



Technological Advancements to Achieving Poverty Alleviation and Livelihood Enhancement of GPs

By

Prof. Virendra Kumar Tewari

Director – IIT Kharagpur

Director – IIT Bhubaneswar

Prof. Rintu Banerjee

Head – Agricultural and Food Engineering Department

**Head - Center for Rural Development and Innovative Sustainable
Technology**

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WEST BENGAL -721302, INDIA

Poverty in India

Year	Headcount Poverty Ratio (As a % of total population)	Absolute Number of Poor (in millions)
1973	54.9	321.3
1983	44.5	322.9
1993	36	320.4
2004	27.5	301.7
2004*	37.2	407.2
2011*	21.9	269.8
2019#	20.8	346.3

Source: Planning Commission and Santosh Mehrotra

270,000,000
Indians are poor

=


1 in 5 Indians is poor

India's Poverty Profile

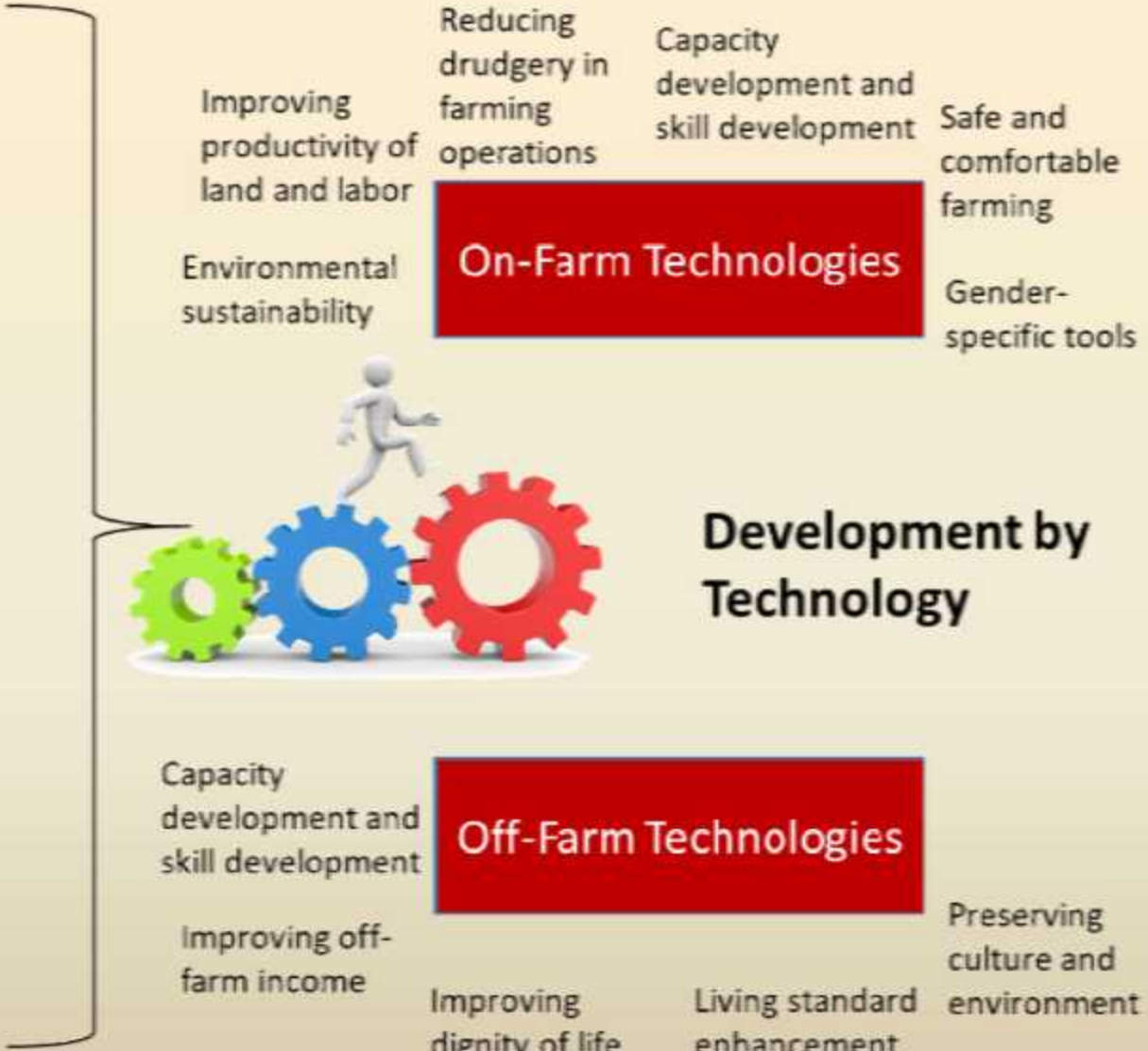
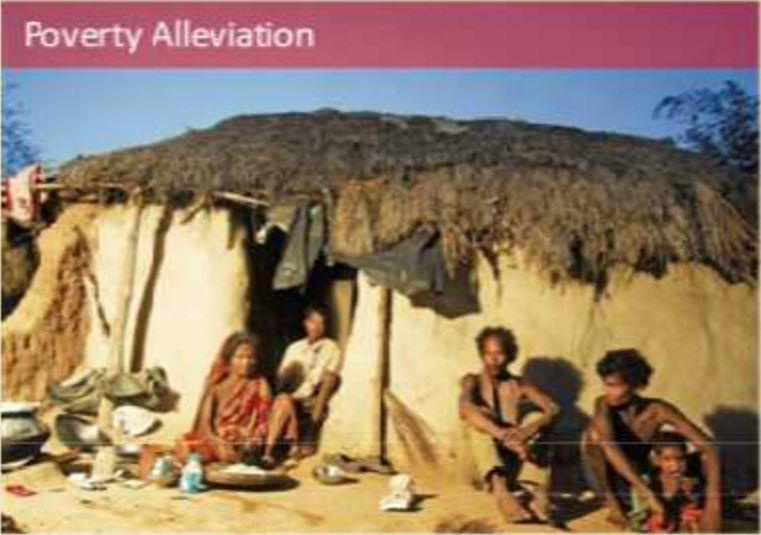
THE 7 LOW-INCOME STATES HOUSE
62%
OF INDIA'S POOR

THE LOW-INCOME STATES ARE HOME TO
45%
OF INDIA'S POPULATION

80% of India's poor live in rural areas



Technological Advancements for Poverty Alleviation and Livelihood Enhancement





Studies conducted by IIT Kharagpur on Livelihood Enhancement of GPs

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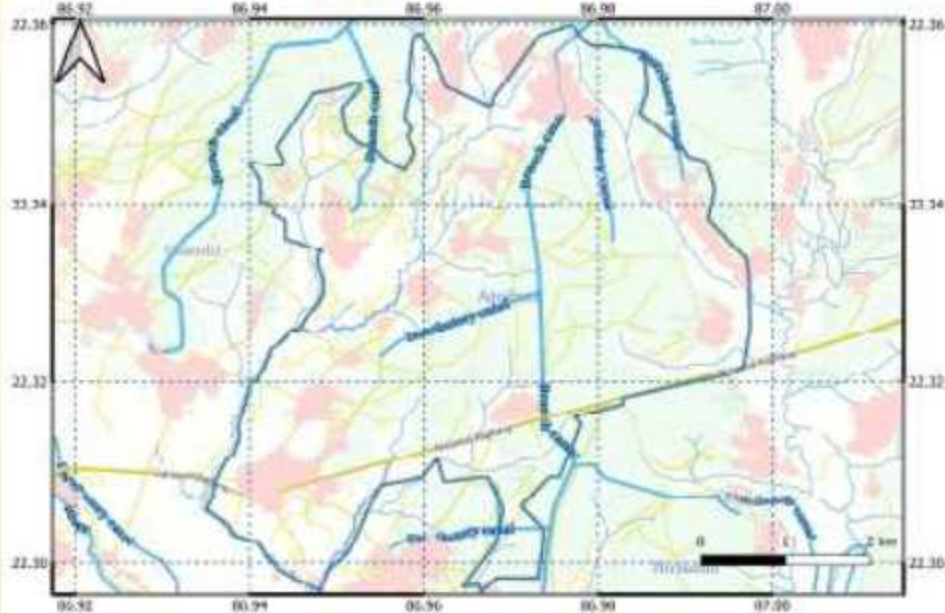


Rural Spatial Planning Study by IIT Kharagpur

GPs Selected in West Bengal

Aguibani (District – Jhargram)
Gram Pradhan: Smt. Rani Hembram Murmu

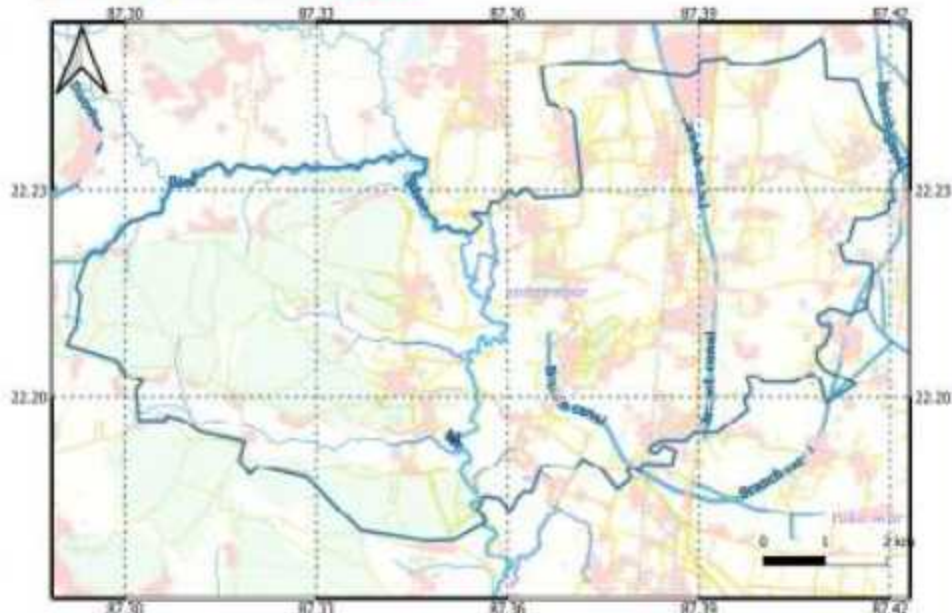
Total Area: **20 km²** Total Population: **10913**
Female/Male Ratio: **0.89** Literacy Rate: **69.64 %**
Nos of Villages: **38** Nos of Samsads/Booths: **08**
Nos of Households: **2345**



* Data provided by Respective GPs

Mokrapur (District – Paschim Medinipur)
Gram Pradhan: Sri Jogendranath Doloi

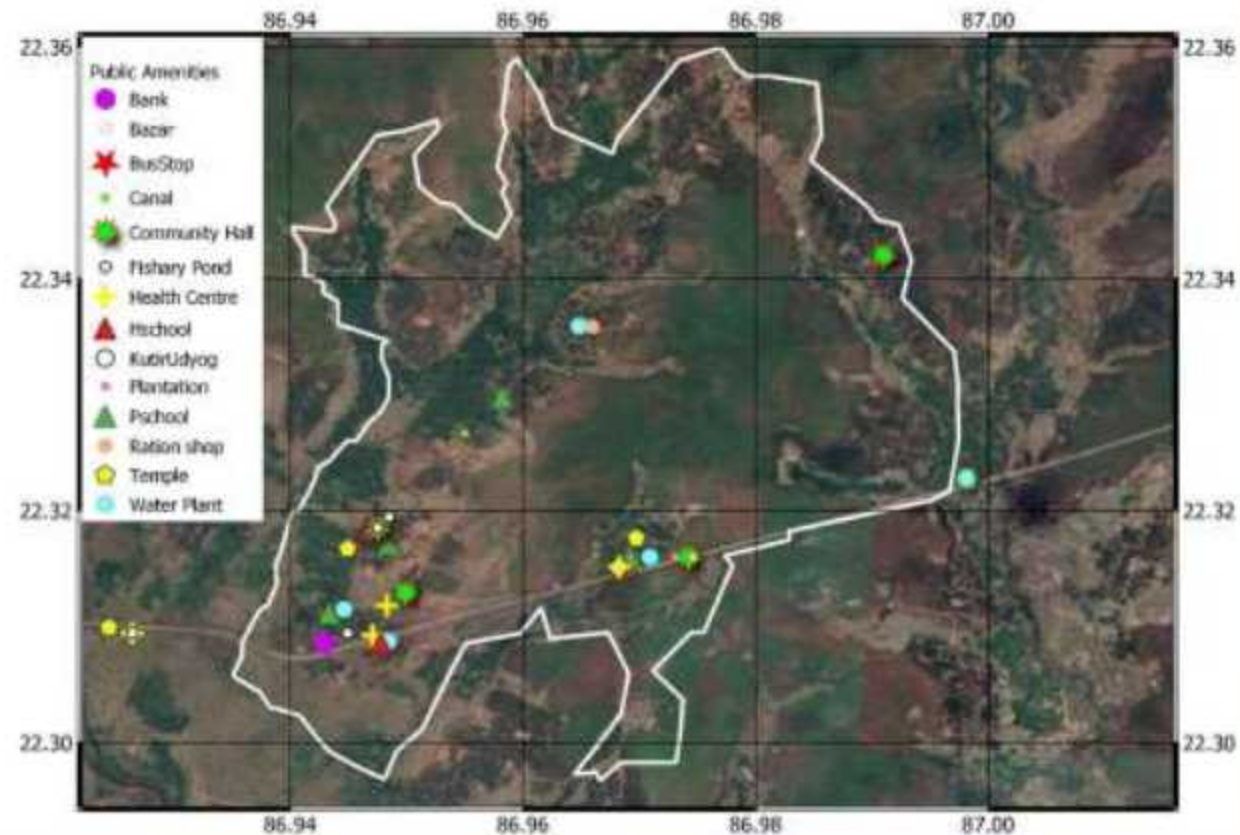
Total Area: **44 km²** Total Population: **24845**
Female/Male Ratio: **0.95** Literacy Rate: **68%**
Nos of Villages: **44** Nos of Samsads/Booths: **15**
Nos of Households: **5700**



Aguibani GP: Spatial Distribution of Amenities

Observations:

- *Most of the public amenities are centred near highway.*
- *The interiors of the GP are mostly devoid of common and even essential public amenities like health centre, bank and ration shops.*



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Proposed Development Activities Water, Sanitation and Waste Management

Har Ghar Nal	Water supply and Distribution
Shuddh Jal	Water Treatment and Quality Monitoring
Catch the Rain	Rain Water Harvesting
ODF Villages	Building toilets to households and Public Bio-toilets
Swachh Bharat (Gramin)	Wastewater treatment and reuse for cultivation
Waste Management	Solid waste collection and composting



IIT Kharagpur can help with planning, detailed designing, and overseeing implementation and maintenance of all these programmes in the villages

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Proposed Development Activities Agriculture and Food Security

Enhancing Agricultural Production

- **Soil Testing:** Micro and Macro nutrient recommendation
- **Crop Planning:** Seasonal cultivation and marketing
- **Micro-Irrigation:** Drip and sprinkler irrigation
- **Protected Cultivation:** Greenhouse and shadenet



Agri-Mechanisation

- **Custom Hiring Centers:** Agricultural implements and machines
- **Training:** Service, maintenance and operations
- **Safety measures:** Crop harvesting and spray application
- **Tools:** Women friendly tools



Production Storage and Processing

- **Crop storage:** Silo, bag and bin storage, and cold storage facility
- **Packaging:** Packing of vegetables and fruits in biodegradable plastic
- **Food processing units:** small scale food processing units
- **Marketing and distribution:** Solar Vendor carts for milk, vegetables and fruits





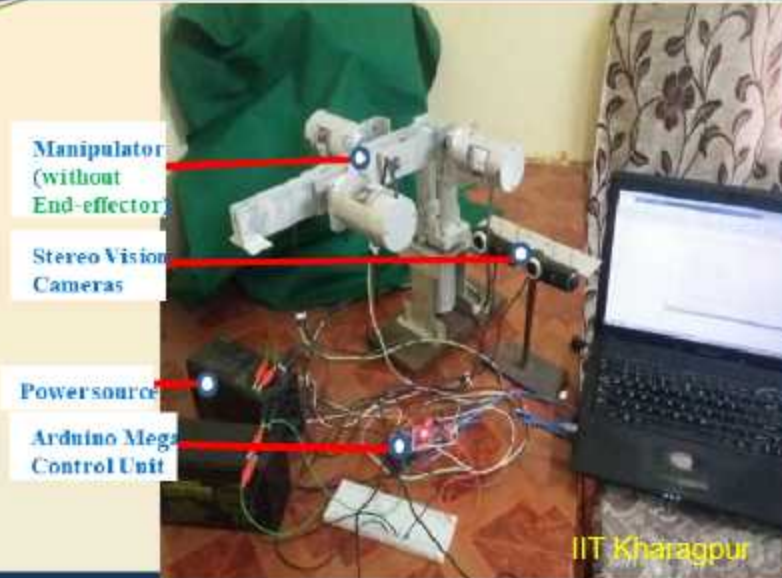
On-Farm Technologies by IIT Kharagpur

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Advanced On-Farm Technologies developed by IIT Kharagpur

Prototype of Robotic Arm



Prototype of Robotic Transplanter



Drones in spraying operation



Developed Tractor Mounted Automatic Variable Rate Fertilizer Applicator

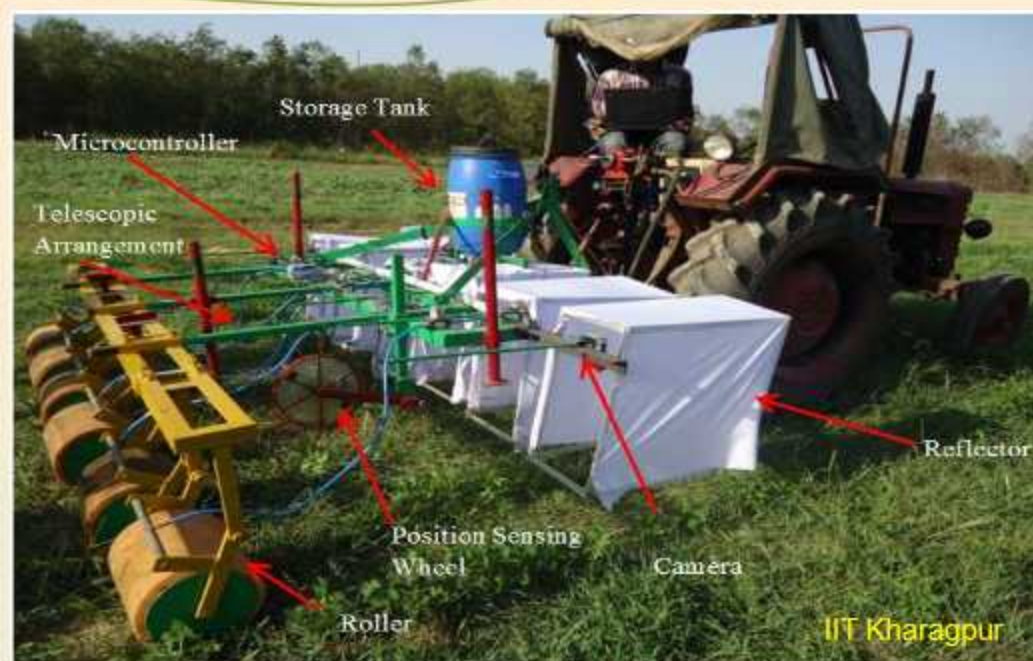


Field Testing of Microcontroller based automatic variable rate fertilizer applicator



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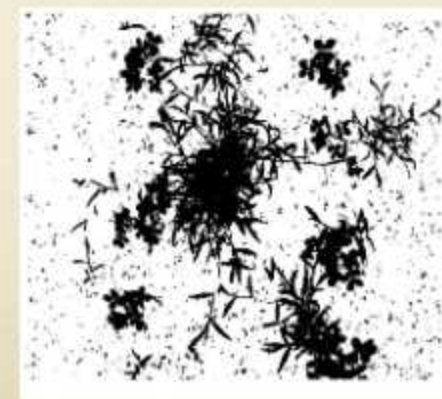
Developed Tractor Mounted Automatic Variable Rate Herbicides Applicator



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A sample of pixel information with RGB values



Processed image

Savage of herbicide chemicals upto 40 to 45 %.



Automatic sugarcane bud cutting machine



IIT Kharagpur

(1) Feeding chute, (2) feed rollers, (3) camera, (4) cutting arm assembly, (5) cranking motor, (6) electronic controller, (7) AC motor and (8) hood gallery



Buds and internode portion separated by the system

Sugarcane Bud Planting Technology with automatic fungicide applicator



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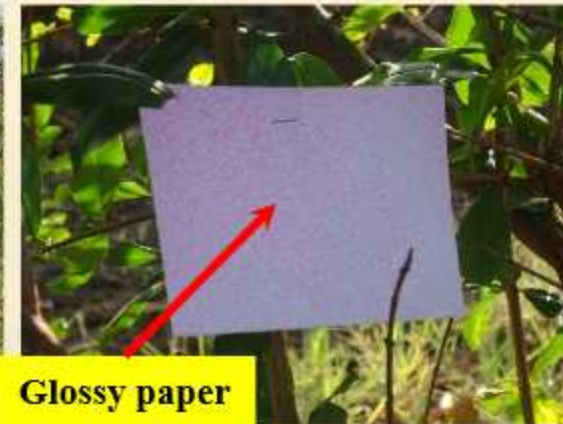
(1) Hopper, (2) Bud metering unit, (3) Furrow opener, (4) Power Transmission system (5) Ground wheel, (6) Fungicide tank, (7) Pump & solenoid valves, (8) Optical sensors, (9) Control unit and (10) Spray nozzle



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Ultrasonic sprayer based Orchard sprayer

Spray pattern evaluation



Glossy paper

Air-assisted sprayer retrofitted with ultrasonic sensor based system





Off-Farm Technologies by IIT Kharagpur

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Puffed Rice (Muri) Making Machine (Biomass)



Unit at Mukundapur, Keshpur West Midnapore



Unit at Jamboni Block, Jhargram



Unit at Agartala, Tripura

- Solved the problem of smoke and hardening of rice.
- Reduces drudgery & removes occupational hazards.
- It allows the production of 50 kg Muri per hour with uniform quality.

4 days training conducted to SHG members from 10 districts of Tripura at Mohonpur Block, Agartala during 9th to 12th July 2018.



Mechanized Dhenki (Rice Pounder)



Gobindapur, Jhargram



Bankura Ummayani Institute of Engg., Bankura

- Used for dehusking and rice Aatta making.
- Reduce drudgery; Single person operation.
- Provides safer working condition.
- Productivity 22-25 Kg/hour.

Motorized Potter Wheel



Bamunmara, Lodhasuli

- Used for making Pottery products.
- Drudgery-free operation and protect the potters' from backbone pain diseases.
- Earning of the potters' increased to Rs. 800 to 1,000/day.

Sabai Grass Rope Making Machine



Unit at DHAN Foundation, Odisha



Unit at Nayagram, West Midnapore

- Used for making rope from Sabai grass.
- Single person, motor driven.
- Productivity 600-700 gm/hour.

Motorized Sisal Fiber Extractor Machine



Sisal Plantation Farm Rajnagar, Birbhum



Sisal fiber

- Used for extracting fiber from Sisal leaf.
- Process 12-14 kg of leaves per hour.
- Produces 1-1.5 kg fiber per hour (wet basis).

Jute and Banana fiber Sutli Machine



- Used for making sutli from fiber.
- Reduces drudgery, consumes less time.
- Productivity 500 gm/hour.

Pedal Driven Amber Charkha



Unit at KVIB, Gopiballavpur



Unit at KVIB, Jhargram

- Driven by both legs instead of hand.
- Machines of higher spindle can be operated.
- Productivity increased from 16-18 to 32-34 spindles per day.

Coir Rope Door Mat Making Machine



Unit at Pingla, West Midnapore

- Used for making door mat from coir rope / any other rope.
- It ensures almost complete removal of drudgery.
- Productivity 6-8 pieces per day.
- Solves the problem of gender sensitivity too.

Bamboo Slivering Machine



Traditional method



Field trial of slivering machine at Datan, West Medinipur



- Bamboo joints cut to down into thin slivers of 1.5 - 2.0 mm and 6 - 8 inches long.
- No fatigue and drudgery to the artisans.
- Productivity is 240 bamboo slivers (pati) per hour.

Preservation of Sugarcane Juice by Enzymatic Method



Sugarcane juice



Sugarcane plantation

- Preserving the sugarcane juice in bottles for a period of one to two months at room temperature without any loss in the quality and flavor of the juice.
- Utilization of effective preservatives to keep the fresh quality of sugarcane juice allowed it to be more widely marketed, and enhanced its quality and safety as well.
- Technology transfer to Midnapore Cultural and Welfare Association.

Cashew Apple Juice by Enzymatic Treatment



Cashew apple



Cashew apple juice

- The use of enzymes to reduce the tannin content from 24 percent to 10 percent i.e. at palatable level.
- This adds value to each of the constituents in the value chain, starting from the collectors of the cashew apple to the users and increases income of the rural people.
- The product is already available in selected markets.
- Technology transfer to Midnapore Cultural and Welfare Association.

Sal leaf Plate and Bowl Making Machine (Electric)



Unit at Hasimpur, Keshiary

- Used for making plates and bowl from Sal leaves.
- Electro-thermal energy for molding of plate.
- 300 plates and bowls are made in a hour.

Earthworm Separator



**Earthworm separator at Gopali, West
Medinipur**



Vermicomposting ready for use

- Used for separating of earthworms from vermicomposting.
- The drum elevation (1.5 to 3 ft) for convenience operation and collection of earthworms.
- Earthworm separation efficiency is about 90-95%.

Rice Flaking Machine



Rice flake

- Used for making rice flake and the feeding rate is 24 kg/hr.
- Average husk separation efficiency 80% .
- Capacity of the machine: 10-12 kg per hour.
- Technology transfer to ONGANON, Nadia.



Technology Display and Training Programs by IIT Kharagpur

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Machinery display



Technology demonstration



Technologies Developed and Transferred





Thank You

Prof. Rintu Banerjee

Head – Agricultural and Food Engineering Department

**Head - Center for Rural Development and Innovative
Sustainable Technology**

Email: rb@agfe.iitkgp.ac.in

