

INDUSS

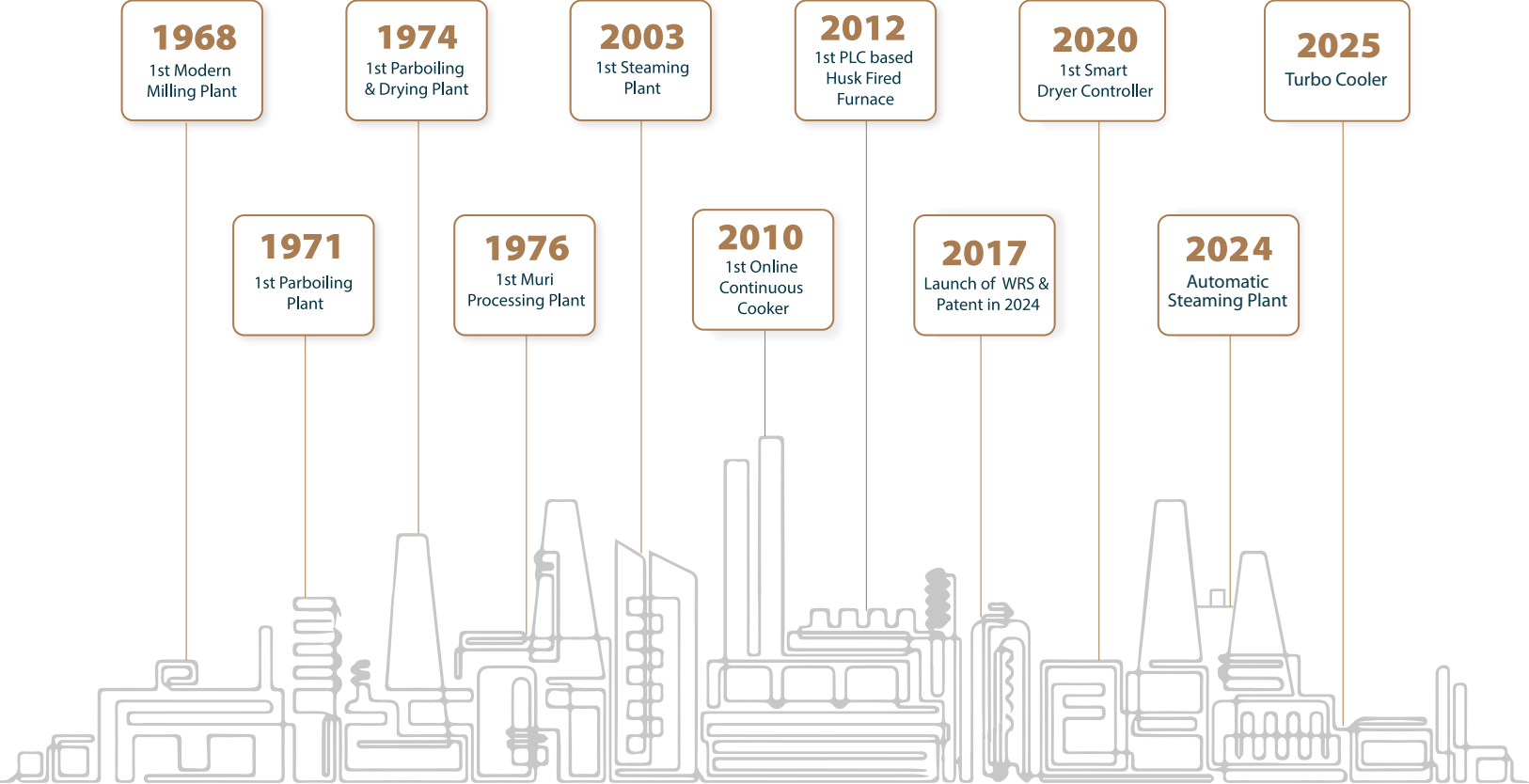
THE RICE ENGINEERS



LEADERSHIP & EXCELLENCE



INDUSS HAS BEEN FIRST IN MARKET TO LEAD WITH R&D, COLLABORATE & INNOVATE WITH CUSTOMERS TO INTRODUCE NEW MACHINERY/FEATURES FOR RICE INDUSTRY





MEET THE RICE ENGINEERS OF INDIA



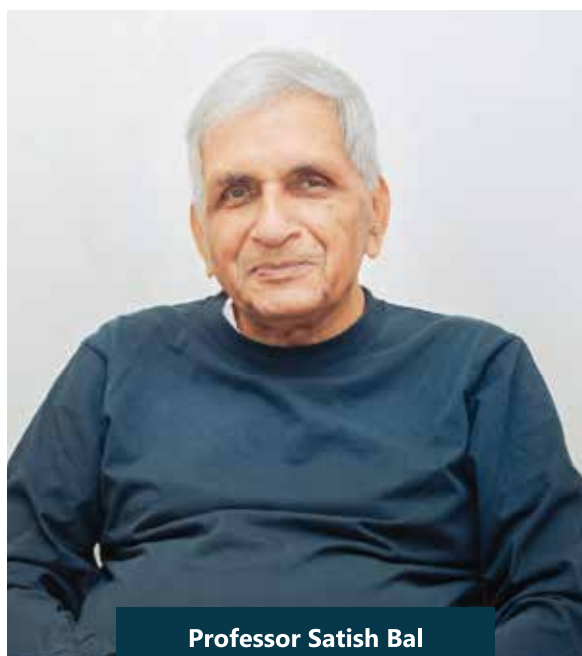
Mr. Shanti Swarup Aggarwal
M.D.

Mr. Shanti Swarup Aggarwal

When SSA first started foraying into the world of rice engineering in the 1960s, the Rice Mill Industry was still a cottage scale business with traditional steel blade Huller machine which had the capacity of producing 6-10 tons per day. There were high broken and the by-products could not be recovered.

It was in 1968, that 'Modern Machineries Corporation', to be known as Induss Food Products & Equipments Ltd. later, was set up as an agency house for selling modern rice milling equipments such as rubber roll shellers and cone polishers. The promoters of this venture were Mr. V.S. Agarwal, Mr. Shirish Agarwal and Mr. Shanti Swarup Aggarwal. Induss manufactured the 1st modern Parboiling and Mechanical Dryer plant in India. Broken were drastically reduced by 50% and a lucrative by-product rice bran could be obtained from which edible oil was extracted. This brought in 'modernisation of rice mills' all over the country.

Even today, he dedicates his time and unparalleled energy in developing new technology and methods to enrich this industry and bringing maximum benefit to the rice mill owners.



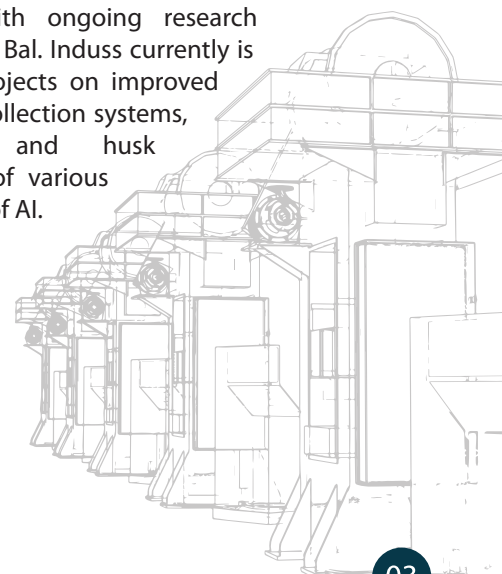
Professor Satish Bal
Senior Technical Advisor

Professor Satish Bal

Prof. Bal did his B.Tech (Agriculture Engineering) IIT, Kharagpur. He then did M.S. from Louisiana State University, USA and Ph.D. in Agriculture Processing at IIT, Kharagpur. He then joined IIT as a Professor in 1966 and finally retired as HoD, Post Harvest Engineering Centre, IIT Kharagpur.

During his M.S. at Louisiana State University he was involved in the design and development of LSU Paddy Dryers. He was actively involved in the design and development of LSU Paddy Dryers while at IIT too. With his research work, he contributed towards the development of superior quality parboiling technology at Induss.

The Induss process and technology is being upgraded continuously with ongoing research under guidance of Professor Bal. Induss currently is doing multiple research projects on improved colour, soaking time, dust collection systems, reduction in power, and husk consumption, automation of various processes and introduction of AI.





PARBOILING THE PRIMARY SCIENCE OF RICE MANUFACTURING

The process of wetting, heating, steaming and drying of paddy is called 'Parboiling'. The purpose of this process is to produce physical and chemical modifications in the cereal with economic, nutritional and practical advantages.



**LOW FREE FATTY
ACIDS IN RICE BRAN**



**HIGHER OIL CONTENT
IN RICE BRAN**

SINGLE STAGE - SINGLE STEAMING

- Hot water is filled in tanks
- Paddy filled in tank
- Soaking for 6 hours
- Water is discharged
- Paddy is steamed
- Discharge to Dryer
- Drying at 120°C for 6 hours





SINGLE STAGE - DOUBLE STEAMING

- Paddy is filled in tanks
- Steaming done in tanks
- Cold water is filled in same tank
- Soaking for 6 hours
- Water is discharged
- Second steaming done
- Discharge to Dryer

THREE STAGE – DOUBLE STEAMING FOR WHITE RICE (LONG GRAIN)

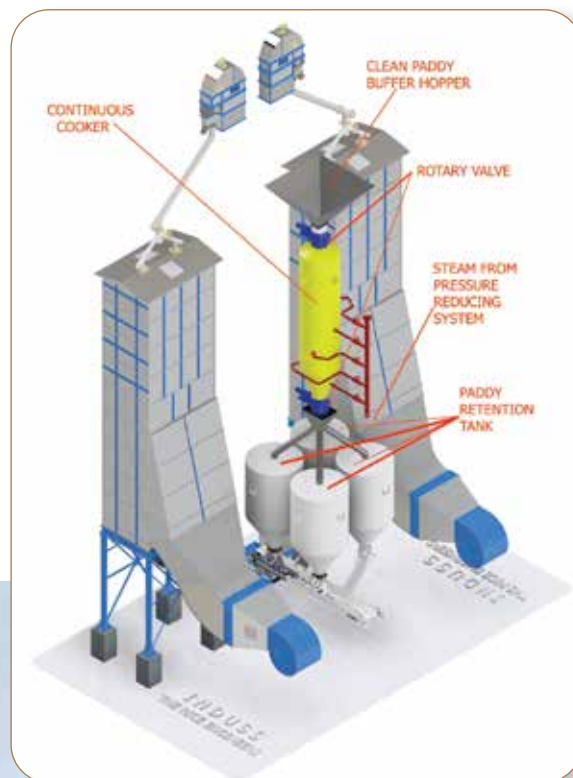
- Paddy filled in small tank on top
- Steaming in small tank
- Cold water filled in big tank
- Soaking for 6 hours
- Water discharged
- Second Steaming in small tank at the bottom
- Discharge to Dryer
- Drying at 120/100°C for 8 hours



CONTINUOUS COOKER

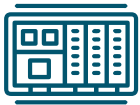
Continuous Cooker For Pre-steaming & Post Steaming

- This process ensures minimum 2% Less Broken.
- Pre steaming operation – Automatic input of raw paddy into pre cooker with steam pressure and temperature controls.
- Water filling in soaking tanks with level sensors.
- Continuous circulation of water. Steam injector connected to soaking tanks to ensure constant temperature.
- After 3 hrs. of soaking drain out of water from soaking tanks.
- Paddy discharged from soaking tanks to continuous cooker for second steaming.
- Cooker operation – input & output of paddy flow into cooker controlled both at the top and bottom by rotary valves and level sensors. Pressure reducing system to ensure constant pressure and temperature.





CONTINUOUS STEAMING PLANT



PLC CONTROLLED



LESS BROKENS



UNIFORM COLOUR



COOKER CAPACITY
15TPH TO 25TPH

AGED OR SEASONED RICE

'Aged' or 'Seasoned' Rice is the rice stored for 10 to 12 months.

The quality and taste changes after cooking.

Long storage might result in fungus, insects or rodents.

Loss in weight.

Requires large storage space and blocks the capital.

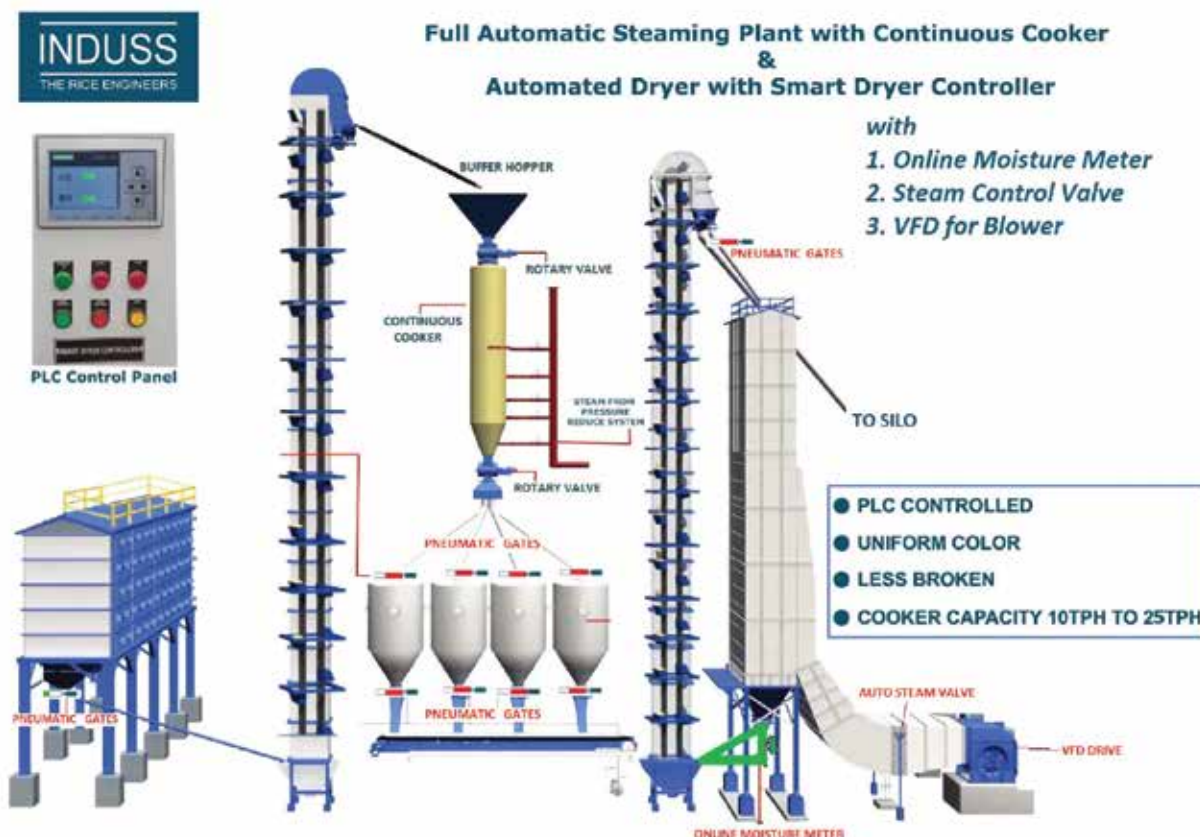
STEAMED RICE

The cooking quality, colour and taste similar to 'Aged rice'.

No storage of Paddy or rice required.



FULL AUTOMATIC STEAMING PLANT WITH CONTINUOUS COOKER



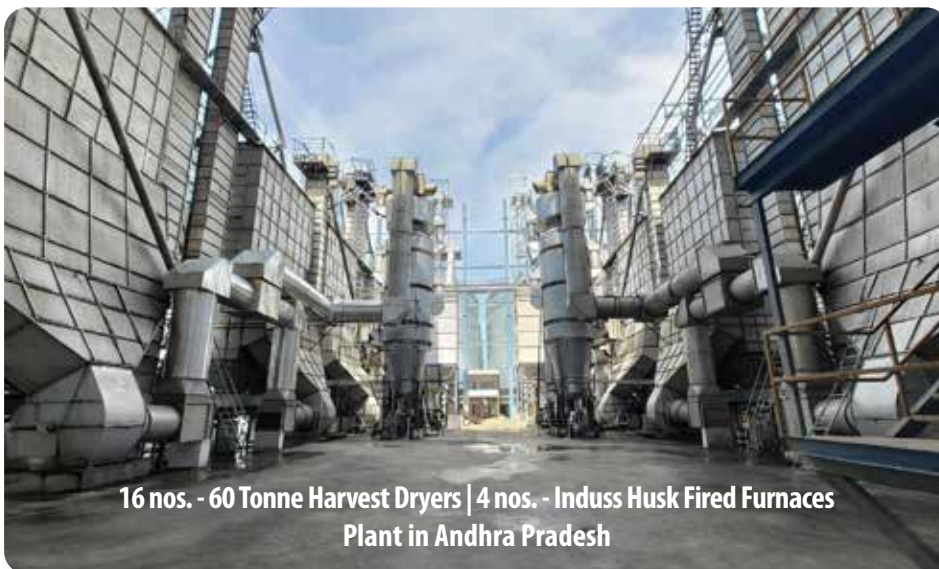
- Pneumatic gate under SILO (optional extra feature) will open for elevator to fill buffer hopper above cooker.
- Rotary valve above cooker opens for paddy filling controlled by sensors in the cooker.
- Continuous steaming in cooker through PRS system. 5 streamlines at different positions to ensure uniform cooking. Continuous discharge of paddy in retention tanks through bottom rotary valve.
- Pneumatic gate above first retention tank opens and paddy is filled. High level sensor in retention tank closes the gate automatically. Pneumatic gate above second tank opens automatically and filling continues. This process goes on till the last tank.
- Paddy is stored in tanks for a fixed time to ensure tempering and uniform colour. After the fixed time paddy will discharge automatically through pneumatic gate into the dryer. Once the tank is empty gate closes automatically.
- The above process continues till the last tank.
- Dryer duct temperature controlled via steam valve (PID) based on time and temperature can be controlled. It can be based on online moisture sensor (optional).
- All processes are controlled through a single PLC panel.

PADDY & MAIZE DRYER WITH PLC CONTROLLED HUSK FIRED FURNACE



Husk furnace with Automatic Controls

- Low Husk Consumption – 25% less than boiler
- Compact design – less space
- One furnace for multiple dryers
- Low power requirement
- No chimney required
- Automatic cold ash discharge
- Temperature range 60°C to 170°C





TURBO COOLER

Advantages of Turbo Cooler

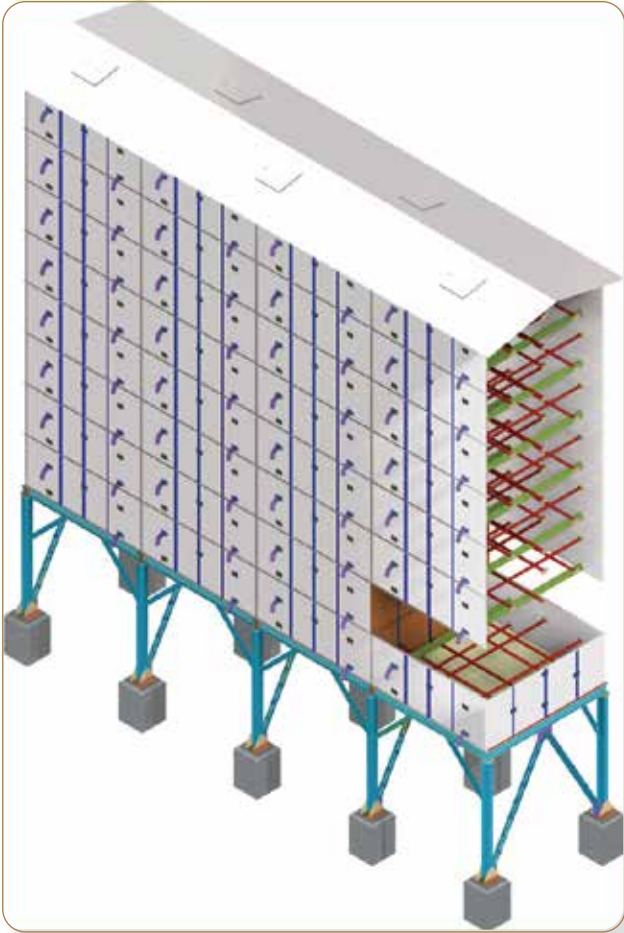
Low power consumption - 9 HP
PLC Controlled discharge

- Installed between cooking tanks and paddy drier
- Cools grains from 85°C/90°C to 35°C in single pass
- Improves drying efficiency - reduces moisture by 3-5%
- No surface condensation of saturated vapors
- Fewer cracks & Lower broken
- Improves gelatinization
- Eliminates case hardening
- Improves cooking



SILO & STORAGE BINS

Natural air circulation system for Raw/ Parboiled paddy



DIGITAL GRAIN MOISTURE METER

Measurement of moisture content in the paddy, brown rice, polished rice





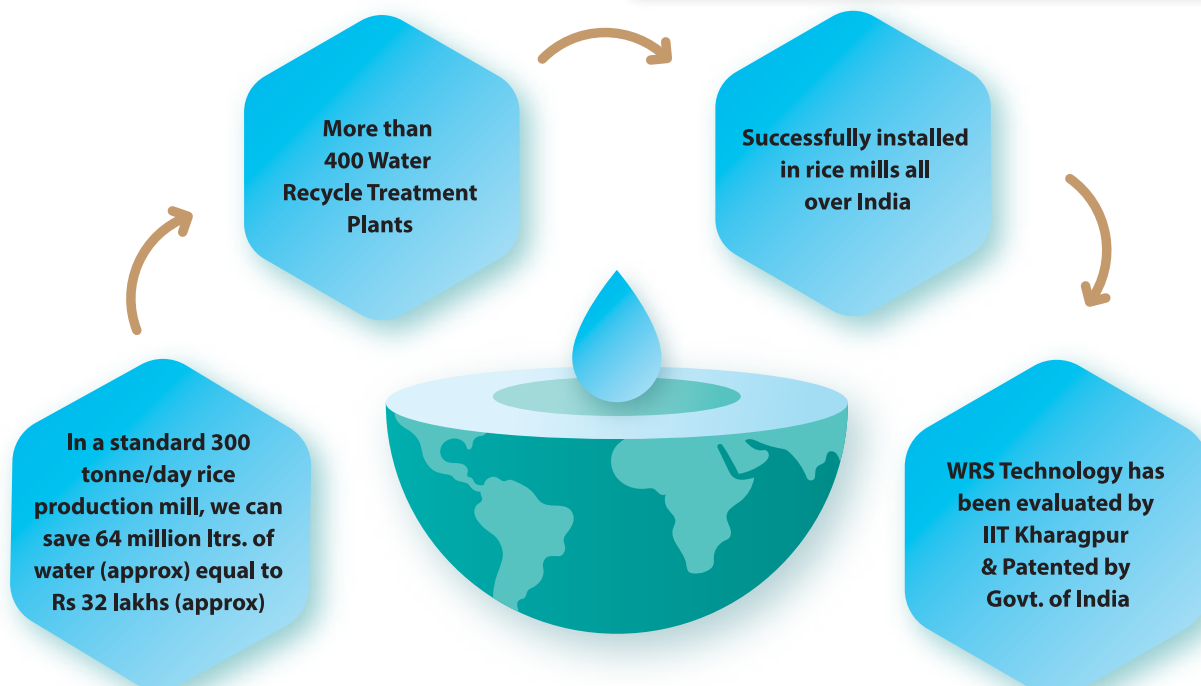
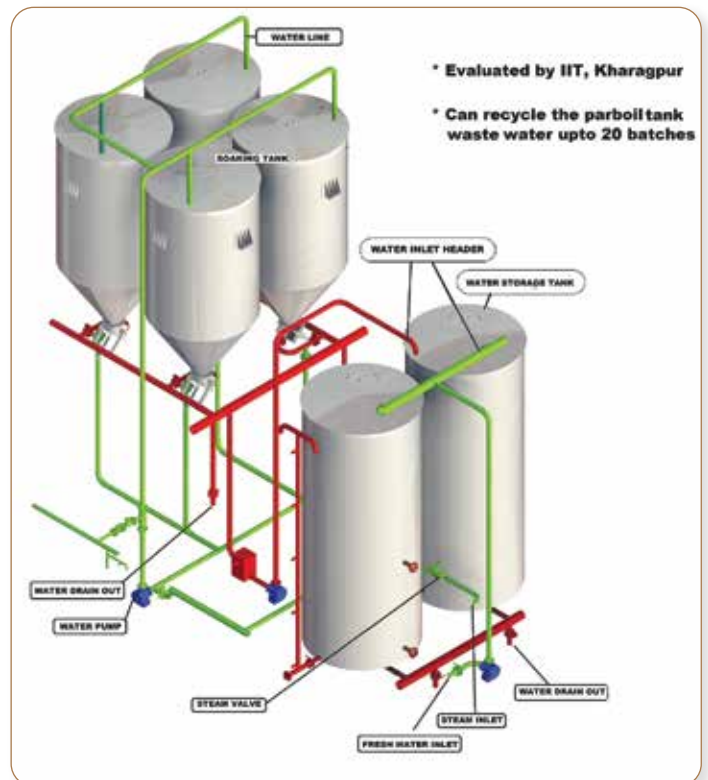
WATER SAVING TECHNOLOGY

Induss has earned PATENT for the award-winning 'Water Recycle Technology' from Govt. of India.

Latest revolution in Rice Mill industry – 70% savings of water.

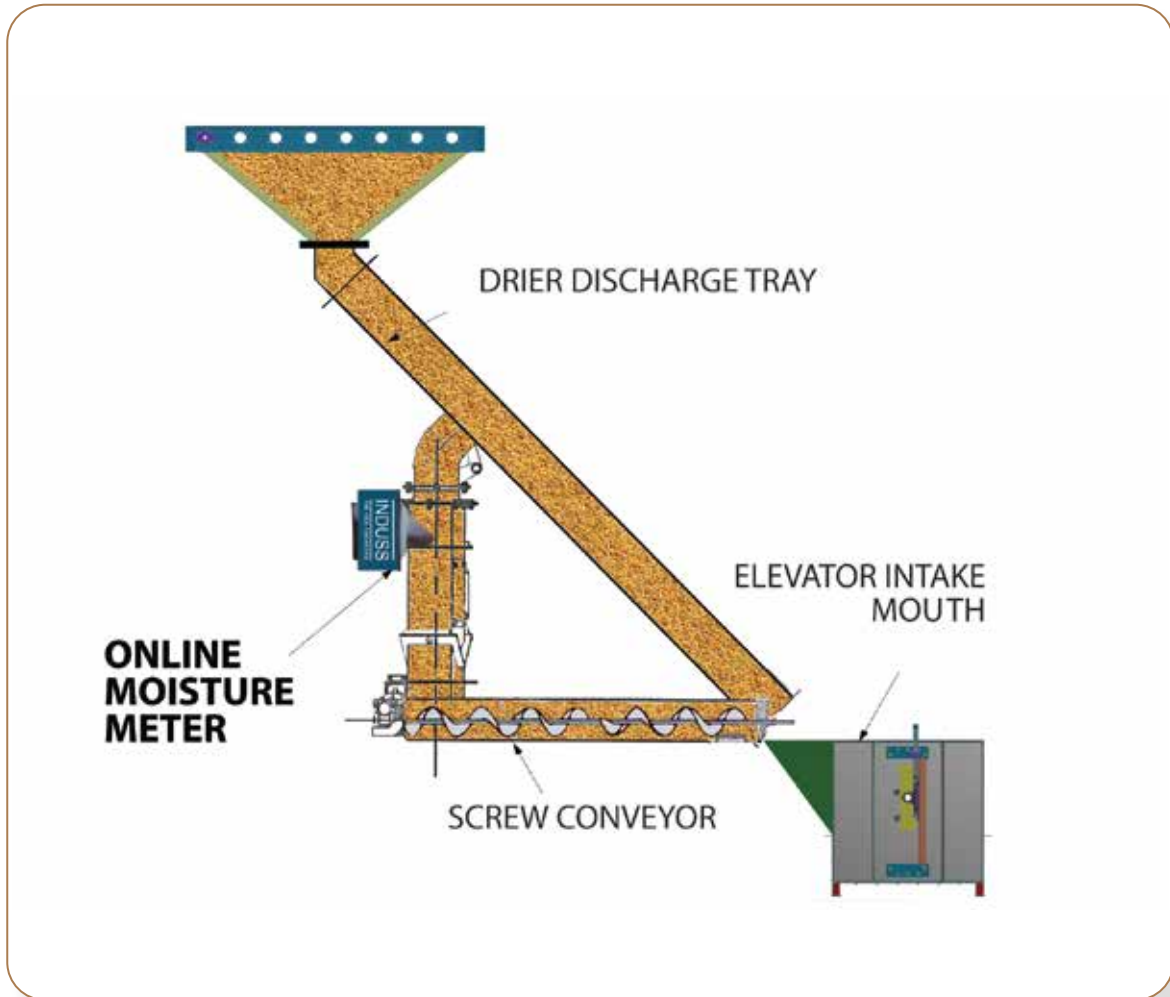
The Advantages of This Recycling are:

- Conservation of water - Water requirement is reduced from 1.20 kl to 0.30 kl per ton of paddy processed. Water demand for the parboiling process is reduced by 4 times.
- Low steam requirement - Energy conservation.
- Eliminates the need for expensive waste water treatment plant. The 5% water discharge from bottom of tank can be used for plants, road cleaning etc.
- Destroys or inactivate micro-organisms.
- No discoloration, offensive flavour.
- No effect on quality of rice including colour, flavour, broken and food quality and food safety.
- Eliminates water pollution.
- Reduces husk consumption in hot water preparation.





SMART DRYER CONTROLLER



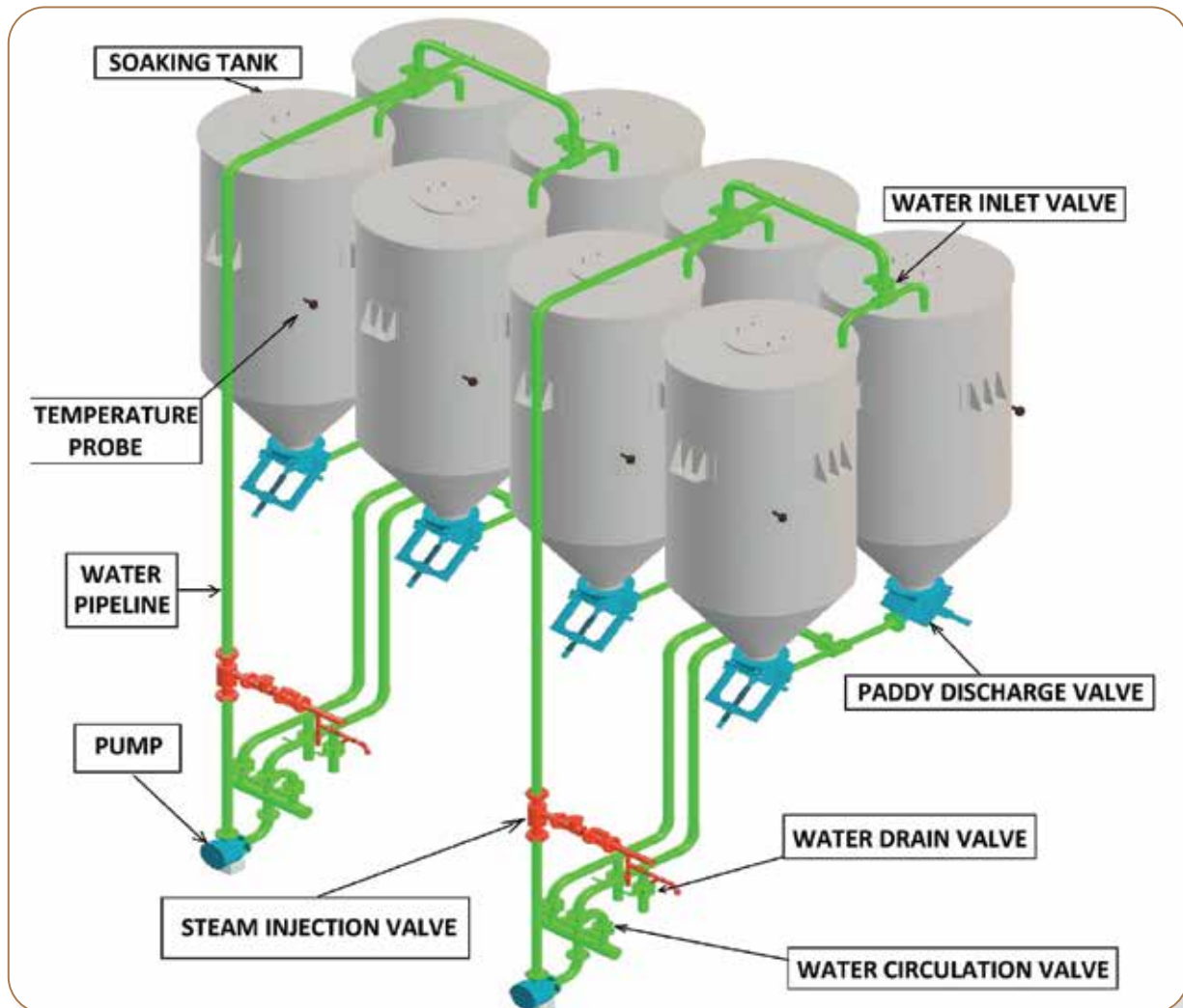
Here's how the PLC-based Smart Dryer Controller works:

- Online Moisture meter works on Di-electric principle.
- Metal sheet forms the negative plate and metal fin forms the positive plate.
- Paddy acts as di-electric substance.
- A sensor gives the paddy moisture.
- Signal terminal box provide necessary analog signals.
- The steam flow linked to moisture gets adjusted automatically.





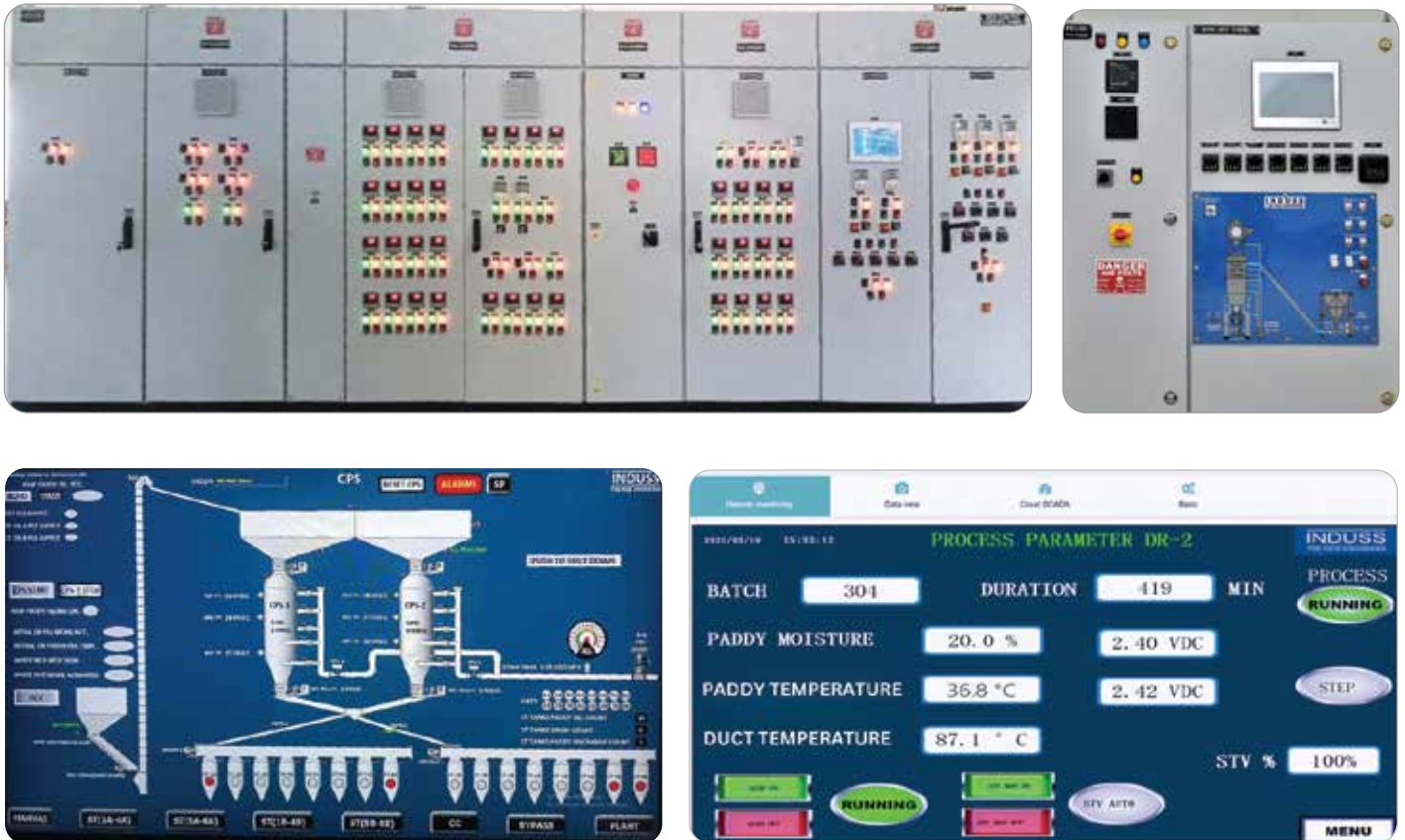
SEMI AUTOMATION



- Reduces soaking time – 3 to 4 hours
- Reduces drying time
- 3-4 batches per day against traditional 2 batches
- Uniform temperature and colour
- Less broken

ADVANCED AUTOMATION TECHNOLOGY

SCADA / HMI based Automation using latest state-of-the-art PLC System



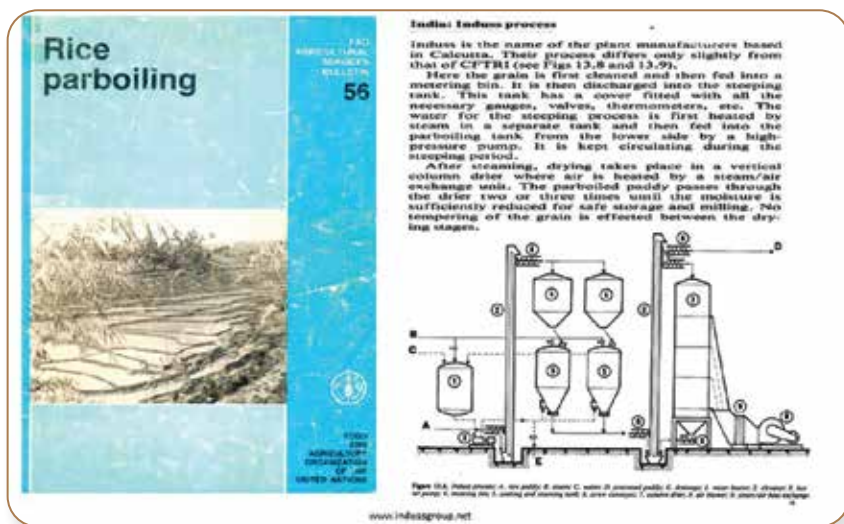
Induss offers Cloud-Based Industrial Internet of Things (IIoT) solutions covering :

- Data Acquisition: Enabling real-time data collection and analysis.
- Plant Remote Monitoring & Control: Providing remote access and control for enhanced operational efficiency.
- Data can be accessed through Mobile, Tablet or any handheld devices.
- Data storage available for analysis and optimising plant efficiency.



AWARDS & RECOGNITION

World Wide Recognition



Award - Star Performer
2021 - 2022



Award - Star Performer
2022 - 2023



EEPC - Star Performer
Award



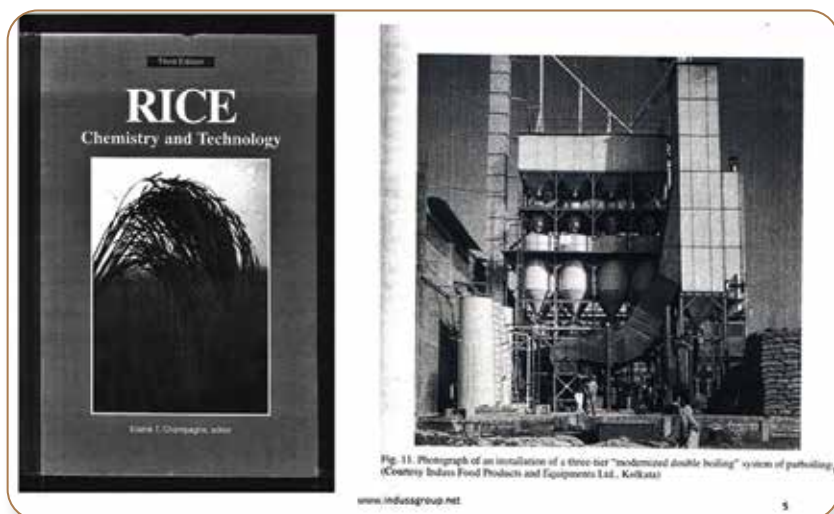
Award - Engineering
Export Promotion Council



Award - Engineering Export
Promotion Council



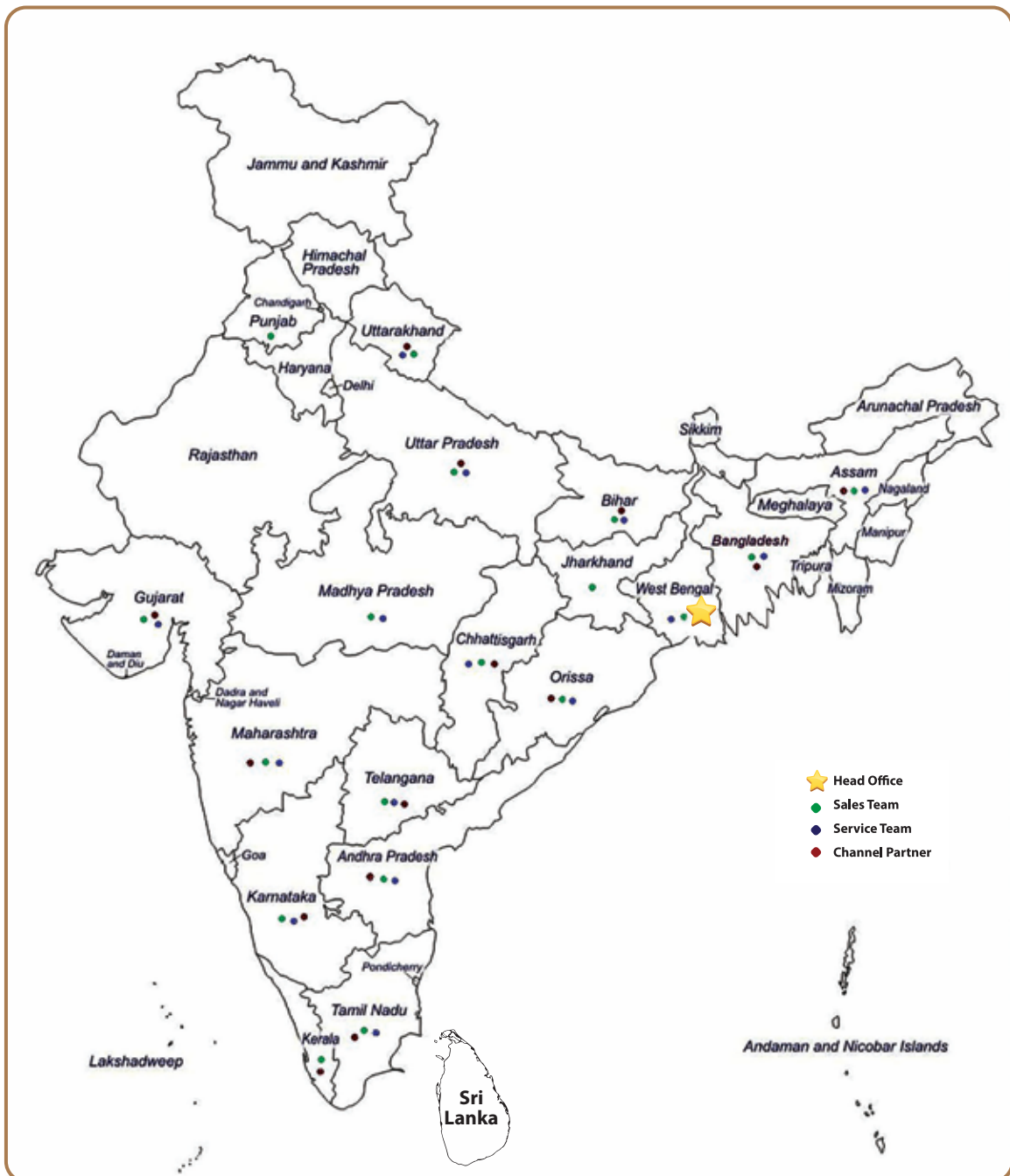
Federation of
Small & Medium Industries



INDIA			
WEST BENGAL	1350	KARNATAKA	225
ANDHRA PRADESH/TELANGANA	1085	UTTARAKHAND	25
ODISHA	400	PUNJAB	200
CHHATTISGARH	600	GUJARAT	100
UP	402	MADHYA PRADESH	25
BIHAR	200	ASSAM	69
HARYANA	200	KERALA	5
JHARKHAND	100	OTHER	350
MAHARASHTRA	215		
ALL INDIA		5551	

OTHER COUNTRIES	
BANGLADESH	200
NEPAL	20
NIGERIA	46
VIETNAM	12
THAILAND	7
CAMBODIA	5
MYANMAR	21
PAKISTAN	150
EXPORT TOTAL	461
GRAND TOTAL 6012	

INDUSS FOOTPRINT ACROSS INDIA AND OVERSEAS COUNTRIES



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