion of Organic Farming by Govt, of India

In order to harness the advantages of organic farming and to build up the soil health and ensuring quality food free from pesticide residue, Government of India has been promoting organic farming under different schemes namely Mission Organic Value Chain Development North Eastern Region (MOVCDNER) and Parampragat Krishi Vikas Yojana (PKVY) Rashtriya Krishi Vikas Yojana (RKVY) and Mission for Integrated Development of Horticulture (MIDH), Network Project on Organic Farming under ICAR, Namami Gange - National Mission for Clean Ganga and National Project on Organic Farming (NPOF).

Certification systems

India has two organic certification systems in place. Although both the systems are based upon common national standards but adopt different approach for verification and documentation. a. National Programme for Organic Production (NPOP) for export and b. Participatory Guarantee System for India (PGS-India) for domestic and local markets

1. NPOP certification

NPOP certification is a kind of third party certification, in which, the farm or the processing of the agriculture produce is certified in accordance with national or international organic standards by an accredited organic certification agency. NPOP certification is facilitated by Agriculture Processed Food and Export Development Authority (APEDA), Ministry of Commerce and Industries, Govt, of India.

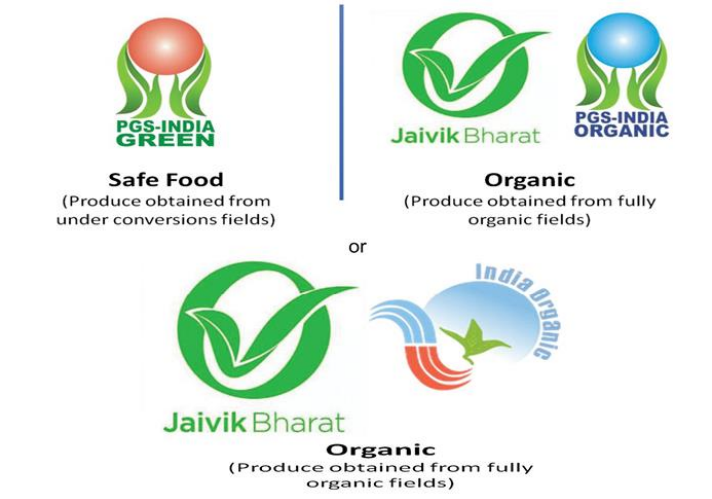
2. Participatory Guarantee System for India (PGS-India)certification

Participatory Guarantee Systems are locally focused quality assurance systems, built on a foundation of trust, social networks and knowledge exchange. In the case of organic agriculture, PGS is a process in which people in similar situations (in this case producers) assess, inspect and verify the production practices of each other and collectively declare the entire holding of the group as organic. PGS-India is facilitated by Ministry of Agriculture and Farmers Welfare, Govt, of India through National Centre of Organic Farming (NCOF) as its Secretariat. A total of 6.12 lakh hectares land and 9.32 lakh farm ers covered under PG S-India certification and 9.12 lakh hectares land and around 15 lakh farm ers covered under NPOP certification.

About NCOF

National Centre of Organic Farming (NCOF) with its nine (09) regional centres is a nodal organization for promotion of organic farming under National Mission on Sustainable Agriculture (NMSA) with following major mandates • Promotion of organic farming in the country through technical capacity building of all stakeholders including human resource development. • Technology dissemination & strain supply. • Statutory quality control of biofertilizers and organic fertilizers under the Fertilizer Control Order (FCO, 1985). • Promotion of low cost participatory system of organic certification. • Awareness and publicity through print and electronic media.

Labelling of Organic logos on organic products:



For details contact the nodal Agencies at:

National Centre of Organic Farming
Hapur Road, Near CBI Academy, Sector 19, Kamla Nehru Nagar, Ghaziabad, Uttar Pradesh 201002
Email: nbdc@nic.in, W: https://ncof.dacnet.nic.in/

Regional Centre: Bhubaneswar
Plot No-23 (P), Khandagiri-Chandaka Road, Near Kalinga Studio Chowk, Ghatikia, P.O-Mahalaxmi Vihar, Bhubaneswar-751029.
T: 0674-2721281, **E:** biofor04@nic.in

3. Unlocking potential of Genebank collections for climate resilient agriculture

By Dr. Ashok Kumar, Director, ICAR-NBPGR, New Delhi

Plant Genetic Resources (PGR) refers to germplasm‖ or genetic diversity of actual or potential value that exists among individuals or group of individuals belonging to a species. The full spectrum of PGR consists of diverse type of collections such as those derived from the centres of diversity, centres of domestication and from breeding programmes. PGR broadly includes landraces, farmers' varieties, breeding material, genetic stocks, obsolete and modern varieties, wild and weedy relatives of cultivated plants, and potential domesticates such as wild species. Amongst the total number of species of higher plants which have been identified worldwide (250,000), PGR comprise 40% of these species, while the crop plants (cultivated as agricultural or horticultural species) cover only 2.8% of the species. Nevertheless, it is often stated that only 30 species "feed the world" providing more than 90% of calories or prote into human nutrition (FAO, 2010). Intensive modern breeding efforts in these staple food crops for higher yields have led to a narrowing of the gene pool by concentrating more on favorable alleles.

Furthermore, the increasing genetic uniformity of crop varieties combined with climate change effects makes crops more vulnerable to various biotic and abiotic stresses. Characterization, evaluation and regeneration of germplasm are an integral component of Plant Genetic Resources management. Characterization and evaluation of germplasm is the key to accelerate utilization in crop improvement programme by exposing the actual value of germplasm. The characterization of germplasm deals with the understanding and recording of highly heritable characters which may be used in establishing taxonomic identity, while, the germplasm evaluation deals with assessing the agronomic potential of an accession including quality parameters and response to various abiotic and biotic stresses. Maintenance of germplasm without losing genetic integrity is also a prime objective in PGR management. PGR are therefore important for maintaining genetic diversity for and preventing such losses, which may have serious consequences for food, nutrition and environmental security.

Regional Centre: Cuttack

- Conducted 89exploration programmes including special exploration missions in cyclone hit coastal districts, drought and flood affected areas of Odisha and a total of 9307 acc including 913 wild relatives of crops were collected from Odisha, NEH and adjoining region.

- A total of 6081 accessions comprising Cultivated rice (3796), wild rice (386), turmeric (665), Pigeon pea (09), Taro (51), M&AP (04), green gram (103), black gram (66), horse gram (87), sesame (899), wild cucurbits (17) were characterized for various agro-morphological traits as per the minimal descriptors.
- A total of 20314 accessions were multiplied and conserved in LTS (12,652), MTS (7028) cryo bank (50) and FGB (584). In addition, 330 herbarium specimens were deposited in NHCP, NBPGR, New Delhi.
- A total of 5254 acc of different crops, their wild relatives, medicinal plants and wild economic plants were supplied (32 institutes) and 7513 acc were received (15 institutes) for research purpose.
- A total of 768 accessions comprising various crop groups, M&AP and wild relatives are being maintained in the field gene bank of this Base Centre.
- A catalogue on rice germplasm and a document on "Plant Genetic Resources of Orissa-Accomplishments and future strategies" were published.

4. Freshwater aquaculture technologies for sustainable livelihood development

By Dr. Saroj Kumar Swain, Director, ICAR-CIFA, Bhubaneswar

Presently, India is the 4th largest capture (marine and inland) fishery and second largest aquaculture fish producing country in the world (FAO, 2020). India's total fish production stands at 13.76 million metric tonnes (2018-19), which is about 7.6 per cent of total global fish production. Traditionally, marine fisheries have revealed growth in India's fisheries sector, contributing about 70 per cent of total fish production during the 1950s. India's marine fisheries sub-sector is now performing with a downward trend, with 60% of Exclusive Economic Zone (EEZ) stocks over-exploited and the rest fully exploited. The marine fishery potential in the Indian waters has been estimated at 4.41 MMT, constituting more than 47% demersal, 48% pelagic and 5% oceanic groups. The dwindling trend in marine capture fisheries limits the scope of further augmentation in harvest capture as out of 1,368 species available, 200 commercially important species also require attention for their survival due to their complex food chain and interdependent existence.

The inland water resources of the country are comprised of 29,000 km of rivers, 0.3 million ha of estuaries, 0.19 million ha of backwaters and lagoons, 3.15 million ha of reservoirs, 0.2 million ha of floodplain wetlands and 0.72 million ha of upland lakes, which contribute about close to 2 million tonnes of fish annually (ICAR, 2011). The present average yield of riverine systems is estimated at about 1 tonnes per km. Freshwater aquaculture showed an overwhelming growth from 0.37 million tonnes in 1980 to 8.90 million tonnes in 2018-19, with a mean annual growth rate of over 7 percent in the recent past. Freshwater aquaculture contributes to over 95 percent of the total aquaculture production. Freshwater aquaculture in India has evolved from a state of homestead activity in few pockets of Eastern Indian states during the 1950s to the present state of a vibrant enterprise that has spread wing all over the country.

As the premier institute of aquaculture research in the country, ICAR-CIFA has a variety of technological offerings in its basket to augment the fish production: Technology packages for more

than thirteen fish species, Jayanti Rohu- a genetically improved strain of Rohu which gives 18 percent additional growth in a year after eleven generations of selection; CIFABROOD- a broodstock diet helps in early maturation of fish; FRP hatchery – a portable small size hatchery facilitates to undertake breeding programs even in hilly terrains; CIFAX- a therapeutic formulation to combat disease problems in fish. Besides, ICAR-CIFA advocates different approaches to the state governments and other stakeholders to maximise the fish products, such as system diversification and species diversification concepts where the former focus upon to standardize a different kind of aquaculture systems ranging from back yard ponds to super-intensive systems, aquaponics and later concept thrusts upon bringing more species into culture system in order to increase per unit productivity of the water and culture system.

CIFACURE

CIFACURE is used for controlling common bacterial and fungal infections of freshwater ornamental fishes. The product can be very well used in aquarium and other outdoor tanks where the ornamental fishes are grown. It controls many bacterial diseases like haemorrhagic septicemia, ulcers, fin rot, tail rot, eye diseases and mouth fungus and other fungal infections. It is available in 25 ml dropper bottle.

Manufactured and marketed by: Durga Enterprises, Bhubaneswar, Odisha.

CIFAX

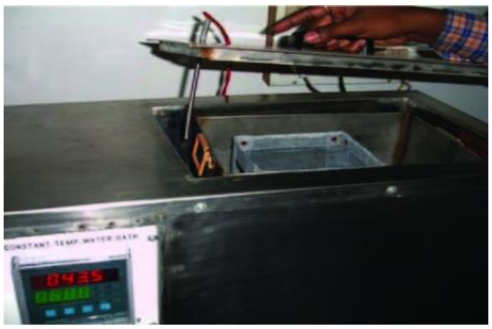
CIFAX™ is a chemical formulation and first commercialized technology of CIFA. It prevents and cures ulcerative diseases of freshwater fishes.

Manufactured and marketed by: Agarwal Trading Co., Raipur, Chattisgarh.

CIFABROOD

CIFABROOD™ is an exclusive carp brood stock diet, adequately rich in essential nutrients. It advances gonad growth and maturation, facilitates early spawning and significantly increases spawning response. Suitable for multiple/repeated breeding, off season gonad growth and post spawning recovery. The rate of feeding is 3-5% of total body weight during egg development phase.

Manufactured & Marketed by: Aisharya Aquaculture Pvt. Ltd. Naihati, West Bengal.



CIFA-CRYO

CIFA-CRYO is a manually operated handy cryofreezer for gamete cryopreservation. This manually operated handy cryofreezer is used for the cryopre-servation of milt of freshwater fish species. This is suitable and more advantageous in terms of liquid nitrogen use, size of the unit, on-farm utilization and easy operation. It is helpful in processing the milt sample upto -60° c for storage in liquid nitrogen (-196° c).

Manufactured & Marketed by: Biotechnika, Bhubaneswar, Odisha.

FRP Carp Hatchery

Fiberglass Reinforced Plastic (FRP) carp hatchery has proved to be a very effective tool in carp seed production which will be beneficial to the farmers. It can be transported, installed and operated in remote places to ensure easy and timely availability of carp seeds. FRP hatchery is suitable for fish breeding in field conditions for 10-12 kg of carps in one operation and can be used as a tool for bio-diversity conservation.

Manufactured & Marketed by: M. R. Aquatech, Bhubaneswar, Odisha.

Immunoboost-C

Immunoboost-C is an immunostimulant to improve brood fish health and seed production in carps. It modulates the fish immunity against microbial diseases and has been proven through extensive trials conducted at many aquaculture regions in India. It is also given to spawn, fry and fingerlings through bath treatment during seed transport.

Manufactured & Marketed by: Smruti Agency, Bhubaneswar, Odisha.

Jayanti Rohu

Jayanti Rohu™ was developed through selective breeding of rohu, Labeo rohita from different founder populations of North Indian Rivers. Improved Jayanti Rohu™ is the first genetically improved fish in India. It has shown improvement in the gain of 17% per generation for growth trait. Dissemination of improved rohu to different parts of India is under progress.

Portable Magur Hatchery

Portable Magur Hatchery has its high market demand due to its protein rich flavour and medicinal value. The portable magur hatchery is a simple device comprising a stand on which are placed a row of plastic tubs (12 em dia, 6 em high). Water supplied from the overhead tank through a common pipe to all the tubes with individual control tabs. It includes egg incubation and hatching. The technology creates a suitable environment for high hatching percentage where maximum 50,000 eggs can be incubated at a time.

Manufactured & Marketed by: M. R. AquaTech, Bhubaneswar, Odisha.

5. Genetics and biotechnology to augment aquaculture production & food security

By Dr. Jitendra Kumar Sundaray, Principal Scientist, ICAR-CIFA, Bhubaneswar

Agrivision 2022 was a platform to discuss the recent advancement in food production system. The three days program deliberated many issues and food production system through aquaculture was an attraction. Aquaculture has grown to be a vital sector, and genetics and biotechnology are helping to shape it in the direction of sustainable production. Products from fisheries and aquaculture are one of the many food commodities available, but maintaining profitability and environmental compatibility is tough. Hybridization, transgenesis, genomic technologies, and genetic engineering with genome sequencing, genome editing (ex: CRISPR/Cas9), and gene knockouts to develop species with desired traits related to disease resistance, stress resistance, and other traits have proven to be beneficial in increasing production and productivity. As a result, the use of genetics and biotechnology will propel sustainable aquaculture production to new heights. As the world's population grows and people become wealthier, the food production system must adapt by producing enough high-quality food to feed everyone while causing little environmental damage. Policy changes, economic stressors, pollutants, and natural calamities all have the potential to disrupt the world's intricately integrated food supply systems. For the concept of food security, the nutritional aspect is critical.

Pesticides used indiscriminately have resulted in higher levels of chemical contaminants in aquaculture systems. Because various chemicals emitted only reach aquatic bodies, the aquaculture system has become an ultimate destination for anthropogenic pollutants. Due to its impact on aquatic creatures, such as agrochemicals on the health of fish or other aquatic organisms, aquatic toxicology has been highlighted by global researchers. We must continue to do innovative research by which society gets maximum benefit from all research interventions.

6. Cultivation of Medicinal Plants a Profitable Business for Farmers

By Dr. Gyanranjan Mahalik, Associate Prof of Botany, CUTM, Bhubaneswar

A critical global concern increasing world population and a widening economic divide between the poor and the rich is a severe global problem associated with the economically weaker sections' affordability of expensive quality healthcare. According to the World Health Organization (WHO), recognising traditional complementary and alternate systems of medicine to provide health security to the poor in developing nations is a welcome step. These systems widely use medicinal plants (MPs) for preparing drugs. Globally only 18% of world flora are presently used for healthcare. Only 900 medicinal plants are grown in different nations, mostly in developing economies, out of the 3000 medicinal plants traded in worldwide marketplaces.

Profit in Medicinal Plant Farming

Cultivating medicinal plants in a commercial mode is one of the most profitable agri-businesses for farmers. If anyone has sufficient land and knowledge of herb marketing, they can earn a high income in a very sensible investment in India.

Cultivating medicinal herbs like Shankhapushpi, Atis, Kuth, Kutki, Kapikachhu, Karanja is changing the Indian agrarian Ayurvedic scenes and the extraordinary opportunities for the farmers to increase their income. According to the Traditional Treatment Health Center, 25 significant medicinal plants are always in total demand. They are; Indian Barbery, Licorice, Bael, Isabgol, Atis, Guggal, Kerth, Aonla, Chandan, Senna, Baiberang, Long Pepper, Brahmi, Jatamansi, and Madhunashini, Kalmegh, Satavari, Ashwagandha, Chirata, Katki, Shankhpushpi, Ashoka, Giloe, kokum, Safed Musli.

The medicinal herbs Mint, Aloe vera, Basil, Tulsi, Lemongrass, Coriander, Ajwain are the most beneficial therapeutic yields in India.

However, a survey conducted by the All India Coordinated Research Project on Ethnobiology (AICRPE) during the most recent decade recorded more than 8000 types of wild plants utilised by the tribals and other conventional communities in India for rewarding different medical issues. Around 30% of therapeutic arrangements are gotten from roots, 5% blossoms, 10%

organic products, 14% bark, 16% entire plants, 6% leaves, 7% seeds, 3% wood, 4% rhizomes, 6% stems and just under 20% of the species utilised are developed.

Market Scenario

The market for medicinal plants in India stood at Rs. 4.2 billion (US$ 56.6 million) in 2019 and is expected to increase at a CAGR 38.5% to Rs. 14 billion (US$ 188.6 million) by 2026. The total world herbal trade is currently assessed at US$ 120 billion. India's share in the global export of herbs and herbal products is low due to unsophisticated agricultural and quality control procedures, lack of processing, research & development, standardisation in products and regulatory framework in the trade of medicinal plants.

The export of herbs and value-added extracts of medicinal herbs has gradually increased. In 2017-2018, India exported US$ 330.18 million worth of herbs at a growth rate of 14.22% over the previous year. Also, exports of value-added extracts of medicinal herbs and herbal products in 2017-2018 stood at US$ 456.12 million, recording a growth rate of 12.23% over the previous year. The demand for herbal/value-added extracts of medicinal herbs is gradually increasing in foreign countries, especially in European and other developed countries.

Government Initiatives

The Government of India has taken several measures to promote the cultivation and export of medicinal plants. The National Medicinal Plants Board (NMPB) offers up to 75% subsidy to farmers; formulates schemes and guidelines for financial assistance in various zones of medicinal plant divisions, secured under promotional and commercial plans relevant to government non-government associations.

The Department of Commerce has set up export promotion councils (EPCs) to promote exports of various product groups and has assigned Shellac & Forest Products Export Promotion Council (SHEFEXIL) to mandate herbs and medicinal plants exports. Pharmaceuticals Export Promotion of several herbal products has been promoted to Pharmaceuticals Export Promotion Council (PHARMEXCIL). The EPCs facilitate the exporting community and undertake various promotional measures to encourage exports of their products.

Under the Market Access Initiative (MAI) Scheme of the Department of Commerce, the EPCs/trade bodies are provided with financial assistance to participate and organise trade fairs, buyer-seller meets (BSMs), reverse buyer-seller meets (RBSMs), research & product development, market studies, etc.

The Merchandise Exports from India Scheme (MEIS) provides incentives to the exporting community for specified goods to counteract infrastructural inefficiencies and the associated

costs of exporting products manufactured in India; thereby giving particular emphasis to these products which are of India's export interest and have the capability to generate employment and enhance the country's competitiveness in the world market.

The International Cooperation Scheme by the Ministry of AYUSH provides financial assistance to exporters to help them participate in trade fairs, organise international business meets & conferences and avail product registration reimbursements.

Through its quality certification programmes such as 'AYUSH' and 'Premium' marks, the Ministry of AYUSH has been assisting the industry in setting up standard quality. In addition, it has also entered into a memorandum of understanding (MoUs) with a few countries to promote traditional medicines.

Future of Medicinal Plants Industry in India

In India, the production and cultivation of medical plants are primarily unorganised. An equipped supply chain management and the formation of farmer associations will improve the country's production and sales of medicinal plants. The sector has observed recent entries of start-ups bringing in technology upgradation. These start-ups use precise farming techniques by integrating artificial intelligence (AI) and data analytics for crop profiling and seed analysis for better germination.

Conclusion

Cultivating medicinal plants in a commercial mode is one of the most profitable agri-businesses for farmers in India. If anyone has sufficient land and knowledge of herb marketing, they can earn a high income with moderate investments.

7. Turmeric Secondary Metabolites and Pharmacological Values: Preserving and Expanding Our Indigenous Knowledge Base

By B. Jyotirmayee, Research Scholar, CUTM, Bhubaneswar

Traditionally held medical knowledge is primarily concerned with maintaining and distributing herbal medicine know-how. Traditional medicine uses a wide range of plant-derived substances, notably those with therapeutic properties. However, Traditional Knowledge is quickly degrading due to the lack of recording, rapid land-use change, and a lack of intergenerational knowledge transmission. Secondary metabolites may be discovered in a wide variety of medicinal plants. Organs, tissues, and cells may have particular regulatory pathways for synthesising and transporting each molecule. Stress and developmental events affect the SM content in medicinal plants with the exact genetic origin. Plants used in ancient and modern medicinal preparations and medication discovery are increasingly being selected and grown using biotechnological approaches.

There is a long history of turmeric's use in Ayurveda, contemporary medicine, and home treatments for many diseases. Consequently, it has essential functions in biology, medicine, and pharmacology. In turmeric, each molecule has a distinct biological role. The cancer-prevention potential of at least 20 antimicrobial compounds and 14 components has been established. Twelve of its members also have antitumor and anti-inflammatory effects. With at least ten molecular antioxidants, it possesses anti-inflammatory properties. There are 326 various biological, clinical, and pharmacological functions associated with turmeric. As a result, it is considered the region's most valuable medicinal plant. In ethnobotany, phytochemistry, and pharmacology, the medicinal properties of plants are examined to see how these findings might be employed for medical development. Studying previously used medical plant species may assist guarantee herbal treatments are safe, and new medications are discovered. In ethnobotany, phytochemistry, and pharmacology, the medicinal properties of plants are examined to see how these findings might be employed for medical development.

Importance of Turmeric in the Rising Worldwide Scenario

During the modification of primary metabolite production, traditional organic molecules produced by microorganisms are known as secondary metabolites (secondary metabolites). Antimicrobial and pigment-producing secondary metabolites are common among secondary metabolites with ecological purposes. Root exudates are one method to communicate with neighbouring plants and microorganisms in the root's rhizosphere. Depending on the adjacent biotic and abiotic environment, the chemical components of the root exudates are species-specific and rely on a particular plant species. Root exudates may mediate various positive and negative interactions between plants and microbes. Plant health may be affected by interactions between root exudates and secondary metabolites released by micro soil flora. Secondary metabolites were shown to be more effective in fighting germs after treatment with organic solvents. In other words, the secondary metabolites in the organic solvent were more active because of their polarity and their propensity to dissolve in it. Many ecologically important secondary metabolites, including defence mechanisms, antibiotics, and pigment production.

Contribution of Turmeric to the Medical and Industrial World

An essential and commonly used secondary product of bacteria is antibiotics. Bacterial antibiotics like erythromycin, produced from *Saccharopolyspora erythraea,* are widely utilised because of the vast range of microorganisms they are effective against. It is widely available, mass-produced, and often taken orally. Bacitracin, an antibiotic produced from Bacillus subtilis, is often used in modern medicine. In nature, bacitracin, an antibiotic, is produced by the enzyme non-ribosomal peptidyl-synthetase. The specificity of the potent isolates allowed them to create metabolites, which increased the isolates' activity several times. It may thus

be used to produce natural antimicrobials as an alternative to conventional treatments by using *Curcuma longa*.

Further research into the metabolites produced by the bacterial isolates is needed to find new antimicrobial agents. These metabolites might be employed to treat microbial infections. In the hunt for novel metabolites, the discovery of antimicrobial-active strains points to the soil as an ecological niche with a rich microbial diversity that has yet to be fully explored. As a result of their high growth rates and ability to develop quickly in raw materials, Bacillus species are widely used as the predominant bacterium in industry. In this way, the red pigment generated by the bacteria may be further defined for use in industry.

The widespread use of commercial antimicrobial medications to treat infectious infections has led to increased multiple drug resistance in recent years. There are also possible side effects on the host, such as hypersensitivity, immunological suppression and allergic responses while using antibiotics. In light of this circumstance, scientists were obliged to look for new antimicrobial agents. Antibiotic resistance is on the rise among medically essential microorganisms, necessitating the continual search for new and improved treatments. As a result, there is a pressing need to create new antimicrobial medications from medicinal plants like turmeric to cure infectious infections. Screening studies have been conducted in many countries. The antimicrobial activity of herbal extracts from diverse global locations has been shown in several studies.

Conclusion

Turmeric is a wonder to humankind since it has so many beneficial biological functions. As an essential part of Asian culture, turmeric has been used for a long time in traditional medicinal systems, including Ayurveda, Siddha, and Unani. Since ancient times, it has been employed in culinary dishes to add colour, flavour, and aroma to the long-plant rhizome of the Curcuma longa plant. The biological effects of curcumin, the primary active ingredient, and other compounds derived from it are many and diverse. Turmeric, a natural substance, is effective in treating a wide range of disorders without causing any harm to humans. There is adequate knowledge on turmeric's usage other than as a spice and therapeutic use, but more study is required in the future to produce new turmeric products. Thanks to its high phenolic and flavonoid content, several ailments are treated with it, which has excellent antioxidant action. Folk remedies for gynaecological issues, gastrointestinal issues, hepatic disorders, cough, sore throat, respiratory illnesses, infectious infections, and blood disorders have all used this spice. Its chemical ingredients have been identified as polyphenols, alkaloids, diterpenes, sesquiterpenes, triterpenes, and sterols. Toxicological, anti-mutagenic, cancer-fighting activities have been shown in cell research for turmeric. Many research has done on animals show that this spice has anti-inflammatory and neurodegenerative properties and cancer, diabetes, depression, obesity, and atherosclerosis properties.

9. (Biofertilizers in Rice Crop)- Chlamydospore formation in Trichoderma and its utilization for the sustainable health management of rice crop

By Harekrushna Swain, Scientific Staff, Botanical Survey of India, ERC, Shillong

Trichoderma is one of the most important biocontrol fungi, which could produce mycelia, conidiophores, and chlamydospores three types of propagules under different conditions. Chlamydospores are produced in harsh conditions in various fungi, and may be more resistant to adverse conditions. However, the knowledge associated with the mechanism of chlamydospore formation remained unclear in *Trichoderma*. This study is aimed to explore the essential genes and enzymes associated with chlamydospore formation in *Trichoderma*. The culture condition, survival rate, and biocontrol effects of chlamydospores and conidiophores from *Trichoderma* strains were determined. Seven different spp. of *Trichoderma* were characterized according to morphological and molecular tools. Two of the isolated strains, namely *Trichoderma hebeiensis* and *Trichoderma erinaceum*, outperformed the other strains. Both of the strains controlled four important rice pathogens, i.e., *Rhizoctonia solani* (100%), *Sclerotium oryzae* (84.17%) and *Sclerotium rolfsii* (66.67%). Furthermore, the genes responsible under chlamydospore-producing and chlamydospore-nonproducing conditions were performed. *Trichoderma* isolates produced chlamydospores under particular conditions, and chlamydospore-based formulation of *Trichoderma* exhibited higher biocontrol ability against *Rhizoctonia solani* in rice plant than conidoiospore-based formulation. Significantly higher expression of some stress related enzymes was observed in *Trichoderma* treated plants which helped in better crop growth both under biotic and abiotic stresses. These isolates helped both the varieties to accumulate more nutrients. This study proves that *Trichoderma erinaceum* obtained from tree bark may be incorporated in integrated rice crop management both as biocontrol agent and biofertilizer. The results would provide a basis on the molecular mechanisms underlying *Trichoderma* sporulation, which would assist the development and application of fungal biocontrol agents. This investigation also demonstrates that *Trichoderma* strains obtained from tree bark could be considered to be utilized for the sustainable health management of rice crop.

10. (Biofertilizers in Rice Crop)- Endophytic fungal microbes isolated from wild rice species are the hidden world for the sustainable agriculture and the better health management of Rice Crops

By Ms. Rupalin Jena, Research Scholar, ICAR-NRRI, Cuttack

Due to rapid population growth the demand for food is increasing day by day. Rice being the most important food crop of the developing world is a staple food for more than 60% of the Indian Population. The increase in rice population has declined from 3.55% during 1981-1990 to 1.74% in the next decade. The average productivity of rice is also comparatively low in India, which needs a significant increase to meet the demand of food for the growing population. However, the productivity rate has reached almost to maximum living almost no or less space to increase production by

increasing productivity. Hence, it is needed to stop the yield loss due to different external factors like disease and pests which is being done by chemical pesticides. However, the chemical pesticides are not advisable for food crops and also contributor to environmental pollution, so there is a need to find out an alternative approach to combact disease and pests in rice.

The endophytes which are residing inside the plant in turn providing many benefits to the plants may play an important role to stop the yield loss in rice by providing resistance from inside the crops against different diseases. The wild rice species like *Oryza rufipogon*, *Oryza nivara*, *Oryza granulate*, *Oryza barthii, Oryza longistaminata* are possible source of endophytes which can be good candidates for management of rice health. The wild rice harbors many potential economic traits which may be due to presence of different endophytes residing inside them. The literature survey showed that very less work has been undertaken to utilize the endophytes from wild for rice health management. In present proposal we would like to explore the wild rice endophytes for management of rice diseases and its health and also study the mechanism of interactions among endophytes, pathogen and hosts.

MAIN OBJECTIVES:

- ☞ Collection of different wild rice endophytes
- ☞ Finding the best endophytes as biocontrol agent in order to replace the use of chemical fertilizers.
- ☞ Endophytes formulation apply on rice field during seed sowing
- ☞ Mass production and formulation of selected effective endophytes and demonstration in field.

WORK DONE SO FAR:

- ➢ We studied and found the best endophytes from different plant parts such as seed, root, leaf and stem of wild rice species.
- ➢ We applied them for different rice diseases basically found in rabi and khariff season.
- ➢ We also focused the growth promotion of rice crops in field and the better health management of rice crops.
- ➢ Both khariff season and rabi season we applied the treatments and found better condition of rice crops.
- ➢ So, it can be concluded that the endophytes may be an alternative for chemical treatment for better plant health management which is also environment friendly.

APPLY OF ENDOPHYTIC FORMULATION FOR HEALTH MANAGEMENT OF RICE CROPS:

Mass production and formulation of selected effective endophytes and application in field:

- Simply the rice seeds before sowing just treated with endophytes and then normal sowing procedure in field will be followed.
- The application of mass multiplication and treated plants will be used as our best agricultural application.
- Field trials for farmer's.
- Distributing the endophyte formulation in the form of a package of practice.

Expected outcomes:

- To stop the use of chemical fertilizers.

- To control the diseases in both khariff and rabi season rice plants.
- Application of endophytes in better health management of rice crops.

11. Banana Cultivation by drip irrigation, Tissue culture Technology and Integrated Nutrition Management: Success Story share

By Mr. Dhirendrakumar Bhanubhai Desai, Progressive Farmer, Bharuch, Gujrat

Innovative Approach of Farming:

- **Cultivation (40HP):** Use of sub-soiler: for deep-cultivation: Domestic Tractor
- **Sapling distance**: 6 feet X 6 feet = 1200 Saplings per acre.
- **Fertile Organization**: Drip Irrigation System
- **Organization of Fertilizers**: Integrated Bid Nutrient, Less Chemical Fertilizers, Use of Showering Fertilizers.
- **IBNM & CFM**: (Integrated Bid Nutrient Management in Combination with Chemical Fertilizer Management)
- **Periods for the production of the Crops**: a) Up to 10.5 months- 1st, b) Up to 16.5 months- 2nd, and c) Up to 24 months- 3rd
- **Production:**
  - **Per Hectere:**
    - Plantation: more than 80 tone.
    - 1st lame: more than 65 tone
    - 2nd lame: more than 55

Old Farming System	New Farming System
CULTIVATION: Because of continuous use of fertile soil and chemical fertilizers as well as heavy HP- Tractors plough on the soil become hard layers and therefore some time it could be difficult to cultivate the farm in depth 10 to 12 inch, which affects on the layer of the farm especially for the deep- rooted crops.	**CULTIVATION:** Simple: It's possible to cultivate the farm with low-HP Tractors in depth of 20 to 25 inches, which is too good for the deep- rooted crops.
DISTANCE BETWEEN SAPLINGS: 5 X 5 feet, 5.5 X 5.5 feet, 5 X 5.6 system had very less saplings and it had also less sun- rays on these sapling as well as their it took more time- periods for cutting onwards; which had less in productivity too.	**DISTANCE BETWEEN SAPLINGS**: 6 X 6 feet: It is good to have saplings about 1200 per Acre in it with less time-period it provides good productivity and it has less time-periods for cuttings too which made it easy and fast development.
ACCESSIBILITY OF SEEDS/SAPLINGS: The saplings were tidy and had issues of diseased productions and also need much more insecticides for the protection. The plantation should be done especially in the monsoon only.	**DISTANCE BETWEEN SAPLINGS**: Healthy tissue-cult plants are free of diseased articles and insecticides and also have gain in production with less cost. These can be planted in every season.

Details of the last 5 years of Agricultural Achievement

YEAR	2016-17	2017-18	2018-19	2019-20	2020-21
CROP	BANANA	BANANA	BANANA	BANANA	BANANA
TOTAL AREA (HECTARE)	1.20	1.25	1.35	1.85	5
TOTAL PRODUCTION (KG)	110000	115200	117789	165419	467622
TOTAL INCOME (Rs.)	1045400/-	1076000/-	1085602/-	1608908/-	4558357/-
TOTAL EXPENSES (Rs.)	248000/-	242000/-	240000/-	289476/-	760000/-
TOTAL NET PROFIT (Rs.)	797400/-	834000/-	845602/-	1319432/-	3798352/-

Information per hectare area

YEAR	2016-17	2017-18	2018-19	2019-20	2020-21
CROP	BANANA	BANANA	BANANA	BANANA	BANANA
TOTAL AREA (HECTARE)	1	1	1	1	1
TOTAL PRODUCTION (KG)	73333	78846	87251	88400	91000
TOTAL INCOME (Rs.)	646933/-	658840/-	804150/-	839800/-	887250/-
TOTAL EXPENSES (Rs.)	183500/-	179500/-	177778/-	154500/-	152000/-
TOTAL NET PROFIT (Rs.)	463433/-	479340/-	626372/-	685400/-	735250/-

Total Expenses per hectare 2019- 2020

43500/-	Rs . 14.50 per plant cost, 1 hectare – 3000 plant (6x6 spaced) 14.50 x 3000 = 43500
25000/-	Land preparation cost.
20000/-	Water charges, electricity bill , pipeline maintenance cost
20000/-	Organic fertilizer , green pavement, IBNM costs
30000/-	Packing charges and lace support charges.
16000/-	Labour charges
154500/-	Cost per Hectare.

Total Expenses per hectare 2020- 2021

43500/-	Rs . 14.50 per plant cost, 1 hectare – 3000 plant (6x6 spaced) 14.50 x 3000 = 43500
23000/-	Land preparation cost.
20000/-	Water charges, electricity bill , pipeline maintenance cost
18000/-	Organic fertilizer , green pavement, IBNM costs
27500/-	Packing charges and lace support charges.
20000/-	Labour charges
152000/-	Cost per Hectare.

Successful cultivation of banana by Drip irrigation and integrated nutrition management

In the beginning of the year, he used to cultivate banana and sugarcane in an old way which resulted with little financial compensation. He got Information about drip irrigation system and tissue culture banana during the agricultural tour of Jain Irrigation, Jalgaon during the year 2004 and adopted this method since 2005.

· Drip irrigation system and Planting Tissue Culture banana

· In the summer, use timely and proportionate proportion of green manure and use of bio-compost, synthetic fertilizer as well as chemical fertilizer in last 10 years.

· For quality production of banana, sprinkle on banana with different spraying and cover them with plastic bag.

· After planting banana producing 3 times banana in 27 months. In the first year produces 32 to 35 tons in second year 25 tons and third year 20 tons of banana per acre. No such production is available in such a short time in India

Ready to exporting banana in my farm.


Prepare Banana to pack in box.


Quality Banana's lime.


Banana's Packing house.

Tax Invoice of Proceeding Book & Note Pad

TAX INVOICE *(ORIGINAL FOR RECIPIENT)*

AB Imaging & Prints Pvt. Ltd. 62 & 63 Ganganagar, Unit-6 Bhubaneswar GSTIN/UIN: 21AAFCA5348H1ZY State Name : Odisha, Code : 21 E-Mail : ab_print@rediffmail.com	Invoice No. AB/689/21-22 · e-Way Bill No. 811213795933 · Dated **14-Mar-22** Delivery Note · Mode/Terms of Payment **15 Days** Reference No. & Date. · Other References Buyer's Order No. · Dated Dispatch Doc No. · Delivery Note Date Dispatched through · Destination Terms of Delivery
Buyer (Bill to) **EVATION BUSINESS SOLUTION** CUTTACK GSTIN/UIN : 21AAECE9646F1ZQ State Name : Odisha, Code : 21	

Sl No.	Description of Goods	HSN/SAC	GST Rate	Quantity	Rate	per	Amount
1	**Souveneirs** *Printing of Agrivision 22 Souveneir*	9989	18 %	600.000 Nos	337.00	Nos	**2,02,200.00**
2	**Printing of Note Pad** *Printing of Note Pad for Press*	9989	18 %	1,000.000 Nos	14.55	Nos	**14,550.00**
3	**Printing of Note Pad** *Printing of Note Pad in WIRO*	9989	18 %	600.000 Nos	36.00	Nos	**21,600.00**
							2,38,350.00
	CGST						**21,451.50**
	SGST						**21,451.50**
	Total			2,200.000 Nos			₹ 2,81,253.00

Amount Chargeable (in words) *E. & O.E*

Rupee Two Lakh Eighty One Thousand Two Hundred Fifty Three Only

HSN/SAC	Taxable Value	Central Tax Rate	Central Tax Amount	State Tax Rate	State Tax Amount	Total Tax Amount
9989	2,38,350.00	9%	21,451.50	9%	21,451.50	42,903.00
Total	**2,38,350.00**		**21,451.50**		**21,451.50**	**42,903.00**

Tax Amount (in words) : **Rupee Forty Two Thousand Nine Hundred Three Only**

Company's PAN : **AAFCA5348H**

Declaration
We declare that this invoice shows the actual price of the goods described and that all particulars are true and correct.

Company's Bank Details
Bank Name : **Kotak Mahindra Bank**
A/c No. : **2445736186**
Branch & IFS Code: **Janpath,Bhubaneswar & KKBK0000493**

for AB Imaging & Prints Pvt. Ltd.

Authorised Signatory

SUBJECT TO BHUBANESWAR JURISDICTION

This is a Computer Generated Invoice

Attendance Sheet of Participants

SL	Name	Organization	Sign
1	Namita Muduli	Ravenshaw University, Cuttack	
2	Dr. Khirod Sahoo	Ravenshaw University, Cuttack	
3	Rageshree swain	Ravenshaw University, Cuttack	
4	Sanjay Kumar Madkami	Ravenshaw University, Cuttack	
5	Bhaswatimayee Mahakur	Ravenshaw University, Cuttack	
6	Srushti Prajna Mohanty	Ravenshaw University, Cuttack	
7	Pragyan Rout	Ravenshaw University, Cuttack	
8	Smrutirekha Mishra	Ravenshaw University, Cuttack	
9	Barsha Bhushan Swain	Ravenshaw University, Cuttack	
10	Dr. Shasmita	Ravenshaw University, Cuttack	
11	Dr. Debasish Mohapatra	Ravenshaw University, Cuttack	
12	Bibekananda Panda	Ravenshaw University, Cuttack	
13	Prof. Pradipta Kumar Mohapa	Ravenshaw University, Cuttack	
14	Prof. Luna Samanta	Ravenshaw University, Cuttack	
15	Prof. Soumendra K. Naik	Ravenshaw University, Cuttack	
16	Monalisha Dasmohapatra	CUTM, Bhubaneswar	
17	Suchismita Prusty	CUTM, Bhubaneswar	
18	Dr. Ranjan Kumar Sahoo	CUTM, Bhubaneswar	
19	Dr. Gyanranjan Mahalik	CUTM, Bhubaneswar	
20	Lopamudra Samantaray	CUTM, Bhubaneswar	
21	B Jyotirmayee	CUTM, Bhubaneswar	9668504465
22	Dr. Yashaswi Nayak	CUTM, Bhubaneswar	
23	Ananya Mishra	CUTM, Bhubaneswar	
24	Sunanya Das	CUTM, Bhubaneswar	
25	Dr. Sutar Suhas Bharat	CUTM, Bhubaneswar	
26	Dr. Rukmini Mishra	CUTM, Bhubaneswar	
27	Rashmi Ranjan Sutar	CUTM, Bhubaneswar	
28	Sonupriya Sahu	CUTM, Bhubaneswar	
29	Debasmita Das	CUTM, Bhubaneswar	
30	Pushpalatha Ganesh	CUTM, Paralakhemundi	
31	S. R. Harish Chandar	CUTM, Paralakhemundi	
32	Sonali Sucharita Jena	CUTM, Paralakhemundi	V
33	Sreedhara Ambareesh	CUTM, Paralakhemundi	I
34	Samikhya Jena	CUTM, Paralakhemundi	R
35	Ram Prasad Behera	CUTM, Paralakhemundi	T
36	Santanu Mishra	CUTM, Paralakhemundi	U
37	Shreya Shree Nayak	CUTM, Paralakhemundi	A
38	Tanmayee Mohanty	CUTM, Paralakhemundi	L
39	Sanchita Mishra	CUTM, Paralakhemundi	V
40	Ch. Sai Swetha	CUTM, Paralakhemundi	I
41	Raghavendra P	CUTM, Paralakhemundi	R
42	S. Veera Vishnu	CUTM, Paralakhemundi	
43	Sanchari Pandit	CUTM, Paralakhemundi	VIRTUAL
44	Rupalin Jena	ICAR-NRRI, Cuttack	
45	Harekrushna Swain	ICAR-NRRI, Cuttack	

46	Prachitara Rout	ICAR-NRRI, Cuttack	
47	Dr. Parameswaran C	ICAR-NRRI, Cuttack	
48	Dr. Sanghamitra Samantaray	ICAR-NRRI, Cuttack	
49	Dr. Sharat Kumar Pradhan	ICAR-NRRI, Cuttack	
50	Dr. Devanna BN	ICAR-NRRI, Cuttack	
51	Dr. Arup Kumar Mukherjee	ICAR-NRRI, Cuttack	
52	Dr. Dillip Ranjan Sarangi	ICAR-NRRI, Cuttack	
53	Byomkesh Dash	ICAR-NRRI, Cuttack	
54	Sudhansu Sekhar Bhuyan	ICAR-NRRI, Cuttack	
55	Dr. Kutubuddin Ali Molla	ICAR-NRRI, Cuttack	
56	Nibedita Swain	ICAR-NRRI, Cuttack	
57	Manjusha Chandravani	ICAR-NRRI, Cuttack	
58	Dr. Reshmi Raj K.R	ICAR-NRRI, Cuttack	
59	Aravind Rathod	AEEC, UAS, Raichur	VIRTUAL
60	Dr. Bindhu K G	AEEC, UAS, Raichur	VIRTUAL
61	Dr. Sudhir Kumar Rajpoot	BHU, Varanasi	VIRTUAL
62	Dr. Manish Pandey	BARC, Mumbai	
63	Sonali Jaiswal	D.D.U. Gorakhpur University	
64	Manasa Gowda	Ernst&Yiung	VIRTUAL
65	Dr. Raghunath Satpathy	GM University, Sambalpur	VIRTUAL
66	Mr. Dhirendrakumar Bhanubh	Gujrat	
67	IPSITA ISWARI DAS	ICAR-CIFA, Bhubaneswar	
68	Dr. Jitendra Kumar Sundaray	ICAR-CIFA, Bhubaneswar	
69	Dr Saroj Kumar Swain	ICAR-CIFA, Bhubaneswar	
70	Dr. N.P. Sahu	ICAR-CIFE, Mumbai	VIRTUAL
71	Dr. Vijay Bahadur Singh Chauh	ICAR-CTCRI, Bhubaneswar	
72	Dr. M. Nedunchezhiyan	ICAR-CTCRI, Bhubaneswar	
73	Dr. M. Nedunchezhiyan	ICAR-CTCRI, Bhubaneswar	
74	Dr. Usha Kiran Betha	ICAR-IIOR, Hyderabad	VIRTUAL
75	Dr. Ravi Kishore Pamarthi	ICAR-NBPGR, New Delhi	6/3/2022
76	Dr. Anjula Pandey	ICAR-NBPGR, New Delhi	
77	Dr. Susheel Kumar Raina	ICAR-NBPGR , J&K	VIRTUAL
78	Shradha Jamwal	ICAR-NDRI, Karnal	VIRTUAL
79	AKANSHA GUPTA	IIT Delhi	〃
80	Abhay Tiwari	IIT Delhi	〃
81	Himanshu Arora	IIT Delhi	〃
82	Sauren Das	ISI, Kolkata	
83	Rajashree Dutta	ISI, Kolkata	VIRTUAL
84	Ekta Bhattacharya	ISI, Kolkata	
85	Sreemoyee Mitra	ISI, Kolkata	
86	Madhurima Dutta	ISI, Kolkata	
87	Baishnab Charan Tripathy	JNU, New Delhi	
88	Gorasiya Chirag Amrishbhai	Junagadh Agricultural University	VIRTUAL
89	Shaktishree Jena	KVCET, Anna University, Chennai	for
90	Revathy K	Madras Christian College	
91	Anju Kumari	MPUAT, Udaipur	VIRTUAL
92	Payal Kapoor	NAFBI, Mohali	〃
93	Payal Kapoor	NAFBI, Mohali	〃
94	Sayani Saha	NIT Durgapur	
95	Dr. Samarendra Mahapatra	OUAT, Bhubaneswar	

96	Pramod Kumar Jena	Raiganj University	VIRTUAL
97	Bijayalaxmi Mahanty	RD Women's University, Bhubaneswar	ABSENT
98	Tamarapalli Sravya Sruti	RD Women's University, Bhubaneswar	Tamarapalli Sravya Sruti
99	Dr. Kalidas Pati	ICAR-CTCRI, Bhubaneswar	
100	Prof. K. C. Bansal	Secretary , NAAS	VIRTUAL
101	Dr. Shahnawaz Ahmad Dar	SKUAST, Jammu & kashmir	
102	Saroj	SMVDU, Katra, J&K	VIRTUAL
103	Srija Priyadarsini	SOA University, Bhubaneswar	Srija Priyadarsini (CA
104	Dr. Bijoy Kumar Sahoo	SOA University, Bhubaneswar	
105	A.P. SIVAMURUGAN	TNAU, Coimbatore	VIRTUAL
106	A.P. SIVAMURUGAN	TNAU, Coimbatore	"
107	Sudhanshu Ranjan	The Farm Enterprise, Cuttack	Sudhanshu Ranjan
108	Dr.Papa Madiallacke DIEDHIO	Université Gaston Berger de Saint-Louis	VIRTUAL
109	Dharavath Saicharan	UAS Dharwad,	"
110	Ningaraju G. K	UASs, Bengaluru	"
111	Chaitra C Kulkarni	UAS, Bagalkote	"
112	Dr. Asna Urooj	University of Mysore, Mysore	Asna Urooj

113. Aiswarya Majhi Ravenshaw university, cuttack
114 Rojalin Gochhi Ravenshaw University, Cuttack
115 Subhashree Sanal Ravenshaw University, Cuttack
116 Debasmita Nayak Ravenshaw University Cuttack
117 Sangeeta Biswal Ravenshaw University, cuttack.
118 Annapurna Shial Ravenshaw university Cuttack.
119 Bishnu Prasad Sahoo Ravenshaw University Cuttack
120. Dhanunjaya Halba Ravenshaw University, Cuttack
121. Ipsita Iswari Das, ICAR- CIFA, BBSR.
122. Nirmaya Jena , Ravenshaw University, Cuttack.
123. Bijayalaxmi Sahoo Ravenshaw University, Cuttack.
124. Reshmi Raj K.R, ICAR - NRRI, Cuttack.
125. Chunjun Parida, Ravenshaw university
126. Smruti Priyadarshini Badapanda, Ravenshaw university, Cutte
127. Swagati Priyadarsini, Ravenshaw University
128. Suchismita Behera, Ravenshaw University
129. Tapaswini Kundu, Ravenshaw University
130. Swetapadma Sahu. Ravenshaw University
131. Gayatri Parida, Ravenshaw university.
132. Sahitzarani Sahoo, Ravenshaw University
133. Aryapatra Bedaprabha, Ravenshaw University.

134. Lahanka Mahanty, Ravenshaw university
135. Prajukta Bhuyan, Ravenshaw university
136. Laxmipriya Behera, Ravenshaw university
137. Suchismita Dhalsamant, Ravenshaw university
138. Sebangi Mohanty.
139. Baisakhi Mohanty | B.N. Mohanty (daughter) Ravenshaw Botany
140. Kanina.
141 Dayanidhi Sahoo - 9583713152 - Ravenshaw University.
142 Sharbani Bahali - 8328878029 - CUTM
143. Sreetashini Parida - 7978149416 - CUTM, BBSR
144. Manjulata Palei 7809796003. CUTM, BBSR
~~145. DR. Padmanav Routray - 9861196248 - CIFA~~
145. Prof Sanlita Padhi. —
146. Manoj Kumar Biswal. Bagne
147 - Kankana Chakraborty. → 4720 (scien. Stud. BSI).
D. P. DASH Ahm NABARD. ODISHA

Exhibitors

SL	Name	Category
1	MCL	Sponsoring
2	Canara Bank	Sponsoring
3	COFFEE BOARD	Stall Exhibition - 3
4	ICARDA	Stall Exhibition - 4
5	CMFRI	Stall Exhibition 5
6	Coconut Development Board	Stall Exhibition 4
7	ICAR-NRRI	Stall Exhibition 3
8	Odisha State Warehousing Corporation	Sponsoring
9	Bharat Petroleum Corporation Limited	Sponsoring
10	OAIC	Sponsoring
11	ICAR-NBPGR	Stall Exhibition 6
12	National Seeds Corporation	Sponsoring
13	KRIBHCO	Stall Exhibition - 3
14	PCRA	Stall Exhibition - 3
15	Ruchi Foodline	Stall Exhibition & Sponsoring
16	OMFED	Stall Exhibition - 6
17	Paradeep Phosphate Limited	Sponsoring
18	ORMAS	Stall Exhibition
19	Odia Language, Literature & Culture Dept., G	Sponsoring
20	LARSEN & TURBO	Sponsoring
21	Central Bank of India	Sponsoring
22	Dept. of Tourism, Govt of Odisha	Sponsoring
23	Bank of India	Sponsoring
24	APEDA	Stall Exhibition 02
25	NABARD	Sponsoring
26	Tea Board	Sponsoring
27	National Medicinal Plant Board, MoA	Stall Exhibition - 3
28	Department of Biotechnology	Stall Exhibition - 9
29	NALCO	Sponsoring
30	TRIFED	Stall Exhibition
31	ICAR-CTCRI	Stall Exhibition 4
32	Coir Board	Stall Exhibition - 12
33	Botanical Survey of India	Stall Exhibition . 2
34	ICAR- CIWA	Stall Exhibition 3
35	ICAR-CIBA	Stall Exhibition - 1
36	ICAR- CIFA	Stall Exhibition 7
37	Central Horticultural Experiment Station	Stall Exhibition - 4

1) BSI - Anchal Biswas, MK Das

2) NMPB - MOA - Dr. Chinmay Rath, Dr. Siddarth Tiwari, Shyamsundar.

3) CIFA - Uday Kumar Udit
Nitish Kumar Chander
Bhaskar Rao V,
G. Sreenivasulu
Ramkrushna C. Sethy
D. Panda
Sarath

4) CMFRI - Gyanaranjan Dash
Rajesh Kumar Pradhan
Ranjan Nayak
Subrat Sahoo
Jitendra Pradhan

5) CIWA - Arpita Mohapatra
Tapaswini Sahoo
Atul C. Hemram

6) NRRI - A K Panda
S K Mahapatra
S K Tripathy
B. Pandhan

7) CIBA - Leesa Priyadarshini

8) OMFED:-
Biswajit Mohapatra
Ajay Mohapatra
Alok Swain
Sanjukta Mohapatra
Girija Pattnaik
Upendra Kumar Sethy

(9) APEDA
Sitakanta Mandal
Sachin Pradhan

Selected List of Progressive Farmers

SL no	Name	Sign
1	Manoj Kumar Bisai	
2	Ranjan Bhuyan	
3	Ganeshwar Rout	
4	Dharanidhara Nayak	
5	Babaji charan Sahoo	
6	Jitendra Swain	
7	Dhirendra Das	
8	Narendra Swain Kumar	
9	Kalpataru Bhuyan	
10	Kakeyi Kandi	
11	Pramala Kandi	
12	Sulochona Kandi	
13	Labanabati Das	
14	Golak Bhoi	
15	Hemant Mallick	
16	Chimayi Kandi	
17	Prakash Kandi	
18	Shantilata Kandi	
19	Nirmala chandra Bhoi	
20	Ganeshwar Kandi	
21	Suraj Kumar Das	
22	Kartik Sahoo	

Statement of Accounts:

ACTUAL SOURCE OF INCOME & EXPENSE AGRIVISION-2022			
Dr.			**Cr.**
Expenditure	**in Rupees**	**Income**	**in Rupees**
To Auditorium	₹ 18,000.00	By NMPB	₹ 58,500.00
To Accomodation Expense	₹ 1, 00,000.00	By APEDA	₹ 2,34,000.00
To Photo & Videography	₹ 5, 00,000.00	By CDB	₹ 55,000.00
To Bag & Lanyard	₹ 3, 00, 000.00	By ORMAS	₹ 1,60,000.00
To Stall	₹ 4, 00,000.00	By CTCRI	₹ 20,000.00
To Human Resource	₹ 50,000.00	By Tea Board	₹ 20,000.00
To Flex	₹ 60,000.00	By OSWC	₹ 20,000.00
To Publication of Pre-Conference/ information brochure material/ Souvenir/ Conference / Seminar abstract / Proceedings/ Action points/ recommendations etc.	₹ 2,81,253.00	By NABARD	₹ 1, 00,000.00
To Memento	₹ 60,000.00	By CIWA	₹ 58,500.00
To Tiffin	₹ 15,000.00	By OAIC	₹ 20,000.00
To Lunch	₹ 3,85,000.00	By KRIBHCO	₹ 50,800.00
To Mask & Sanitizer	₹ 10, 000.00	By PPL	₹ 20,000.00
To Office Stationery	₹ 15, 350.00	By Coir Board Stall	₹ 2,92,500.00
To Water	₹ 15, 000.00	By Coir Board Sponsor	₹ 1,00,000.00
To Flower Decoration	₹ 5,000.00	By BSI	₹ 58,500.00
To Miscellaneous	₹ 50,000.00	By L&T	₹ 3,00,000.00
Pre-Conference Expenses	₹ 2,35,397.00	By NALCO	₹ 20,000.00
		By Central Bank of India	₹ 1,25,000.00
		By Bank of India	₹ 1,00,000.00
		By Coffee Board	₹ 58,500.00
		By Department of Tourism	₹ 1,00,000.00
		By Registration	₹ 2, 00,000.00
		By Organizers	₹ 3,28,700.00
TOTAL EXPENSE	**₹ 25,00,000.00**	**TOTAL INCOME**	**₹ 25,00,000.00**

Signature and of the Competent Authority:

Name and Designation of the

Competent Authority: Dibyanshu Prasad Das, Managing Director, Evation Business Solutions Pvt. Ltd.

Seal of the Institute:

Conference Activities:

Inauguration of Agri Vision-2022 and Exhibition by Dr. Joykrushna Jena, DDG (Fisheries), ICAR in presence of from left Pof. SK Nayak, VC, Ravenshaw University, Prof. BC Tripathy, Former VC, Ravenshaw University, Dr. SK Sahoo, MD, RuchiFoodline, Dr. SK Swain, Director, ICAR-CIFA, Prof. PK Mohapatra, HOD, Dept. of Botany, Ravenshaw University and Er. Dibyanshu P Das, MD & CEO, Evation

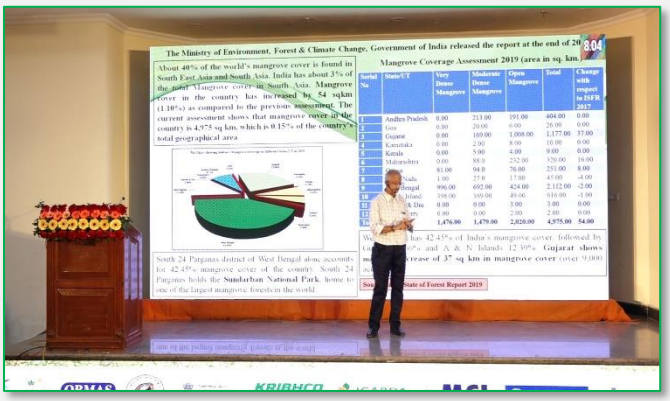
Shri DP Dash, AGM, NABARD R.O. Bhubaneswar, felicitated by Shri Dibyanshu Prasad Das, CEO, Evation at Agri Vision 2022

Dr. Mrutyunjay Mohapatra, DGM, IMD, Govt. of India felicitated by Er. Dibyanshu Das, CEO, Evation

Shri DP Dash, AGM, NABARD R.O. Bhubaneswar during his speech

Dr. Mrutyunjay Mohapatra, DGM, IMD, Govt. of India addressing the media


NABARD


The Ministry of Environment, Forest & Climate Change, Government of India released the report at the end of 20
Mangrove Coverage Assessment 2019 (area in sq. km.)


STALL
02
NMPB


RAVENSHAW CONVENTION CENTRE
SEVEN PILLARS OF WISDOM


CIFA
CMFRI

Dr. Trilochan Mohaptra, DR-ICAR & Sec. DARE, Govt. of India Addressing the crowd virtually. In stage Dr. Pawan K. Agrawal, VC, OUAT, Dr. Ajay K Parida, Director, ILS and Dr. Padmini Swain, Director, ICAR-NRRI

Welcome to Agri Vision-2023

With the successful completion of Agri Vision-2022, we are going to host **Agri Vision-2023** at the first quarter of 2023. The complete Conference will be classified into 4 segments i.e **Agriculture & Horticulture, Fishery & Aquaculture, Animal Science, and Agri Business**.

Very soon we are going to announce the **Agri Vision-2023** at: http://www.agrivision.in/

Thanks Note:

Evation and the organizing committee is very thankful to NABARD for its exclusive financial grant for publishing the scientific book of abstract, sending expert to share their views at our conference platform and overall support for which we have successfully delivered the Agri Vision 2022 Conference.

We hope the same support and cooperation from NABARD in upcoming chapters of Agri Vision.

NABARD

Evation

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