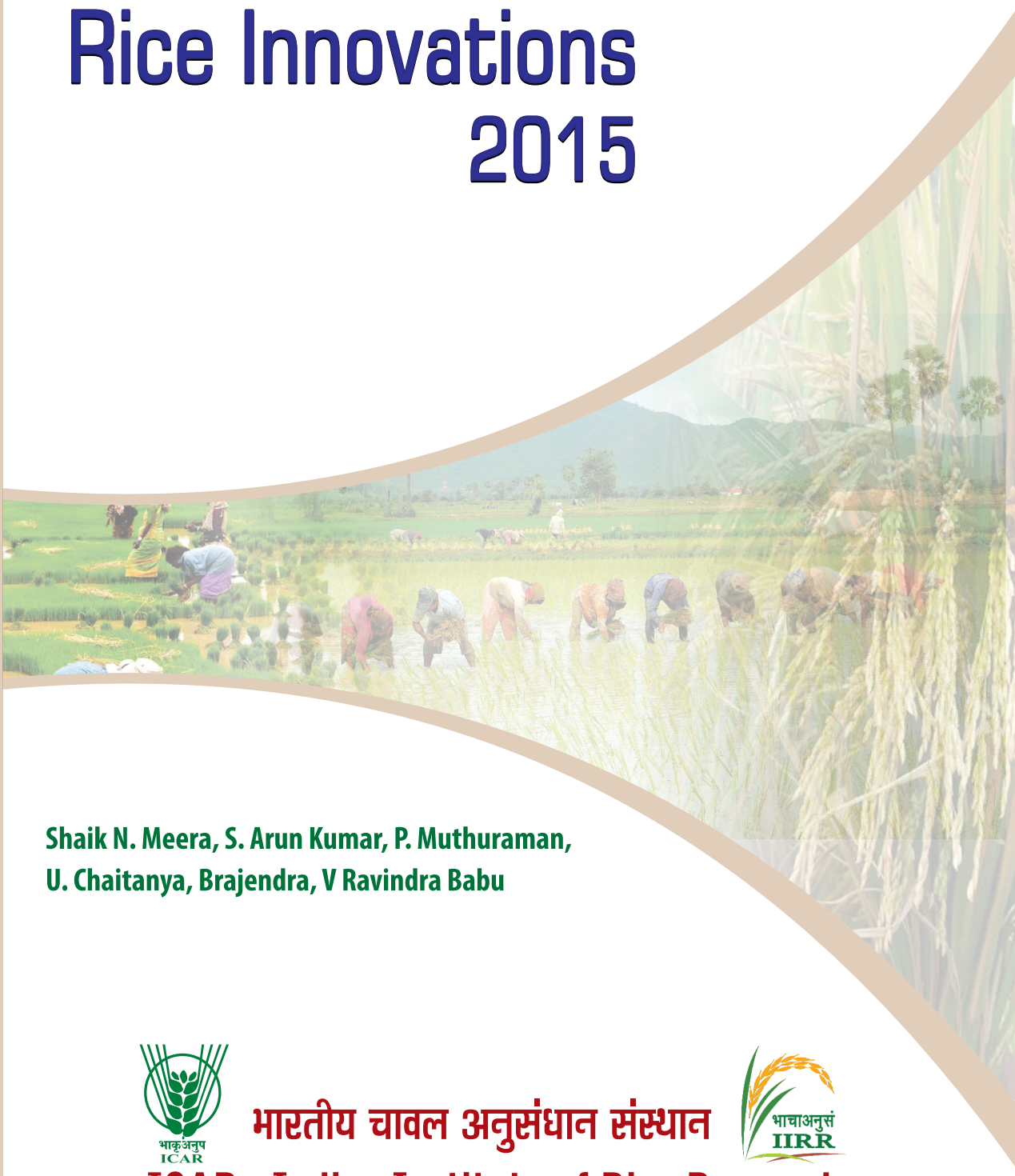
Rice Innovations 2015



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भाकृअनुप
ICAR

भारतीय चावल अनुसंधान संस्थान

भाचाअनुसं
IIRR

ICAR - Indian Institute of Rice Research

Rajendranagar, Hyderabad - 500 030

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Message

Dr. S. Ayyappan
Secretary DARE &
Director General ICAR
New Delhi

"Innovation is the ability to see change as an opportunity - not a threat"

Technology transformation for sustainable production, productivity and profitability depends on the decisions and actions of millions of farmers.

Indian Council of Agricultural Research committed to the cause of farmers and farming as a whole and visualises massive innovation capacity that exists among the Indian farmers. Indian farmers have been innovative in showing the world about best rice cultivation practices over the years while adapting or refining recommended technologies.

To help spur this innovative spirit, the council has been emphasising on bringing into limelight, the innovations that are developed and practiced by farmers. I am happy to learn that Indian Institute of Rice Research is organising "Innovative Rice Farmers' Meet" under the banner 'R-innovate' at IIRR Campus, on 29 August 2015 for showcasing the innovative spirit of rice farmers from across the country.

I congratulate Dr. V. Ravindra Babu, Director (A), IIRR and his dedicated team for bringing out this valuable publication on "Rice Innovations 2015". I am hopeful that this will be the first step towards realising the farmers centric and demand driven participatory technology development in rice sector of the country. I convey my best wishes to all the farmers on this occasion.

(S. Ayyappan)

17 August, 2015
New Delhi

Message

Dr. Jeet Singh Sandhu

Deputy Director General (Crop Science)

Division of Crop Science - ICAR

Krishi Bhavan, New Delhi

When tillage begins, other arts follow. The farmers, therefore, are the founders of human civilization.

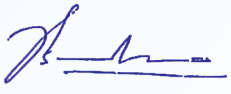
Daniel Webster

Rice is the major cereal crop grown in about 44.6 million hectares in the country. India represents all kinds of diversity under which rice is grown across the globe. No other crop is as versatile as rice and it is interwoven in the cultural, social and economic life of millions of Indians. In short for all of us "Rice is Life".

Enormous scientific knowledge and a number of technologies have been developed over last few decades for the betterment of farm families. For contextualising these technologies, ICAR always believed in giving due attention towards understanding the farmers perspective and their innovation capacity.

I am glad that Indian Institute of Rice Research is organising "Innovative Rice Farmers' Meet" under the banner 'R-innovate' at IIRR Campus, on 29 August 2015 to bring under one umbrella, the selected farmers' innovations very specific to rice. I believe that this should usher a new era of documenting a cafeteria of technological innovations in rice farming that would encourage many other farmers to build effective partnerships in the participatory technology development process.

My hearty congratulations to Dr. V. Ravindra Babu, Director (A), IIRR and his committed team for bringing out this valuable publication on "Rice Innovations 2015". I am hopeful that this kind of activities will be continued for years to come to usher into inclusive growth in the Country.



17 August 2015 (Jeet Singh Sandhu)

New Delhi

Message

Dr. A.K.Singh

Deputy Director General (Agricultural Extension)

Division of Agricultural Extension,

Krishi Anusandhan Bhawan, New Delhi

The "Farmers First" approach has gained significance in redefining the way agricultural research is conducted world over. At ICAR, we believe that farmers should be rewarded appropriately for hand-crafting the journey of Indian agriculture. Farmers and their communities should not be secondary to the agricultural R&D organisations, but instead be the direct partners in the technology development process.

Keeping in view the need for a paradigm shift from a single technical knowledge system and diverse local knowledge systems, ICAR has initiated documenting farmers' innovations in the country. There is a greater need to identify, recognise and promote those farmers who are actual grass-root innovators of agricultural technologies. These innovations have emerged out of farmers' vast experience and the wisdom. If these kinds of activities are undertaken crop-wise, many innovations can be documented and promoted effectively.

Rice is the primary food crop of the country and hence, Indian Institute of Rice Research has come forward to showcase the innovative spirit of rice farmers from across the country. I appreciate Dr. V. Ravindra Babu, Director (A), IIRR and his team for compiling such a valuable publication on "Rice Innovations 2015". I trust IIRR will continue to encourage rice innovators for developing location specific technologies and for up scaling those innovations.

25 July 2015

New Delhi

(A.K. Singh)

Message

Dr. I.S. Solanki
Assistant Director General (F FC)
Division of Crop Science - ICAR
Krishi Bhavan, New Delhi

"Innovation is the ability to see change as an opportunity - not a threat"

India's success in agriculture is the outcome of a close and continuing partnership between the governments on the one hand and millions of farmers on the other. Innovation and research supported by the government could not have succeeded until it was tested and widely absorbed by farmers, helping the country to achieve self sufficiency in food in the process. It is the basic strength and creativity of our farmers that has made India the agriculture powerhouse that it is today.

Agricultural innovation matters to small-holder farmers, it matters to poor consumers, and it matters to scientists. One of the strongest drivers of poverty reduction has been agricultural innovation bringing down the cost of food. On the other hand, farmers need to move from a survival mode to a development mode with the continuous innovations emanating from their field experiences.

The present volume documenting 30 rice innovations is a welcome first step in this direction. I congratulate Dr. V. Ravindra Babu, Director (A), IIRR and his dedicated team for bringing out this valuable publication on "Rice Innovations 2015". I convey my best wishes to all the farmers on this occasion.

17 August, 2015 (I.S. Solanki)

New Delhi

Foreword

IIRR has been playing a key role in developing technologies to enhance rice productivity, resource and input use efficiency and profitability of rice cultivation without adversely affecting the environment. This can only be achieved when farmers' perspective is kept in mind while formulating the research projects. Towards achieving the mission statement of IIRR, much emphasis is given in the recent past for encouraging innovative extension methods, where farmers are direct partners in technology development, refinement and re-innovations.

Indian farmers have been innovative in showing the world about best rice cultivation practices over the years while adapting or refining recommended technologies. To help spur the innovative spirit among rice farmers, the Indian Institute of Rice Research is organising "Innovative Rice Farmers' Meet" at IIRR Campus, on 29th August 2015. The Meet aims at showcasing the innovative spirit of rice farmers from across the country. About 30 Innovative Farmers from across India are invited to give a brief presentation during the Meet.

As a continuous process of documenting the farm innovations in rice sector, we are bringing a publication on "Rice Innovations 2015". The document comprise of about 25 innovations related to rice farming. We are aware that many more rice innovators are there across the countries that have developed technologies that deserve upscaling. In future, we shall be including many more innovators.

We shall be happy to receive your comments or suggestions in making this kind of endeavour as effective as possible in future and hope this publication will motivate other farmers to bring in more innovations in the coming years.

17 August, 2015

Dr. V. Ravindra Babu

Director (A), IIRR

Prologue

As per the kind directions from Hon'ble Director General, ICAR - to help spur the innovative spirit among rice farmers, the Indian Institute of Rice Research is organising "Innovative Rice Farmers' Meet" at IIRR Campus, on **29th August 2015**. About 30 Innovative Farmers from across India are invited to give a brief presentation during the Meet. The meet aimed at showcasing innovations of rice farmers from across the country.

For this, applications / nominations were invited from the farmers from all over the country. Wide publicity was given using different platforms. A total of 78 nominations were received from different states.

The committee constituted by the Director had a series of meetings for selection of innovative farmers. Selection was made based on parameters such as Uniqueness and originality of the innovation, stage of development, degree of success (or potential for success) of adoption by other farmers and impact or benefits. The single most criteria used to assess the applications /nominations was that the innovation must have potential for use on a wider scale and be able to demonstrate a positive effect on the rice cultivation.

There was some consideration regarding the number of winners in proportion to the number of applications across the 5 broad geographic regions (North, East, West & Central, North-eastern and South). At the end of this exercise, we could finalize and document 30 innovations that are likely to have impact on the rice farming at local or regional levels.

We shall be happy to receive your comments or suggestions in making this endeavour as effective as possible in future.

The innovations documented in this book are as reported by the farmers mentioned there in. The technologies, even though are duly certified by the nominating agency, not necessarily are endorsed by the Indian Institute of Rice Research, Hyderabad.

17 August, 2015 (Editors)

New Delhi

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Innovation matters...

Innovations and Inventions!

It is important to understand that an innovation is not synonymous with invention. An invention culminates in the supply (creation) of knowledge, but innovation encompasses the factors affecting demand for and use of knowledge in novel and useful ways.

Novelty is fundamental to invention, process of creating local change is fundamental to innovation.

Innovations are Important!

Science and technology are critical to the development and economic growth strategies of both developed and developing countries. Scientific and technological knowledge and information add value to existing resources, skills, knowledge, and processes, leading to novel products, processes and strategies. These innovations are the changes that lead to improvements in economic and social conditions and environmental sustainability.

Indian farmers are known for their courage and capacity to experiment and innovate. There is a need to encourage such innovations for the betterment of society. Many a times farmers' innovations are low-cost, farmer-friendly and easy to adopt for fellow farmers, particularly confined to a locality.

Innovation is therefore central to development.

How innovations evolve?

Generally in marginal agro-ecosystems, farmers continuously look for technologies that best fit their bio-physical, economic and socio-cultural conditions. To large extent, formal research and development efforts result in technologies that are widely adopted by the farmers. Notwithstanding these efforts, there may be a need for local innovations. Out of necessity, and based on their cultural background, inherited knowledge and daily observations, farmers generate solutions (even though sometimes partially) to their own problems. Unfortunately, these innovation processes, their results and potential for scaling-up are poorly studied and documented.

Innovation should be so soft as to touch the people it serves,

but hard enough to leave distinct impact on farmers' lives

Innovations have some contexts!

There is another type of innovation development process viz., from the farmers. This kind of process of innovation is shaped in very different ways, depending on the particular context in which innovation systems emerge and how this context changes over time. First, the pivotal actors that start the process in agriculture are farmers. Factors that trigger innovation are quite different—broadly speaking, they are either related to need or to passion. These factors and farmers put together may develop few innovations.

Innovations can't be seen in isolation, but in a context.

Can all these Innovations be adopted?

Not certainly.

Like Indigenous Technical Knowledge (ITK), some of the local innovations of farmers may be incorporated into the formal research agenda. Giving recognition and value to local innovations is crucial to institutionalise them in the formal research and development system, in order to contribute to community empowerment and rural development.

To achieve this, a validation or screening process is an important intermediary step. But for validation one can't pin down best-bet methodological steps. The validation process is context-specific, based on technology attributes (relative advantage, compatibility, predictability, observability, complexity and trialability) and largely influenced by the farmers' background and perceptions. A broad stakeholder representation and good facilitation will add to the quality of the process and will avoid any inappropriate local innovations being scaled up.

Innovations can't be blanket recommended.

They need thorough validation, refinement and recommendation by local organisations

✳✳✳✳

Cost Effective Multi Purpose Tiller cum Puddler

Profile:

Shri Parma Ram Chaudhary
Vill. Chhatter, PO Jughahan,
Teh. Sundernagar,
Distt. Mandi,
Himachal Pradesh
+919805756261

Age	61 years
Educational Qualification	Matric
Land Holding (in hectares)	2.0
Rice Farming Experience (in years)	40
Cropping system adopted	Paddy, maize, wheat, vegetables, oilseeds and pulses

Brief Description

Sh. Parma Ram Chaudhary has developed a multi-purpose tiller cum puddler using the engine of an abandoned scooter (Lambretta) in the year 2009. He has fabricated puddler tines, tillers, ridge makers and a weed scraper for use in puddling, ploughing, ridge and channel making and weed scraping in wider spaced crops, respectively.

How is it developed?

In small and scattered hill farms, it was difficult to use the tractor for heavy field operations. Further, high cost of manual labour and costly branded tillers are out of reach of resource poor hill farmers. With this innovation, the field operations are easily done saving the manual labour and animal draft power.

Work efficiency & Energy use: This equipment can be efficiently operated using petrol for ignition and can be switched on to kerosene oil later on for energy consumption. This equipment uses 50 ml petrol and 1 litre kerosene per hour covering 0.24 ha area for puddling, 0.08 ha for ploughing, 0.16 ha for ridging & channel making and 0.08ha for weed scraping operations.

Labour and time saving: This equipment resulted in huge saving of manual labour as well as animal draft power.

Drudgery reduction: The equipment resulted in drudgery reduction in various manually done farm operations like ridge and channel making and weeding etc.

Adaptability across the system: This equipment weighing 60 kg has been liked by a large number of the farmers in Balh valley of District Mandi. This equipment is of immense use in hilly terrains where plot size is small not suited for the movement of heavy farm machinery.

Images/ Illustrations

Multi-purpose tiller cum puddler equipment

Tiller tines of multi-purpose tiller cum puddler equipment

Puddler wheels of multi-purpose tiller cum puddler equipment

Ridge cum channel maker tool of multi-purpose tiller cum puddler equipment

Recognition received

ICAR Jagjivan Ram Abhinav Kisan Purskar-2013 (Zonal)

Receiving ICAR Jagjivan Ram Abhinav Kisan Purskar-2013 (Zonal) from Hon'ble Union Agriculture Minister, GOI

Receiving progressive farmer award during Vibrant Gujarat 2013 Global Agriculture Summit

Practical Utility/ Scalability

Trainees of various agencies from all over the state visit his farm to see his innovation. Officers from the state departments as well as dignitaries from ICAR have also visited to see his innovation. Mr. Choudhary is a source of inspiration for the farming community in the region and with his low cost innovations and models for marginal farmlands has set an example for other farmers. Now a large majority of the farmers of the area has started using similar type of equipment available in the market.

Portable Combine Harvester-cum-Power Tiller: Cost Effective Farm Machinery Suitable for Fragmented Holding

Profile:

Shri SK. Sirajul Islam Shah
Vill. Vior, P.O. Vikahar
P.S. Tapan, Dist. Dakshin Dinajpur
PIN-733133, W.B.
Mobile : 9733334455

Age	67
Educational Qualification	Graduate (B.A.)
Land Holding (in hectares)	3.0 ha
Rice Farming Experience (in years)	42 yrs.
Cropping system adopted	Jute-Rice-Wheat cropping system Jute-Rice-Potato cropping system

Brief Description

The land holding of farmers of D. Dinajpur district is very less, i.e. farmers are small & marginal. Labour problem at the time of peak agricultural operation (like harvesting of crops) is another barrier for profitable agriculture. This is more conspicuous particularly in case of field crops like paddy, wheat, etc. It is not possible to use large combine harvesters for harvesting of crops considering land holding & economic condition of farmers. In this situation this mini combine harvester may solve the problem of the farmers. Hence this innovation.

The innovation is a Portable Combine Harvester-cum-Power Tiller. This is cost effective and is suitable for fragmented holding. The capacity of Portable Combine Harvester-cum-Power Tiller is 17-18 decimal/ hr in case of Boro and 33 decimal in case of Aman paddy. Important characteristics of this innovation are Full feed threshing, cage wheel compatibility working operation, suitable for fragmented holding.

How is it developed?

He has a sizable land and suffered from unavailability of sufficient labour during harvesting time. So, he tried for purchasing a combined harvested. Heavy duty large size com-

bined harvester is available in the market. Price of the combine harvester was 16 lakh at that time. But he did not have that capacity. His quest for small combined harvester went in vain. But he got a photograph and a booklet of this combined harvester wherefrom he started. It costs only 2.0 lakh.

He possesses a Mitsubishi power tiller which he used as its engine opening its tiller parts. He manufactured all other spare parts on his own except the front cutting blade which he purchased from KAMCO.

1) In traditional heavy duty combine harvester, after threshing paddy is lifted up with a rotary lifter which causes breakage of paddy grain. He modified it with a conveyor belt fixed with series of plates which effectively lifts paddy grains without breakage of grain.

2) Modification : Engine of the power tiller shifted to the back of the machine below the handle; the thresher section is fitted there. Paddy is collected in gunny or polythene bag. The machine is now devoid of sitting arrangement and operated by walking.

3) Cultivator gear has been kept outside which serves as the main gear of operation of harvester.

Images/ Illustrations

Full view of the combine harvester

Engine and the grain collection unit

Harvesting unit

Threshing unit

Winnowing unit with conveyor belt from threshing unit

Collection of paddy in bag at the end

Cage wheel fitted for operation in muddy field

Innovator Sk. Sirajul Islam Shah with his manufactured machine

Practical Utility/ Scalability

Considering the problem of farmers & high cost of large combine harvester, the technology was developed by the innovative farmer. As it requires one power tiller, that can be used separately for tillage operation and one attachment for using it as mini combine harvester, the small & marginal farmers can easily afford this innovated machine. The machine was successfully demonstrated in KVK Instructional Farm as well as in different farmers' field. The machine is eco-friendly low cost & profitable for farmers.

The success of this mini combine harvester has been published in different newspapers, Zonal ICARZ Report & model is displayed in different exhibition, Krishi Mela etc. Farmers are interested for this innovation and are ready to use this machine

Mandava Weeder

Profile:

Shri Kishan Rao Parcha
7-1-246/A/1/1, Balkam Pet
Opp. Yellamma Temple Lane
Hyderabad – 500 016
Mobile : +91 9441123197
Email : sukshethram@gmail.com

Age	61 Years
Educational Qualification	**B.E.(Electrical Engg.)**
Land Holding (in hectares)	**10 Hectares**
Rice Farming Experience (in years)	**35 years**
Cropping system adopted	**Traditional, Non-Chemical**

Brief Description

Mandava Weeder is an improvised implement to better mulch the weeds in an SRI paddy field, aerate the soil root zone and lessen the drudgery of the operator so it can be operated by women also.

The problems solved with the use of Mandava weeder are:

1) The earlier models such as Cono weeder were heavier, thus causing more fatigue than necessary to the operator .

2) Since the teeth width is limited to 5 inches, the rice plant is not damaged unlike with other weeders.

The operators of Cono-weeder found that the nuts and bolts , during the use of this weeder in the muddy field, are falling off and required immediate replacement. This problem is completely solved by welding all the joints.

The innovative features of Mandava weeder, compared to other weeders, are:

1) Lesser weight
2) Operator friendly handle
3) Seamlessly welded, without nuts and bolts

4) Thicker metal used for durability

5) Ergonomically designed

6) Cheaper

7) Can be operated by women of average built and strength.

How is it developed?

This innovation was conceived during a workshop on the implements used in SRI, in 2004. All the weeders' performances were analysed and deficiencies of different weeders were noted. Keeping in view of all the problems identified by the operators and observers, an idea was conceived and an improvised implement was designed by synthesizing the beneficial features of different weeders and adding certain features to avoid/neutralize the identified deficiencies

Images/ Illustrations

Practical Utility/ Scalability

Various research establishments in India and farmers and NGOs have appreciated the beneficial features of Mandava weeder. The Mandava weeder is in extensive use in various states such as Telangana, Andhra Pradesh, Orissa, Tripura, Utter Pradesh, Uttarakhand, Himachal Pradesh etc.

Mandava weeder is also introduced to other countries such as Morocco, Afghanistan, Sierra Leone, Nepal etc.

Thousands of Mandava weeders were manufactured locally throughout India and abroad as the design and engineering drawings are open sourced and placed in the Commons. These designs and drawings can be accessed freely by all, through the public domain of Internet and other publications. This open offer without strings has facilitated the farmers and institutions all over the world to replicate and distribute Mandava weeder on a wide scale.

More rice per drop: Sustainable Micro irrigation strategies to maximise rice yields

Profile:

Shri M. Parthasarathy
No: 5, Govindapuram Post,
Dharapuram Taluk,
Tiruppur Dt, Tamil Nadu 638657
04258253777, 09965020000

Age	69 Years
Educational Qualification	PUC
Land Holding (in hectares)	20
Rice Farming Experience (in years)	50
Cropping system adopted	Rice-Onion-Maize

Brief Description

The concept of drip fertigation was tested in the field trials of Research Stations of Tamil Nadu Agricultural University during 2010-12. The outcome of experiments proved to be positive, but there was reluctance in adoption from the farmers.

Technology of drip fertigation was adapted and implemented by this farmer through an innovative approach of Rice- Onion –Maize Cropping system. It was achieved by laying out a drip irrigation system in the month of March with a lateral spacing of 90 cm and with a dripper spacing of 40 cm and raised beds of 90 cm were formed.

Small onion (April – June), Maize (July – September) and Rice under direct sowing (October – February) were grown under drip fertigation making this innovative cropping system under drip beneficial, economical and made the drip irrigation in rice adaptable. The Concept of Drip Fertigation for Rice was selected as Best Management practice by Centre for World Solidarity in 2014.

How is it developed?

The concept of drip irrigation which had multiple benefits in horticultural crops was tried in cereal crop like rice where the scope of water saving and judicious use of water is more.

Images/ Illustrations

Practical Utility/ Scalability

Presently this concept of drip fertigation in rice is being adopted by nearly 50 farmers in and around Govindapuram Village. One of the possible ways to bridge the gap between demand and supply of water is to increase the productivity and water saving per unit area by adopting the appropriate production and management technologies. Drip fertigation offers scope to increase the productivity of crops per unit land, time and all inputs in crop production strategies. Hence this kind of innovation may be promoted across the regions.

Land shaping in flood prone villages

Profile:

Shri Ananta Naskar
Vill.: Bongheri, PO.: Kaikhali Ashram,
Dist.: South 24 Parganas
West Bengal
Mob:08509994726

Age	60 years
Educational Qualification	5th Standard
Land Holding (in hectares)	0.52
Rice Farming Experience (in years)	35 years
Cropping system adopted	Rice/vegetable/Fish - Potato/Vegetable/ Fish –Cucumber

Brief Description

Mr. Naskar excavated a small farm pond at one corner of his flat low land. He used the dug up soil to raise 2 bigha of his low land upto a 1.5 ft high and strengthened its embankment to 3 ft height and 5 ft width. With the rest of the soil, a 5-ft wide and 4-ft high pond embankment was constructed. For effective drainage of the run-off water, the main field was connected to the pond through a pipe. While there is continuous 1-2 ft submergence in the normal (low lying) fields, the raised plot could be drained easily to accommodate the improved varieties. The pond, apart from collecting monsoon rain also helps to better utilize the non-seasonal rains during rabi and summer season.

Mr. Naskar now grows short duration HYV paddy in the raised plot and deep water local paddy in rest of the land during Kharif season. He cultivates Potato after early harvesting of HYV paddy. After harvesting the potato, he takes Cucumber on the same plot. In the low lying field he grows Green Gram after harvesting the local paddy. He also grows vegetables like Beans, Chili, Bottle Gourd, Ridge Gourd and Bitter Gourd on the embankment around the pond and field, throughout the year. He uses the stored rainwater of the pond to irrigate potato, Cucumber and other vegetables on the embankment (occasionally with the help of pitcher). Besides, he uses the pond for growing fish (Monosex Tilapia) for 8-9 months. He is maintaining one milch cow. He is preparing vermicompost with the available cowdung and biomass from his field.

How is it developed?

Mr. Ananta Naskar had 0.52 Acre of cultivable land in the low lying Bongheri village. The village is located in the lap of Sundarbans, just adjacent to the river Matla. Heavy rain during Monsoon inundates paddy fields and keeps them submerged for a long period. Hence, the villagers have no other option than growing long duration, deepwater, traditional paddy varieties that give them poor economic return. At the same time, cyclonic storms (like the Aila in 2009) on and often breaches the river bund and flood the entire village with saline water to jeopardize agriculture for the next 2-3 years.

The problem of excess water in monsoon is matched equally but completely contrary to that of water scarcity in Rabi-Summer season. Farmers' can't take any crop during these two seasons due to scarcity of fresh water and due to soil salinity. Few farmers cultivate green gram with the help of residual moisture but again the productivity is marginalized due to soil salinity. Farmers, specially the youths of the area depend on seasonal migration to Kolkata, for sustenance.

Mr. Ananta Naskar and his sons Nemai (32 yr) and Netai (30 yr) had no other choice than depending on traditional paddy cultivation during monsoon and go out for job work for the remaining 6-months. The topographical modification helped Mr. Naskar to facilitate surface drainage and prevent continuous submergence of his field. The improved land situation allowed Mr. Naskar to cultivate short duration HYV paddy that is giving better economic return. The broad and elevated embankments around the raised plot and farm pond provided opportunity to grow vegetables without any water logging. The stored water supported life saving irrigation during long dry spell during monsoon.

Images/ Illustrations

Practical Utility/ Scalability

Many farmers witnessed the positive outcomes of the technology and subsequently replicated the same in their own field. About 71 farmers covering 8.88 ha of area have already implemented this technology with their own cost, in the same village. It was observed that previously at least 1 female member per family used to migrate to nearby towns. These womenfolk could now get engaged in their own farm in various agricultural activities, besides leisure hour. This kind of innovation is a true reflection of what an individual farmer can contribute to the society for addressing the local needs.

30 cm casing pipe drum seeder and power weeder

Profile:

Shri Sk. Imam Saheb

Nelakondapally (Vill & Mdl)

Khammam (Dist)

Telangana State

Ph- 09704812836

Age	40 years
Educational Qualification	7th class
Land Holding (in hectares)	1.2 ha
Rice Farming Experience (in years)	14 years
Cropping system adopted	Green manure-Paddy-Paddy

Brief Description:

Normal drum seeder is having a spacing of 20 cm in between rows. This makes it difficult for using the cono weeder. This has resulted in the designing of the 30 cm spaced drum seeder and a power weeder.

The problems of weeds on using 20 cm drum seeder for paddy cultivation have resulted in high cost for manual weeding. Also, it was difficult to operate the cono weeder. To overcome this problem, 30 cm casing pipe drum seeder and power cono weeder was designed and used.

How is it developed?

In SRI , initial establishment of seedlings is difficult, hence he used 20 cm drum seeder. But in this rum seeder, the spacing between rows do not allow cono weeder operation. Hence, 25 cm casing pipe drum seeder was developed by the farmer. In this case also labourers were reluctant to use the cono-weeder due to drudgery. Finally he modified casing pipe drum seeder into 30 cm and converted it into a power weeder to run between the rows.

Images/ Illustrations

Practical Utility/ Scalability

The 30 cm spacing drum seeder was taken by 20 farmers of various districts from AP and Telangana. Success story was published in Annadatta telugu magazine, sakshi news, ETV, etc. DAATT Centre of Khammam is undertaking trials to validate the different spacings of paddy drum seeder cultivation for this region.

Aerobic transplanting and SRI for water conservation and sustaining soil health

Profile:

Shri Puttaswamy, M.N.,
S/o Late Nanjundegowda,
Matadadoddi (Village), CA Kere Hobli,
Maddur (Taluk), Mandya (Dist.) – 571422
KARNATAKA
+91 87108 95910

Age	40 years
Educational Qualification	7th Standard
Land Holding (in hectares)	2.0
Rice Farming Experience (in years)	25 years
Cropping system adopted	Rice - Green manure (Diancha) - Rice Rice - Sugarcane; Rice – Cowpea

Brief Description

The farmer hails from the tail end region of the Cauvery command where in canal water never reaches their farm during summer. These tail end farmers are facing severe water shortage for sustainable rice production. Farmers were taking paddy through lift irrigation from the small tributary flowing adjacent to the village. Rice being a high water demanding crop, makes it difficult under conventional system with reduced water availability. Further, reduced availability of electricity for pumping water made it difficult to cover the area under conventional system.

The farmer approached the Rice Scheme at ZARS, VC Farm, Mandya in search of alternatives and cultivated KRH-4 with SRI and aerobic method of cultivation. Considering the success in water saving through SRI and aerobic technique, the farmer started cultivating rice as that of other arable transplanted crop.

The technique of **Aerobic transplanting** involves establishment of rice seedlings with dry seed bed nursery for 20-25 days. The main land was prepared under drier situation and furrows at 30 cm was opened with wooden plough at the time of transplanting and irrigated for wetting the soil. Seedlings were transplanted in the furrows at an intra row spacing of 15 - 20 cm. Then the crop was maintained under aerobic condition with irri-

gation at 6 - 8 days interval. Inter cultivation was carried out by passing wooden plough in the rows. The weeds were controlled with pre - emergent application of Pretilachlor + Bensulfuran methyl @ 4 kg acre^{-1}, inter-cultivation twice between the rows and hand weeding in the intra rows. Nutrient management was maintained as per UAS, Bengaluru package. This technique was adopted in 2.0 acre during the 1st Year and realized a production of 94 quintals with KRH 4 hybrid.

Earlier, under the conventional system of puddled transplanting, farmers in the village were using 150 - 175 cm water. However, with the introduction of SRI and aerobic methods of cultivation the water requirement was reduced to 60 cm and 45-50 cm, respectively. Further, the cost of cultivation was reduced from Rs. 21000/- per acre under conventional system to Rs. 14000/- per acre under aerobic transplanting.

Looking at the success rate, the rice growers association (Sri Harihareshwara Batta Belegarara Sangha) was registered in the village and the technology of SRI and aerobic transplanting was up scaled to 400 acres in the cluster of villages.

How is it developed?

The demonstration of SRI was initiated during summer 2011. Aerobic transplanting was undertaken during 2012 summer. Method demonstration on SRI method of rice cultivation was conducted in matadadoddi in an area of 200 acres under the leadership of Mr. M.N. Puttaswami under the RKVY project on "Enhancing water productivity in Cauvery Command area" by providing technical guidance from AICRIP Scientist, UAS Bangalore through RKVY Project and AICRP on rice was supported with critical inputs and equipments.

It is really worth mentioning about the superb performance of SRI method of rice cultivation in Matadadoddi village of Maddur TQ. SRI method of rice cultivation has registered 29 per cent improvement on yield over farmers practice besides it has consumed 110 cm of water as against 135 cm in farmers practice. The water use efficiency in SRI method of rice cultivation was to the tune of 86.48 kg/ha cm. some demonstration in Matadadoddi was conducted to know the enhancement of water productivity through selection of hybrid in place of high yielding varieties. The rice hybrid RRH-4 and the high yielding varieties viz. MTU 1001, Jyothy, and IR-64 were compares to enhance water productivity. The large scale demonstration revealed that by selecting KRH-4 rice hybrid it was possible to increase rice productivity by 33%

Images/ Illustrations

Practical Utility/ Scalability

Many Farmers of Matadadoddi, Maddur Taluk who adapted SRI method inspired by the success story of Puttaswamy. Water is a major scarce resource for sustainable rice production especially in the tail end regions. The Matadadoddi village in Maddur Taluk, Mandya Dist, Karnataka is the last village under Cauvery command. Rice cultivation during summer season was tougher as the canal water never reached the farm. Adoption of System of Rice Intensification and aerobic transplanting helped to cover 250 acres in the village and the same has been perpetuated to the nearby cluster of villages.

These technologies help farmer in the region to save water, electricity, cover the entire cultivable area even during summer without compromising for yield and economic profit. Further, improved soil health with reduced tillage and reduced green house gasses emissions are added advantage even though it was not quantified.

Organic Rice Farming using traditional Rice varieties

Profile:

Shri Anjaneya A.N.
S/o Nagappa A.
Kumbalur, Kumbalur – Post
Harihara tq. Davanagere-Dist.
09972088929
andanuranjaneya@gmail.com

Age	37 years
Educational Qualification	10th Std.
Land Holding (in hectares)	3.4 ha
Rice Farming Experience (in years)	19 years
Cropping system adopted	Transplanting, 2 crop per year

Brief Description

The farmer is producing and conserving 150 varieties. Seed production and marketing in 12 traditional varieties. The rice variety '*Andanur Sanna*' developed by the farmer is one of the leading native varieties grown in 350 ha.

Developed 2 varieties in paddy where in seed. The farmer has been following organic rice farming in 3.4 ha for last 19 years and the land is a certified under organic farming for 10 years. No application of fertilizers, Chemical and weedicides. There is virtually no incidence of pest and disease. Nutrient Management through insitu green manuring with leguminous crops and traditional native paddy varieties are used. After 4-5 years from the beginning the farmer is getting sustained yield. Value addition is taken up in rice to make finished products.

How is it developed?

Personally the farmer was suffering from respiratory problem. By adopting organic farming health condition of the farmer got improved. Reduction in cost of cultivation by organic farming and by growing green manure insitu crops, there by increased profitability.

Initially, it was found that yield levels of paddy under organic farming conditions went down. Gradually the yield levels were sustained. The present day rice varieties are not showing much response to organic farming. Then the friends and relatives of farmer sug-

gested him to go for traditional paddy varieties which are more responsive to organic farming. For nutrition management, the farmer is growing green manure crop.

Images/ Illustrations



Practical Utility/ Scalability

Inspired by the success of insitu green manure crop, 340 farmers are taken this technology in 1200 ha. The rice variety '*Andanur Sanna*' developed by the farmer is one of the leading native varieties grown in 350 ha. in Karnataka. Involvement of family in value addition and marketing of rice and value added products directly to consumer through 'Weekly organic market' at ICAR- Taralabalu Krishi Vigyan Kendra, Davanagere. The farmer is not spending anything on fertilizers and pesticides and the produce is sold directly to consumer and with value addition results in increased profitability.

For conserving and promoting the local traditional landraces / varieties along with best management practices, this innovation finds place in this year's Rice Innovations.

Development of Rice Variety NMS -2 suitable for low input management under irrigated transplanted condition

Profile:

Shri M. K. Shanhar Guru
Madarahalli-Village, Kannahalli-Post
T. Narsipura Taluk, PIN 571 124
Mysore District, Karnataka
Mobile: 9900658921

Age	67
Educational Qualification	PUC
Land Holding (in hectares)	10
Rice Farming Experience (in years)	47
Cropping system adopted	Rice – Sugarcane –Pulses

Brief Description

M K Shankar Guru, 61 years of age, from Madarahalli Village, T Narsipura taluq, Mysore, is from a family of farmers who have more than 200 years of experience in paddy cultivation. In the year 1992 he started searching for traditional varieties. A labourer from Tamil Nadu brought 1kg of *Selam sanna* seed. Sri Shankar Guru started conserving this under organic practices. Gradually other organic farmers started taking seeds from him and now Selam sanna is very popular in Karnataka. It yields 25 to 30 quintals per acre under organic cultivation.

He has also developed the variety NMS2 which is named after him, Narsipura Madarahalli **S**hankar. He had submitted this variety with a farm accredited under the Bangalore University for observation and obtained the report. He now distributes the seed himself and he has got favourable feedback from the farmers.

How is it developed?

This variety was developed through systematic selection. After three generations of selection and purification, the variety was distributed to other farmers. The demand for this variety was immense as it adapted well to the local conditions. It is pest and disease resistant and does not lodge. The variety came to be known as **'NMS 2'** in course of time and has spread across Karnataka.

Varietal characters of NMS 2:

- ✓ It is a medium fine rice variety
- ✓ It possess light brown husk and white kernel
- ✓ It matures in 130-135 days
- ✓ It gives good quality fodder
- ✓ There is no shattering
- ✓ It is resistant to disease
- ✓ Suitable for Low External Input cultivation
- ✓ There is no pest attack

Images/ Illustrations

Mr. M. K. Shankarguru with his paddy variety N M S – 2

Practical Utility/ Scalability

The demand for this variety was immense as it adapted well to the local conditions. It is pest and disease resistant and does not lodge. The variety came to be known as **'NMS 2'** in course of time and has spread across Karnataka.

Introduction of Red Rice using SRI Method

Profile:

Shri Sh. Kishori Lal

S/o Sh. Sukhia Ram

Village Bagru PO, Basnoor Tehsil, Shahpur distt. Kangra (HP) PIN 176 208

98160 41907

Age	67 years
Educational Qualification	Matriculation
Land Holding (in hectares)	2.0 ha
Rice Farming Experience (in years)	50 years
Cropping system adopted	Paddy- Wheat

Brief Description

With the implementation of Food security Act in Himachal Pradesh the demand for local rice reduced considerably. The produce of local rice is not finding any market or buyers. So Sh. Kishori Lal got an innovative idea that he should switch to Red Rice which is in good demand in metropolitan cities. This is rich in iron contents and is sold unpolished hence is rich in fibre contents also. Now looking at the very good demand of red rice he constituted a group of farmers called 'Kisan Utthan Club' with the membership of about 50 farmers. He provided them the seed of red rice and asked them to produce the crop. He is buying back the entire produce from the farmers and selling it at the price of Rs. 3500 per quintal.

Further, he is growing hybrid rice, that too with SRI technique. Through this technique he has doubled his productivity with very little inputs. Now, this year he is also trying to apply SRI technique in red rice also.

How is it developed?

The problem of unmarkatability of paddy was solved by growing red rice which fetches premium prices in the market. The Rice & Wheat Research Station of CSK Himachal Pradesh Agriculture University developed a new variety of red rice 'PALAM LAL DHAN' in the year 2012. The farmer came to know about it through KVK, Kangra and was provided seed as FLD. He found a ready market for this red rice.

Practical Utility/ Scalability

About 50 farmers have started producing RED Rice in the surrounding areas. On verge of extinction, the hill state's Red Rice has got a new lease of life after it became the first crop variety of Himachal Pradesh to be registered under the Protection of Plant Variety and Farmers Right Act, 2001. Standardising the economically feasible method of rice (SRI) for red rice makes this an innovation worth tried across the state.

Conservation of indigenous varieties of rice

Profile:

Shri Anath Halder
Vill. Naran Beria P.O., Mahirampur, P.S.
Falta Dist.--South 24 Pgns,
West Bengal
09635576523

Age	61 years
Educational Qualification	B.A.,B. Ed.
Land Holding (in hectares)	5 ha
Rice Farming Experience (in years)	50 years
Cropping system adopted	Rice - Mung -Vegetables

Brief Description

The farmer is engaged with rice cultivation for last 50 years. He has contributed immensely for the society with a unique and noble approach through conservation of indigenous rice varieties those are under threat of extinction.

It is noteworthy to mention that each of these varieties comprises unique and incomparable characters. Few of the rice indigenous varieties he is conserving for several years are *Dudheswar, Kerala Sundari, Radha Tilak, Nageswar* and many others. Additionally he is playing the role of key person to use the modern technologies of rice cultivation such as Systemic Rice Intensification, Integrated Pest Management, Vermi-composting, Organic farming around extended area of his community. In doing so, he became the pioneer person to boost the encouragement of the other farmers to adopt the modern technologies of rice cultivation.

How is it developed?

Traditional varieties of rice having unique characteristics are being lost forever. New high yielding rice varieties, hybrids etc are playing the key role to replace the indigenous ones. However, the unique attributes of rice are getting lost which is recognized as a irreparable loss for the farming community. What Mr. Anath Halder, has done is trying to conserve such indigenous varieties. His work is immensely influencing the preservation of biodiversity in other way too.

Practical Utility/ Scalability

More than 1000 farmers have adopted his innovative idea of conserving indigenous rice varieties coupled with modern cultivation technologies for rice production in a sustainable manner. The traditional varieties have amazing adaptability to local environmental conditions and endurance to climatic changes such as draught and flood. It is in this context, the innovation of this kind becomes worth appreciating.

Cultivation and Processing of non-Basmati aromatic Rice (Tulaipanji)

Profile:

Shri Soleman Ali Pradhan
Vill- Bishnupur, Post: Baharail
Dist. Uttar Dinajpur
Pin- 733134
Mob. No. 09734127899

Age	42 years
Educational Qualification	Higher Secondary (10+2)
Land Holding (in hectares)	1.5
Rice Farming Experience (in years)	15 years
Cropping system adopted	Rice-Maize-Rice; Rice-Potato-Chilli

Brief Description

Uttar Dinajpur district has traditionally been known for cultivating an indigenous aromatic rice strain called *Tulaipanji* which is native to the region and has got geographical indicator that is being cultivated by marginal and small farmers. Poor productivity(1 to 1.5 t/ ha) of this rice variety and substantial quantity of chaffy grains in conventional cultivation method led Mr. Pradhan to initiate the venture to grow that particular variety with SRI Technology with total organic manures (Vermicompost and mustard oil cake) without using any chemical fertilizers and chemical pest control measures. This has led Mr. pradhan to get a production upto 3.0 t/ ha with significant reduction of chaffy grains.

Tulaipanji Rice is specially famous for its wonderful aroma and tenderness which is very difficult to maintain in conventional processing. Mr. pradhan after several years of trial and error, has developed Short soaking and tempering method for parboiling of this rice variety. This has led to better grain recovery with scintillating aroma.

How is it developed?

While cultivating *Tulaipanji* rice in conventional method Mr. Pradhan had to face heavy poor production with significant yield loss due substantial chaffy grains. This has prompted Mr. pradhan to shift from conventional practice of rice cultivation of this particular variety to SRI Technique using total organic manure in the form of vermicompost and mustard

oil cake @ 225 Kg/ha and 120kg/ha respectively 8 days prior to transplanting. This process helped him to achieve a production of 2.9 to 3.0t/ha compared to 1.0 to 1.5t/ha in the conventional method. Farm get price of paddy is enhanced to Rs.3500 to Rs.4800/q.

To overcome the problems related to processing, Mr. Pradhan started trial and error with the techniques of processing of rice as per following method

- Soaking the paddy in clean and fresh water for 24 hrs.
- Draining and steaming of rice for 5to 7 minutes
- Heaping for half an hour for cooling.
- Sundrying for 3 days with short Intervals
- Milling of parboiled paddy for 4 times for dehusking, redehusking, grading and polishing.

Final product from conventional processing generally fetches Rs. 60-65/Kg where as Mr. Pradhan fetches Rs. 80-85/Kg. from his innovative processing and cultivation technique.

Practical Utility/ Scalability

Presently around 200 ha of land are being cultivated with *Tulaipanji* rice with the eco friendly techniques standardized by Mr. Soleman Ali Pradhan.

The innovation was documented and published in the Daily vernacular newspaper : *Uttar Banga Sambad* and *Uttarer Sara Di.* Mr. Pradhan Participated in different Exhibitions and Krishi Melas including Krishi mela 2014-15, organized by Uttar Banga Krishi Viswavidyalaya. With these efforts and relative advantages of these techniques, the innovation is all set to benefit the neighbouring villages / districts.

Management of Rice pest through botanical pesticides prepared locally

Profile:

Shri Churamani Mondal
Vill- East Kalinagar, P.O.- Jagadishpur
P.S.- Uluberia, Dist- Howrah
West Bengal
Ph- 09674117524

Age	52 years
Educational Qualification	B.A.
Land Holding (in hectares)	2
Rice Farming Experience (in years)	20 years
Cropping system adopted	Rice-Rice-Mustard/Rice greengram-rice

Brief Description

Churamani Mondal is a resident of East Kalinagar, Uluberia. He is involved in cultivation for last 30 years. He is a progressive and innovative rice farmer. He got training from different government organization and applied the technology in his field. He himself applied his own thinking as how to cultivate paddy which is effective and at the same time there is no yield loss. After conducting trial for several years he developed a rice production technology of his own.

He prepared a seed bed of 2 cattah area for 0.133 ha land and sown 1 kg seed in the seed bed after treating the seed with Trichoderma viride @ 4 g/kg seed. He used 15 kg vermicompost in the during seed bed preparation.

He transplanted 13-15 days old seeding in the main field (1-2 seeding/hill). The finally prepared main field was divided into several plots (6 m x 6 m) with 1.5 ft. drainage / irrigation channel all around the plot. For 0.133 ha area he applied 400 kg vermicompost. As basal application he used 10 kg DAP and 7 kg MOP, for first top dressing (7 DAT) he used 10 kg urea and for 2nd top dressing (21-25 DAT) he used 7 kg urea and 5 kg MOP.

For control of pest and diseases he used different leaf extract. The composition as follows:

Tulsi leaf – 1 kg	Karanja leaf – 1kg
Neem leaf – 1 kg	Akanda leaf – 1 kg
Cowdung – 2 kg	Cow urine – 2 lit.
Molasses – 200gm	

Leafs were crushed and all the materials were mixed and kept in a pot for 20 days. The mixture was stirred everyday for one time. After filtering the solution was spread in the field as well as in the irrigation channel before transplanting @ 200 gm solution in 10 lit. water. 800 gm solution was required for 0.133 ha area. This solution was spread over the leafs during 21-25 DAT (800 gm solution for 50 lit water).

This spray was taken care of major pest and diseases. In this method of cultivation he got 670-680 kg seed from 0.133 ha area.

How is it developed?

As in case of any other rice growing region, Howra also there was a problem of different pest and diseases. He tried different chemical, pesticides to control the pest. But control through chemical pesticides was proven to be costly. To reduce the cost of cultivation he tried to use solution prepared from leaves of different locally available plants. Finally by trial and error method, he standardized the solution and used to control different pest and diseases. At least 120 farmers of his area adopted this technology. Horizontal spread of technology is about 25 ha. Feedback from farmers is positive.

Images/ Illustrations

Practical Utility/ Scalability

Use of botanicals is now emerging as one of the important means to be used in protection of crop produce and the environment from pesticidal pollution, which is a global problem. Two main aspects of botanical pesticides, one search and exploitation of new botanicals as pesticides including isolation, identification and evaluation of the active components and another use of botanicals in agriculture in different forms like direct spray applications of the various plant materials, soil amendments for different plant parts, intercropping of biologically active plants with the main crop, botanical grain protectants, use of botanical based synthetic pesticidal formulations and also use of botanicals as synergists/ binders for synthetic pesticides. It is in this context, the innovations from farmers experiences should be shared across the platforms to validate and large scale promotion.

Innovative Insect Pest management

Profile:

Mr. Vezokho Epao
Thipuzu village, Rihuba, Pfutsero
Dist Phek
8732814767

Age	48 years
Educational Qualification	IX Pass
Land Holding (in hectares)	1 ha
Rice Farming Experience (in years)	30 years
Cropping system adopted	Double cropping

Brief Description

After transplanting wild lemon grass is spread over the entire field to control stem borer in particular and flies and (aphids in bund areas). Wild lemon grass is either put in the soil or it may let float in the field. Wild lemon grass is found abundantly in the village and most of the farmers practice this method since time immemorial.

How is it developed?

By using wild lemon grass insects like stem borer in particular and flies and aphids are repelled.

Practical Utility/ Scalability

Yellow stem borer is a serious pest of rice throughout India and South East Asia. Stem borer occurs both in kharif and rabi seasons. Moderate to severe incidence is noticed in nursery, planting to mid-tillering and panicle initiation stages. Heavy infestation results in 40-60 per cent yield loss. In the absence of absolute control / resistance to stem borer, this kind of local innovation may be promoted after validating the same.

Adaptation of SRI Method in paddy

Profile:

Shri Nitish Kumar

Derbeshpura village,

Badi – Post, Katrisarai Block, Nalanda DISTRICT, Bihar - 805105

07250914456

Age	37 years
Educational Qualification	Matriculation
Land Holding (in hectares)	6
Rice Farming Experience (in years)	12
Cropping system adopted	Paddy – Wheat/Potato – cucurbitace

Brief Description

The farmer has made slight changes in the package of practices in System of Rice Intensification (SRI) to suit to his local conditions. Even though SRI method has been practices across the country, customising the SRI principles and practices Bihar, makes this an innovative effort.

Initially, he started adopting the SRI method of rice cultivation after taking the training from KVK and support from ATMA and DAO office. Use of green manuring in paddy field before transplanting of paddy seedlings of rice hybrid Arize 6444 has proven to be highly productive. Based on this experiments he standardised age of seedlings (12 days old) and spacing (25 x25 cm) for the local conditions. Weeding done with help of conoweeder and use of fertiliser NPK as recommended.

How is it developed?

He started adopting the SRI method of rice cultivation after taking the training from KVK and support from ATMA and DAO office. Use of green manuring in paddy field before transplanting of paddy seedlings of rice hybrid Arize 6444 has proven to be highly productive. Based on this experiments he standardised age of seedlings (12 days old) and spacing (25 x25 cm) for the local conditions. Weeding done with help of conoweeder and use of fertiliser NPK as recommended. Organic fartilizers and bio-pesticides purchased from Gujarat Life Sciences have been used for getting the desired results.

By using this modified SRI method there was a less problem of insect like BPH, stemborer in paddy fields. Regular visit of paddy field and close monitoring of KVK scientist and DAO's official staff of state Govt. made this method more profitable.

Images/ Illustrations

पटना, शुक्रवार, 25 नवंबर, 2011

नवादा

महामारी की आशंका से सहमे लोग

श्री विधि: वैज्ञानिक विधि से खेती कर होगा खाद्य संकट दूर

नालंदा ने बनाया विश्व रिकॉर्ड

धान उत्पादन में कतरीसराय के सुमंत ने कायम की मिसाल

कृषि वैज्ञानिकों ने प्रयास को सराहा

चीन के विश्व रिकॉर्ड को तोड़ा

उपज देख कृषि पदाधिकारी हुए खुश

Practical Utility/ Scalability

About 2200 farmers from neighbouring villages such as Saidi, Badi, Bahadurganj, Naira, Chtachubigha, Bilari have adopted this modified method and got benefited.

Straw Management & Direct Seeded Rice - Wheat Happy Seeder

Profile:

Shri Palwinder Singh S/ O S. Gurmail Singh
Address: Vill: Baronga Zer, Block Amloh,
Distt. Fatehgarh Sahib- 140406
Contact No. 98141-35091, 73072-35091

Age	36 years
Educational Qualification	Post Graduate and Higher diploma in Cooperative Management
Land Holding (in hectares)	**6**
Rice Farming Experience (in years)	**20**
Cropping system adopted	Rice – Wheat; Rice – Potato; Rice – Potato-Sunflower

Brief Description

Although the several benefits of the crop residues, most of the crop residues are removed and/or burnt. The residue burning is widely practiced, which is not acceptable for sustainable agriculture particularly in intensively cultivated irrigated system.

The greater engagement of cereal farmers in better straw-utilisation could probably reduce the adverse impacts of open burning of straw on the environment. However, it seems difficult to achieve with the current knowledge and ability of farmers being limited and also by other external factors.

The innovator has never practiced rice straw burning over his farm for the last 7 years and adopted direct seeded rice technique since 2010 which has resulted in improvement in soil health. The soil status of his farm has also showed improvement as shown below:

OC: 0.3% to 0.5%

P: 9.9 to 21.2

K: 78 to 95

Mn: 2.04 to 9.0

Cu: 1.14 to 1.46

Zn: 3.20 to 3.0

Fe: 23.90 to 31.0

This has resulted in reduced fertilizer requirement and sustained soil health without decrease in productivity of rice as well as wheat. The average productivity of paddy at his farm is 85q/ha whereas that of wheat is 55q/ha.

How is it developed?

He has acquired several trainings from different institute like

- Punjab Agricultural University, Ludhiana
- CSISA Punjab Hub, Ludhiana,
- Crop Care Federation of INDIA
- Indian Grain Storage & Management , U.P
- Attended Biocare International Workshop on "Shaping the future of advanced bio-refining for modern societies" at Brussels, Europe.
- Time to time different trials were also conducted by the different public and private organizations at his farm for the adoption of technology.

He himself has initiated the idea of attaching **Straw Management System** at his combine harvester. He has been felicitated by PAU as well as State Department of Agriculture at various platforms for his innovative approaches. He is always pioneering in adopting the advanced technologies generated by PAU, Ludhiana through Krishi Vigyan Kendra as well as state agriculture department. Many teams from PAU, Ludhiana and Australia have visited his farm to see the technologies adopted by him.

Practical Utility/ Scalability

Being a member of Shaheed Bhagat Singh Youth Welfare club, Bronga Zer, he enthused the nearby villagers by showing the results of his techniques from which the farmers started adopting the resource conservation technologies like DSR, Laser Land Leveller, Happy Seeder. At this time he disseminated these technologies in more than 80 hactares. He is often invited at District, Block level farmer training camps as an expert farmer. He has also delivered a number of TV and Radio talks.

Raised bed Single Seeded Paddy Cultivation

Profile:

Mr. Jiban Das

P.O.: M.T. Para

Teliamura, Tripura-799210

Ph- 09612933475

Age	36 years
Educational Qualification	10th standard
Land Holding (in hectares)	2.5 ha
Rice Farming Experience (in years)	25 years
Cropping system adopted	Paddy-Potato-Paddy, Paddy-Winter, Vegetables-Paddy, Pulses-Vegetables

Brief Description:

Mr. Jiban Das a progressive farmer of Teliamura subdivision of Tripura has developed an innovative idea of paddy cultivation where he has done raised bed method of sowing with a single paddy seed at a spacing of 25x25 cm. By following the direct seeded paddy cultivation his cost of cultivation gets reduced as because there is no transplanting cost involved in this method moreover water requirement was also very less in this method because no continuous flooding was done and water was given through furrow.

Raise bed method of sowing created a better physical condition of the soil. It has observed that different agronomical characters like tiller per hill per plant, no. of panicle per plant, no. of seed per panicle and yield obtained per ha of area was quite higher in this method than the conventional paddy cultivation. This method is also environment friendly also because green house gas like methane emission will be less through this method because it doesn't allow continuous flooding of water.

This innovation can bring success to other paddy farmers also because this method requires less seed, labour and water and yield obtained by this method was also very satisfactory.

Labour Storage: While transplanting paddy a large no of labour force is required but due to shortage of labour most of the farmers cannot transplant paddy at the right time which reduces paddy yield but as because there is no transplanting involved in this method of paddy cultivation.

How is it developed?

Single seeding transplanting in paddy gives a better yield with this hypothesis the farmer went for single seeded direct sowing of paddy by following the same spacing of SRI and alternate wetting and drying method. Scientists of KVK West Tripura helped the farmer for this innovative paddy cultivation by their technical expertise. This innovation is very much eco-friendly as because it requires less land preparation and less emission of methane will be there through this method because no continuous submergence is there in this method

Practical Utility/ Scalability

Many of the farmers of Teliamura Sub division have adopted this practice and a total of 52 farmers of that village are successfully practicing this innovation. By following the direct seeded paddy cultivation cost of cultivation gets reduced and moreover water requirement was also very less. This method is also environment friendly also because green house gas like methane emission will be less through this method because it doesn't allow continuous flooding of water. This innovation can bring success to other paddy farmers because this method requires less seed, labour and water and yield obtained by this method was also very satisfactory.

Furrow opener implement/tool for direct seeding of rice

Profile:

Smt. Puspa Sinku,
W/O Sri Harish Sinku,
Vill. Mahtisai,
Hatgamharia Block,
9199749519

Age	36 years
Educational Qualification	IA
Land Holding (in hectares)	2.5
Rice Farming Experience (in years)	12
Cropping system adopted	Rice – other vegetable crops

Brief Description

Innovative 8 row furrow opener for direct seeding of rice to reduce drudgery and cost of cultivation. In West Singhbhum area, rice is sown by broadcasting method in about 70% area causing heavy weed infestation, higher cost of cultivation due to higher speed and labour wages. Therefore, this implement is beneficial for combating these problems for farmers.

How is it developed?

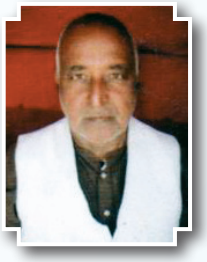
She took the help from KVK that has modified this implement from 8 row to 5 row. Slowly the implement got popularised across the region.

Practical Utility/ Scalability

Weeding is a problem in DSR conditions. This is true, especially in countries where chemical weed control is not yet widely practiced due perhaps to the fact that herbicides are too expensive for the ordinary farmer. Direct seeded rice also has a greater tendency to lodge than transplanted rice because roots of directly seeded rice develop poorly and anchorage is poor. This type of local innovations will not only address the emerging challenges in adopting the DSR method, but also will reduce the drudgery.

Standardised DSR Method in Drought-prone Conditions

Profile:



Shri Dayanand Tiwari,
Vill – Chechriya
PO- Ataula
PS – Meral Garhwa – 822114
Jharkhand
09431364024, 7782927390

Age	64 years
Educational Qualification	Graduate
Land Holding (in hectares)	10
Rice Farming Experience (in years)	51
Cropping system adopted	Paddy + Pigeon Pea + Til + Wheat + Potato

Brief Description

Owing to the shortage of rainfall in the lowland areas, the DSR method (Paddy varieties like Pusa 1509, Abhishek) was introduced by the farmer along with the following practices. Use of alluvial soil to increase the natural fertility of farm from the nearby Aahar, Pokhar river silt was practiced. Desilting of Aahar resulted in increasing the ground water level. Late sowing of Pusa Basmati 1509 to maintain the scented nature of the produce. He has also used rotovator that reduced the cost of ploughing. He standardised the late sowing of Pusa 1509 and under DSR it can be seeded till 28th July without adversely effecting the production. FYM and Green Manure can be replaced by silt management.

How is it developed?

The area from where the innovator hails is the western part of the Jharkhand Region having the rain shadow effect during the monsoon and not for the western winter rain. The average rainfall of the area declined to 650 mm in 2013 and 550 mm in the 2014. This low rainfall scenario has paved the way to innovator to re-strategise the method of cultivation towards DSR method including some innovative practices.

Practical Utility/ Scalability

The surrounding villagers facing drought conditions are interested to adopt the set of practices developed and standardised by the farmer. They should have facilities to provide the life saving irrigation for the crop. Moreover, these practices were started 3 years ago and in the development stage.

Cow dung Ball Rice Seedling

Profile:

Shri Hemantha Kumar Kar
At- Darabachha
P.O.: Marshaghai
Dt- Kendrapara, Odisha
Ph- 09938475604

Age	55 years
Educational Qualification	Bachelor in Arts
Land Holding (in hectares)	4 ha
Rice Farming Experience (in years)	21 years
Cropping system adopted	Rice, Pulses, Oilseeds & Sugar Cane

Brief Description:

Kendrapara District has 1.24 lakh ha of paddy area. 43 % of land in rain fed lowland. In these types of lands it is difficult to do transplanting operation. Therefore in this type of lands direct sowing of paddy seeds was done before advent of monsoon i.e. from May 15 to June 15 by the method of sowing by broadcasting or by punzee (4 to 5 seeds in a cluster).

Cow dung ball rice seedling method is one of the innovative methods which is highly beneficial in low land rain fed area.

How is it developed?

After preparing cow dung slur small of dung is to be made by inserting 4 to 5 no of paddy seeds inside it. Then the balls have to be exposed to sunlight for drying. The Dried balls are sown in the field after ward. During summer deep ploughing of the land is done with the help of tractor or bullock. Before the onset of monsoon the preserved dried dung ball seeds are placed in the line drawn either by bullock or by hand with appropriate distance.

Practical Utility/ Scalability

Several problems can be overcome by this innovation. It acts as seed treatment component and is beneficial to the farmer by reducing disease attack. Especially, it controls severity of BLB for 2 month. It provides nutrients to the young seedling as a root feeder. Before germination the ball safeguards the seed from the bird problem. It solves the weed problem as weed management is easier. To provide employment to women labour. It provides enhanced moisture to the seedlings.

Insect pest control through ITK

Profile:

Shri Rashid Ahmed,
Village Sonairpar,
PO Anipur, District Karimganj (Assam)
PIN – 788734
09435807075

Age	37 years
Educational Qualification	XII std
Land Holding (in hectares)	8
Rice Farming Experience (in years)	15
Cropping system adopted	Rice – Rice – vegetables/Potato

Brief Description

Attack of rice bug at the milking stage of the rice crop is a serious problem. Most of the farmer apply chemical pesticides to control the pest. But there are some effective indigenous technical methods for control of the rice pests. One such method is use of crabs or frogs in controlling rice bug infestation.

In this method, farmers keep dead crabs with the shell broken or dead frog cut into pieces, hangin at the same height of rice panicle in the field. About fifty crabs or frogs are kept randomly per hectare for 7-10 days at the milking stage. As a result, rice bug are attracted by the smell of the dead crabs/frogs. The insects keep sucking the extracts of the crabs/frog rotten bodies. In the mean time, the rice grains get hardened and the bugs fail to pierce the grain.

How is it developed?

The innovation already existed and it was popularised by the farmer. It has been proved to be effective method in controlling rice bug infestation. By this technique, the insects are diverted from the tender rice panicles and allowed to get the grains harden so that critical time of attack is overcome.

The main concept of this indigenous technology for control of rice bug infestation is escaping pest attack by diverting the pest population from target species during the critical/vulnerable stage of infestation.

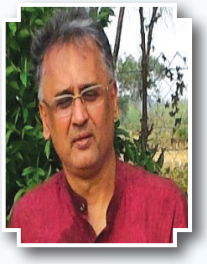
Images/ Illustrations

Practical Utility/ Scalability

The innovation has some advantages over the established methods. The method is eco-friendly, low cost and done using locally available substances. It is easy to adopt and many local paddy farmers have started practising in their fields and are satisfied with the effectiveness of the method and its popularity is increasing.

Up scaling of organic rice production

Profile:



Shri P Srinivasan,

No.277, Main Road Agraharam,

Mallapuram Post, KatchakattuMallapuram Village, (Near aduthurai),

Kumbakonam Tk, Pin 612201

Age	55 years
Educational Qualification	B Com, FCA (Chartered Accountant)
Land Holding (in hectares)	4
Rice Farming Experience (in years)	8 years
Cropping system adopted	Two crops of paddy

Brief Description

The farming is done jointly by friends and relatives in about 45 acres of land situated near Aduthurai(near Kumbakonam), Tanjore District, Tamil Nadu. The area is predominantly very clayey soil and uneven terrain. A decision was taken amongst them to adopt organic practices for cultivation of paddy. To this effect importance was given to improve the quality of soil. Post soil test analysis, it was decided to improve the soil texture and health of the soil.

How is it developed?

After consultation with various experts in the field, for organic cultivation of Paddy, in house preparation of Compost using cow dung and large amount of green and dry leaves were used. The composting method was refined over time to get enriched compost material. All about close to 1.8 tons of Compost was administered in the first cultivation. Subsequently, close to about 1 ton of compost is administered for every planting season.

About 1 ton of compost is administered for every planting season. About 10 liters of Flumic Acid diluted over 100 times was incorporated in the soil after the first two ploughing. Significant improvement in the soil structure was noticed. The Organic Compost is further enriched with Azosperillum, Phospho bacteria and Fraturia 5kgs each and administered in two stages over the cropping seasons. First upon transplanting and the next dose in about 30-45 days. For control of pest, Pseudomonas is administered as foliar spray. Two doses of 3% diluted Panchakavya is sprayed once around 21st day post transplanting and again before the flowering stage.

Images/ Illustrations

Practical Utility/ Scalability

Benefits:

1. The soil texture has undergone change with the incorporation of humic acid and organic compost materials.
2. The crop is able to withstand drought as well as flooding. There were unseasonal rains and even heavy flooding during the month of May.
3. There are virtually no pest infection.
4. The health of the crop as well as the quality of the flowering is found to be very good.

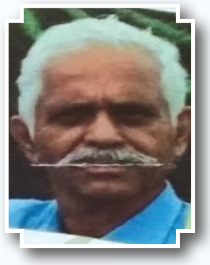
On a comparative note, the fellow farmers who have planted the ADT43 variety of paddy have suffered damage due to unseasonal rains and also severe pest infection. Their experiment over three farms wherein the above practice was adopted have all given similar results. It is now very clear that once the soil is corrected by improving the soil organic carbon, the quality of the crop and capacity to uptake the nutrients and micro nutrients by the crop is found to be substantially higher. Further the variety of paddy is found to be resistant to pest and infection. This visible by comparing the health of the crop of fellow farmers who are largely abusing fertilizers and pesticides and have paid very little attention to improve the soil management.

The practices adopted and refined over the years can be summarized as follows:

1. Improving soil fertility through application of enriched organic compost material.
2. Improving the Nutrient absorbing capacity of the soil.
3. Application of organic sprays such as panchakavya which improves the quality of the crop and the grain.
4. Application of organic pest repellant as opposed to pesticides improves the health of the crop without affecting the soil and its nutrients.
5. The biggest of most important aspect of adoption of the above practices is in contributing to the environmental health as opposed to the environmental pollution.

Saguna Rice Technique (SRT)

Profile:



Shri Chandrashekhar Haribhau Bhadsavle
Saguna Baug,
PO Dahivali, Tal. Karjat,
Dist. Raigad. 410101.
09822282623

Age	64 years
Educational Qualification	M.Sc (Food Science); B.Sc (Agriculture)
Land Holding (in hectares)	15
Rice Farming Experience (in years)	40 years
Cropping system adopted	Saguna Rice Technique (SRT)

Brief Description

Saguna Rice Technique is a unique new method of cultivation of rice and related rotation crops without ploughing, puddling and transplanting (rice) on permanent raised beds. **This is a zero till, Conservation Agriculture (CA) type of cultivation method** evolved at Saguna Baug, Neral, Dist. Raigad, Maharashtra. It reduces treacherous labour by 50%, cost of production by 40%, stops emission of greenhouse gases and improves soil fertility.

The permanent raised beds used in this method facilitates ample of oxygen supply to root zone area while maintaining optimum moisture condition there. We made suitable changes in the conventional rice cultivation to ease farmers' laborious work and to prevent fertility loss during puddling.

The SRT iron forma facilitates planting of crop in predetermined distances enabling precise plant population per unit area. Absence of puddling and transplanting of rice makes it possible for **"Not dependent on erratic behavior of rain."** This means **'No more waiting for Rain God to shower just optimum rain for best transplanting operation'.** Similarly if rain vanishes for few days during crop season it doesn't lead to cracking of land or 'crop kill' immediately.

How is it developed?

In this method we have to till the soil and make the raised beds only once. **The same permanent beds will be used again and again to grow various rotation crops after rice in Kharif season.**

The best time to make these beds is immediately after kharif paddy harvesting, is in

October. Good ploughing and tilling can be done with available residual moisture or by giving irrigation. Add desirable and / or available quantity of any organic manure. Finally till it with rotavator or power tiller to make it workable.

Draw parallel lines with help of rope and lime or wood ash at 136 cm i.e 4.5 feet apart. Use tractor drawn 'Bed maker' or any other means to open furrows at marked lines and make raised beds.

Make depressions / holes with SRT iron forma on the raised beds. Sow / dibble 2 seeds of either Wal beans (Kokan Wal no. 2) or Gram (Vijay), or bush type Cowpea (Kokan Sadabahar) or Horse Gram (Dapoli no. 1) as per recommended variety and distances. Apply fungicides and / or beneficial microorganisms to the seed as per the agriculture university guidelines. Irrigate plot with best possible available method. 3 to 4 hours later spray the plot with selective weedicide Goal (Oxyfluorfen 23.5% EC) @ 1 ml per litter of water. The crop is ready for harvest till 3rd or 4th week of February. Cut the plants leaving roots and 2 to 3 inches stem on the beds.

Its very important to leave the roots of previous crop in to soil and spray the plot with Glyphoset (15 lit water + 100 ml Glyphoset + about 200 g of sea salt or 150 g of Urea) 2 to 3 days after harvesting.

Summer moong beans are to be planted after the winter crop on the same beds between 25thFebruary to 10th March. SRT iron forma and selective weedicide like Goal are to be used.

Same raised beds are to be used again without any ploughing or puddling or transplanting for next Kharif rice crop.

- Approximately 3–4 days before rain begins, make holes on beds by SRT iron forma and put 3 to 4 treated rice seeds in each hole, press it with mixture of manure or good soil (10 Kg. manure and 400 g. Suphala)
- Next day after the first rain spray selective weedicide Goal (Oxyfluorfen 23.5% EC) @ one ml per litter of water.
- At about 4 leaf stage carryout gap filling by using extra seedlings from nearby hills
- Between 25 to 30 days carryout manual weeding without walking on beds and press a Urea (DAP) brickets or one tea spoonful of Suphala in between 4 hills / plants.
- Soon the plots will start looking very nice. We need to pay attention for control of crabs (press Gliricidia leaves in holes & plug with mud), clean bunds, water levels in the plots and so on.
- Its good idea to make a simple light trap for insects, stay in touch with experts of university and control pest problems just in time.
- 2 to 3 days after harvesting of paddy spray Glayphoset as mentioned above.

Important Principles:

- SRT insists that all roots and small portion of stem should be left in the beds for slow rotting.
- Weeds are to be controlled with weedicides and manual labour. No ploughing, puddling and hoeing is to be done to control weeds.
- This system will get the crop ready for harvesting 8 to 10 days earlier. Take this into consideration while choosing a variety to avoid getting harvesting caught in receding rain.

Images/ Illustrations

Practical Utility/ Scalability

It reduces treacherous labour by 50%, cost of production by 40%, stops emission of greenhouse gases and improves soil fertility. It also increases the productivity, thus brings back the confidence of the farmer.

Several Kisan melas, meetings, documentary shows, tv programs on many channels including DD Kisan, Radio programs etc. is already happening about SRT all the time.

Print media also is covering the subject on large scale. I took the technique to the farmers on my own in June 2013. In June 2014 Government of Maharashtra, Agri Department accepted it for Raigad district under PPP-IAD. Looking at the positive results and farmers acceptance the technique is now (Kharif 2015) promoted in 10 districts of Maharashtra. Last year 300 farmers and this year more than 1,500 farmers adopted this technique.

Innovative Organic Rice Farming Practices

Profile:

Shri Gadde Satish Babu
5-44, Vidyut Nagar,
Near Govt ITI, Eluru – 534007
Andhra Pradesh
09912511244

Age	47 years
Educational Qualification	M Com
Land Holding (in hectares)	22
Rice Farming Experience (in years)	19
Cropping system adopted	Modified idea of using cattle excrement

Brief Description

Agriculture is more dependent on the cycle of monsoons. Now the rains are unpredictable. This might be due to ecological imbalances, in addition, the greed among farmers. The farmers and the land both become poorer and poorer. The farmer is being trapped in a debt cycle the soil is losing its fertility. Organic farming practices is one and only solution to get out of all these miseries.

Against this backdrop, when we closely examine the current traditional practices that are being followed very successfully one will certainly bestow his/her attention to realize the underlying truth.

Cattle are the basic component. When labour got used to do sophisticated jobs, taking care of the cattle is a big problem. It is not so. We can overcome the problem like this.

How is it developed?

Part of the land is not our fencing is a must. Sufficient hay in the form of hayrick is stocked at a convenient corner so the cattle after grazing in the open field comeback to hayrick and enjoy taking as and when they need. This comes out of practice. One or two farm assistant can take care of the entire operation. During nights, the cattle are tied to a rope in a row. Every animal's leg is provided with a belt rope, which is hooked to the big one at the other end.

This practice is repeated week after shifting the simple pattern from one point to the other. The main motto is to cover the entire land you demark for the season. When ploughing for cultivation in the alternative years the whole dung and urine are mixed up

with soil providing good natural manure. By allowing the cattle to graze in the farm, the soil absorbs more.

Cattle are the main component in organic farming, and in the days of modernization breeding cattle is a big issue. If viewed practically, it is no issue at all. Agriculture and cattle -both remain complementary to each other. The methods adopted by us from the days of our great grand fathers, being practiced with dedication have been yielding good results which will be presented.

The system we adopt is simple. We allow the cattle to go around a specific area for some days in the off-season in a cycle and the cultivable land gets drenched with cattle urine and dung. The process is repeated year after year. Healthy cattle, fertile soil, assured yield is equal to a contented family. Fertility of the soil remains intact. All the description is to focus only one important thing. That is our agriculture practice is more traditional and with us this remains a passion.

In recent years except mechanization to plough, we never tried to resort any other modern methods even for harvesting. Now a day farmers claiming themselves as pioneers in organic farming has tuned into a great fashion. Post Independent India is made to dependent on chemical fertilizers and harmful pesticides. The solemn obligation on every farmer engaged in organic farming is to liberate the mired farmers from the vicious cycle of dependence and more dependence on chemical fertilizers and pesticides. Bharat is a land of villages and the farmers form backbone to society is literally true. The organic farmer becomes a source of inspiration if his produce is rewarded suitably. Organic farmers need due recognition and public acknowledgement. This becomes possible if encouraged and supported by govt. and similar agencies all over the world.

Images/ Illustrations

Practical Utility/ Scalability

In this method the plant will have more resistance. Organic farming is more traditional in nature and remains paramount forever. The fundamental principle is to keep the sustaining fertility of the soil by using cattle dung & urine in place of chemical fertilizers and cow urine in place of pesticides.

47 farmers in the Kothagudem Organic Growers Association are practising this method.

Certified seed production under SRI method

Profile:

Shri Sachidananda Pradhan

S/o D Pradhan

Kundajhari Village, Rengal, Reamal Block,

Deogarh District

Odisha

Age	43 years
Educational Qualification	Eighth standard
Land Holding (in hectares)	2.8
Rice Farming Experience (in years)	15
Cropping system adopted	Rice (SRI) – Horticultural crop – Fisheries

Brief Description

The farmer has been a pioneer in introducing System of Rice Intensification as it uses lesser water and seed and chemical inputs and also as it improves soil health due to use of organic manures. These changed practices with lower inputs led to enhanced yields with considerable savings of inputs especially the water which is becoming scarce over the years.

He started experimenting with the SRI Method of rice cultivation since 2008-09 in area of 0.25 acres during kharif season where he harvested an yield of 4.4 t/ha. There after he continued the same practice with expansion of area now at 3 acres during kharif and rabi.

Uniqueness of this innovation is blending seed production with the SRI method in a state like Odisha. This has helped supply of quality seed of latest varieties released by OUAT to neighbouring farmers.

Practical Utility/ Scalability

Motivated the rice farmers for cultivation SRI method of rice doing kharif where there are assured irrigation facilities and during *rabi*. Promoted more than 150 farmers for SRI cultivation in neighbouring four villages.

As the cultivation of rice under SRI is generally cost effective, it is thought to be more suited for small and marginal farmers. Farmers experiences show that the technology has the potential to be practiced by small, marginal as well as larger farmers with high economic returns. Based on the field experiences farmers felt the need for mechanized multi row weeders (that can be repaired /fabricated locally) to reduce drudgery and cover more area per unit time.

Paddy under drip fertigation

Profile:

Shri Thotla Mahipal Yadav
Chinthalpet (Vill)
Metpally (Mdl), Karimnagar (Dist),
Telangana State
Ph- 09440210032

Age	30 years
Educational Qualification	9th class
Land Holding (in hectares)	3.00 hect
Rice Farming Experience (in years)	14 years
Cropping system adopted	Paddy in Khariff, Paddy in Rabi, Green manuring in summer

Brief Description:

Drip irrigation by definition is a method of irrigation where the crop's water requirement alone is met through precision irrigation on a daily basis. In rice cultivation, traditionally, water is flooded and rice plants are allowed to grow in the standing water. The innovation here is to provide soil moisture enough to allow for rice plants' uninterrupted growth and development alone and not to flood the field. Along with the water, required nutrients also supplied in doses that are easily absorbed by the roots and no excess is left in the soil. The conservative use of water and nutrients is achieved and productivity per unit inputs is maximized. This innovation helps in sustainable use of resources; water, fertilizer and energy.

Using this technology of precision input (water and nutrients) management the farmer could accommodate more crops with the available water and complete the crop cycle. He also could reduce his costs in Labour use for the crop, energy use for pumping, water use and fertilizer use. He also could produce more rice with less inputs and cost. It is envisaged that this innovative method of rice irrigation would be an appropriate solution for the ever increasing water shortage that the country is experiencing.

How is it developed?

Scientists of Jain irrigation have conceptualized growing rice with drip irrigation and fertigation. Trials in experimental farms were conducted for 4 years and then demonstrations in farmers field for another 4 years. The farmer was involve in localizing the concept. The innovative method is economical and an average B:C of 1:2 was obtained in most cases.

Images/ Illustrations

Practical Utility/ Scalability

Many farmers are willing to adopt this technology especially from the upland regions. The limitation of this technology is its higher investment costs. But for being innovative, we can expect that Indian rice farmers can customize, localize and can make this as cost effective as possible.

Popularising Direct seeded Rice, Paddy Transplanter, Use of Happy Seeder, Use of green seekar, Tensiometer

Profile:

Shri Harpreet Singh,
S/O S. Bakshish Singh
V & PO Bir Naryana, Tehsil Nilokheri,
District Karnal, State Haryana
Ph- 09466242313

Age	37 years
Educational Qualification	Matriculation
Land Holding (in hectares)	45 Acres
Rice Farming Experience (in years)	20 years
Cropping system adopted	Paddy-Wheat, Paddy-Sugarcane, Paddy-Wheat-Maize

Brief Description:

In Haryana ground water level is going lower and lower and there is big problem of electricity during the Paddy season, we have to use the generator sets to irrigate our paddy field. Most of the water consumption is during the puddling of field, but in case of DSR there no need of puddling. Seed is directly sown to field with the help of machine. No water is required before sowing. By this technique I save about 30% of water. From my personal experience there is increase in yield in case of Basmati group paddy. Now days I am trying this technique on Hybrids and getting good results. There is shortage of labour and labour is very costly in this season and wastage of time is also a reason for this. In case of planting we have to waste about two days for the preparation of field and planting but in case of DSR it's a work of hours.

1. Water shortage problem in paddy planting time.
2. Labour problem solved. All work done by the machine.
3. Saving of time. Very less time is required for DSR sowing V/S case of planting.
4. Cost benefits.
5. Due to line sowing easy to harvest.

How is it developed?

The farmer got connected with CIMMYT and got the knowledge about this technique then he contacted with Haryana Agriculture University, Hisar and they helped him to get DSR Machine. With the slight changes in machine started working on it.

Images/ Illustrations

Practical Utility/ Scalability

With the help of Department of Agriculture, Karnal now he is doing very well in this field. He always told to other farmers about this technique and forced them to adopt this technique due to benefits of this technique.

Large numbers of farmers are now adopting this technique. The farmer started with the five acre now he is sowing about 50 acres every year with this technique. Now the total area of DSR in that locality is about 5000 acres. Local news paper several time cover his field and several time in local news channel. Department of Agriculture, Karnal and other Institutions related to agriculture several time arrange the visit of farmers to his farm.

Rat control through innovative bamboo trap

Profile:

Mr. Ajit Biswas
P.O.: M.T. Para
Teliamura, Tripura-799210
Ph- 08414038159

Age	42 years
Educational Qualification	12th standard
Land Holding (in hectares)	1 ha
Rice Farming Experience (in years)	30
Cropping system adopted	Paddy-Potato-Paddy, Paddy-Winter Vegetables-Paddy, Pulses-Vegetables

Brief Description:

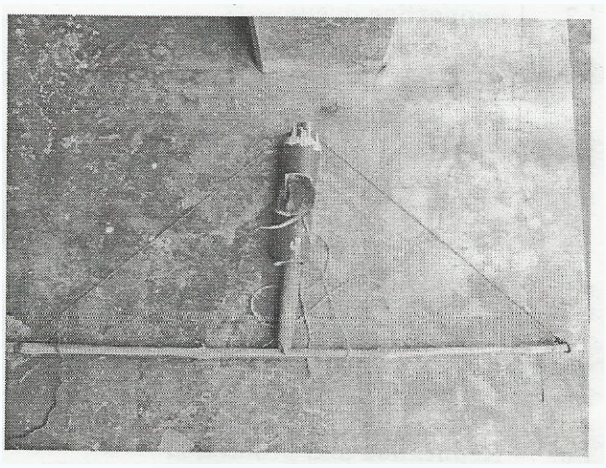
Rat management is a real challenge in paddy. Zinc phosphide based food bait or iron maid mechanical rat trap are used to kill or trap the rat. The efficiency of the technology is not up to the mark being achieving 30-40% level of control. The management cost per ha area varies between Rs. 750-1000.

The average per unit cost of such structure is around Rs. 25-30 which is much less than the cost of mechanical iron made commercial rat control trap. The success rate to control field rat that comes in touch and cut the rope inside the bamboo hole at trapping end of the structure is almost 100%. It has the capacity to kill 7-8 rats per day.

How is it developed?

To prepare the structure of the trap, a 1-1.5 ft long single nodded bamboo having 15-20 cm diameter and a big hole at the one side near node is taken. Another bamboo of 8-12 cm diameter and 2.5-3 ft is inserted into one side. One nylon rope (4-5 mm diameter) having 4-5 ft length is tied with another piece of bamboo (6-7 ft). now the first inserted bamboo tied with one small hole by making a knot outside after passing it just through another small hole of opposite side of the first one. The whole structure is now shaped like a bow. The food bait for rats is kept inside of the bamboo hole just behind the rope. Rats are attracted to the food and faced the obstacle by the jute rope. To get the food they cut the rope, within a moment just after cutting the rope, sharp bamboo traps the rat by heating mainly the head.

Images/ Illustrations



Practical Utility/ Scalability

Presently all the farmers of Batapora, Ramchandra Ghat, Sonatala and Chebri have have adopted the technique.

On Farm Trials was conducted in that village during 2014-15 and it was found that in case of trapping with local made bamboo trap at tillering stage of crop @ 32 traps/ha, Per cent cut tillers = 2.7, Trap index = 11, BC ratio 1:1.90. In case of Zinc phosphide poison baiting (2%) @ 10 g/burrow at tillering to PI stage of the crop, the Per cent cut tillers = 2.3, BC ration was 1:1.85, in case of both trap and zinc phosphide Per cent cut tillers = 1.6, Trap index = 3, BC ratio was 1:2.38.

Rodents cause significant losses both in the field and in post harvest rice management. Hence, the local innovations such as these should be taken into consideration while promoting the rodent management campaigns.

Popularization of Wet Direct Seeding through broadcasting and drum seeding

Profile:

Shri Nekkanti Subba Rao
D No 8-67, College Road,
Achanta, West Godavari District
Andhra Pradesh
09491254567

Age	74 years
Educational Qualification	SSLC
Land Holding (in hectares)	10
Rice Farming Experience (in years)	55
Cropping system adopted	Rice – rice - Pulse

Brief Description

Direct –seeded rice (DSR) is a feasible alternative to conventional puddled transplanted rice with good Potential to save water, reduce labour requirement, mitigate green -house gas (GHG) emission and adapt to climatic risks. Direct seeding has several advantages over transplanting. In addition to higher economic returns, DSR crop if faster and easier to plant, less labour intensive, less water consuming, conducive to mechanization, generally flower earlier and thereby reducing the duration and have less methane emissions. Direct seeded rice establishes earlier than transplanted rice without growth delays from transplant injury. What is important here is how well the local innovative farmers can customise and localise the DSR method to suit to their local conditions.

The farmer has customised and popularized the technology of wet direct seeding through both broadcasting and drum seeder from the past five years in both the seasons with suitable variety. The technology was popularized to almost 2000-2500 farmers from 15-20 mandals of West and East Godavari districts. Through this technology there is reduction in cost of cultivation up to Rs.5000/- per acre and increased production of 3-5 bags per acre depending on the season.

Also there is increased tiller number/hill coupled with reduction of pest and disease load in the wet direct seeded plots compared to the transplanted rice.

How is it developed?

Every season atleast two farmers interaction meetings with scientists of APRRI, Maruteru on wet direct seeding was organized by me which helps the farmers to take up this technology. Also this technology was disseminated by me through a large number of telephone calls. Through dissemination of this technology, atleast 30% area in West Godavari district was converted to DSR especially during Rabi.

Images/ Illustrations

Practical Utility/ Scalability

Cultivation of suitable variety/hybrid in the larger areas improves the productivity of the rice and thereby improving the livelihood of resource poor farmers. Enhancing the rice production and productivity using this technology will improve the country's economy and also helps in attaining the food security.

Power tiller operated Rice harvester (reaper)

Profile:

Shri Laxman Baburao Dalvi
At-Post-Vadap, Tal-Karjat
Dist-Raigad, Maharashtra,Pin-410201
02148226617, 09273187434

Age	64 years
Educational Qualification	S.S.C
Land Holding (in hectares)	1.80 ha
Rice Farming Experience (in years)	40 years
Cropping system adopted	Line Plantation, Sri, Char Sutri, Drum Seeder

Brief Description:

Most of the rice farmers of Konkan region have small holding and undulating land. Most of the farmers have power tiller for their rice cultivation operations. As the combine harvester is not suitable for this situation, most of the rice grower harvest there crop manually. The reapers available in the markets had its own limitations. It harvested the paddy crop above 4 to 5 inch from ground level resulting in the reduction of the straw yield. It was also observed that the safety pins are breaking frequently and very difficult to turn the machine on curve leaving some paddy hills remain unharvested.

Considering this fact in mind, attached power tiller operated rice harvest (reaper) was developed due to which separate engine or gear box is illuminated which minimized manufacturing cost of reaper. The power tiller operated harvester is easy to operate in small field and curve also. Rice crop is harvested by this harvester at 1 to 1.5 inch close to the soil/land surface due to which straw yield is increased, which is helpful to farmer for their livestock and also minimizing problem of stem borer. For harvesting 1 acre of paddy crop 2.5 hours is required, one man can harvest 5 to 6 acre of paddy crop in a day. By using this harvester saving of nine labour per acre is possible.

How is it developed?

The reaper is easy for attachment to power tiller as well as transportation. The reaper is attached to power tiller belt by a pulley therefore breaking of safety pins is reduced. The fuel consumption is very low i.e. within one liter diesel 1 acre paddy crop is harvested. For one acre nine labour saving is costing about 1800/- (one labour @ 200 per day). Therefore

this power tiller operated rice harvester (reaper) is effective and cost benefit to farmer.

The power tiller operated rice harvester (reaper) is very useful to farmers by using their own power tiller he can harvest the crop very effectively.

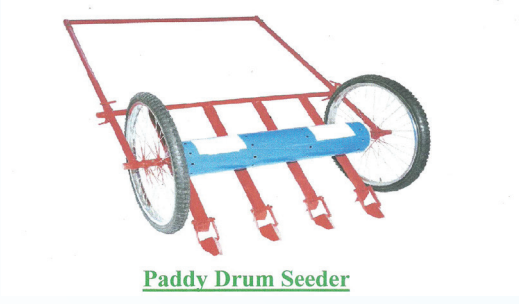
Specifications of power tiller operated rice harvester (reaper):

Length	:	914 mm
Width	:	1524 mm
Height	:	736.6 mm
weight	:	65 kg

Sr.No.	Operation	Labour	Cost (Rs.)	Benefit
1	Paddy Harvesting Manually	10 per acre (Rs. 200/- per labour)	2000/-	
2	The power tiller operated rice harvester (reaper)	1 labour + fuel per acre	300/-	1700/- per acre

Images/ Illustrations

Power Tiller operated Rice Harvester (Reaper)



Paddy Drum Seeder

Practical Utility/ Scalability

Harvesting of paddy crop is labour intensive. The power tiller operated rice harvester (reaper) is very effective for harvesting the paddy crop and save the labour cost. This innovation is adopted by the farmers of konkan region. Demonstrations were conducted in the year 2012 at RARS, Karjat and in the farmers' fields. Till now, 25 machines were sold to farmers from different regions.

Epilogue...

Gone are the days when Indian farmers are profiled as silent receivers of the technologies. In the current scenario, there is a general agreement in recognising farmers as innovators of farm technologies in parallel with the agricultural researchers.

In this backdrop, with this publication we tried to document few innovations in rice farming, some of which are generated and some other re-invented. These innovations are like precious portraits painted by farmers with their creativity, hard work and zeal to bring novel solutions to their micro level situations and thus playing an important role in accelerating innovation-led agricultural growth.

Rice being an important crop of the country, this is a maiden attempt to aggregate, process, document and share rice innovations among wider audience. This is only a beginning and we wish that many more farmers will come forward to share their innovations through this platform. Down the line few years from now, we wish to document as many innovations as possible from across the country.

We look forward towards synergistic partnership between innovative farmers and rice scientists in incorporating some of these ideas into the formal research agenda.

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We are thankful to all the farmers who are nominated from various organisations for the Innovative Rice Farmers Meet 2015. We gratefully acknowledge their innovative spirit. As we could not accommodate all the nominees in this year's event, we shall try to invite many more farmers in years to come. Our thanks are due to all the organisations and the officers who had shown great interest in nominating best of the innovations available in their respective regions.

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