

Revitalization and integration of indigenous scented rice Bhutku and Tulsi Mukul to low land areas of Ranchi

1. Summary of the product/technology (maximum of 200 words)	➤ Base line survey has been done in Ranchi district by KVK. 159 indigenous rice varieties have been identified which have specific characteristics during 2013 to 2016 under PPVFRA program. ➤ Around 10 indigenous rice varieties i.e. Rajnigandha, TulsiMukul, Jeerabhog, Prasad Bhog, Tulsimanjar, Bhutku, DhaniyaPhul, Mekhjawain, Saraikela and Panisayir were selected by KVK under the project to evaluate the commercial potential for better livelihood to the farmers of the region. ➤ Five well managed multi-location trial of selected 10 varieties was organised on farmers field for varietal selection of scented rice. ➤ Two best varieties namely Bhutku and TulsiMukul with commercial potential were selected for promotion on the basis of quantitative as well as qualitative parameters like aroma, yield, lodging resistance and farmer's acceptability. ➤ Developed improved organic cultivation package of practices with aim to improve yield, aroma and marketable quality of the variety. ➤ Organic inputs quality seed, organic liquid manure, bio-pesticide, bio-agent etc. were provided to farmers for quality grain production. ➤ Awareness programs, group meetings, trainings, field days were organised for educating and motivating the farmers for indigenous scented rice production. ➤ Promotion of producers group (PG) of 10 farmers for seed production in the district after training them organic seed production of indigenous paddy. ➤ Seed production programme for large scale area expansion was carried out on participatory mode at farmer's field for these two varieties. ➤ Distributed seed bin for safe storage of seed. ➤ KVK facilitated for marketing linkages to farmers which have insured the boost up of B: C ratio of rice growers from 1.46 to 2.01. ➤ Organized product promotion programs to create awareness among consumers for greater demand.
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2. Is it a new technology? (Yes/No). If no, provide the details of the technology modified	No, it is a modified concept. KVK, Ranchi has been working in conservation and promotion of scented rice varieties since 2013 in collaboration with Protection of Plant Varieties and Farmers Right Authority (PPVFRA) and NABARD, Ranchi. During PPVFR (2013-16) campaign, KVK has identified 159 varieties of indigenous rice which have specific characteristics and sent it to PPVFRA, New Delhi for registration in the name of respective farmers. Out of these, 53 farmer's varieties have been registered as on date. Based on qualitative aspects 10 scented rice varieties were selected to evaluate their commercial acceptability. KVK organised multi-location trial for varietal selection of scented rice. Two scented rice varieties namely Bhutku and Tulsimukul were selected on the basis of quantitative as well as qualitative parameters and farmer's acceptability. KVK developed improved package of practices with partner farmers resulting increasing in the yield of these two varieties. KVK initiated seed chain by maintaining pure line for large scale area expansion as well as seed production. Altogether 2722 farmers are cultivating these scented rice varieties as on 2022-23 and earning their livelihood. The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e. fetching Rs. 30 per kg for indigenous paddy as compared to Rs.18 per kg for HYVs. In addition, there is support from NABARD, Ranchi in packaging and marketing of scented rice. At present, farmers are selling scented rice at Rs.100/- per kg after milling and packaging.
3. IPR involved, if any (Patent/Copyright/ Industrial Registration/Variety/ germplasm registration). Provide Filed/Granted number	No Indigenous rice variety Tulsimukul is registered vide PPVFRA. Reg. No. is 312 of 2016. Registration process for Indigenous rice variety Bhutku is on way as PPVFRA has already notified Passport data through Plant Variety Journal of India Vol. 17, No. 7. Copy attached in Annexure 2
4. Validation procedure followed (within Institute, collaborators, multilocation/multi-site testing)	(1) Multi location trial within district under NABARD project during 2016-17 (2) Multi Location trial in three agro-climatic zones of Jharkhand during 2023-24 (3) Validation by ICAR-NRRI Cuttack, Odhisa

	(4) Aroma validation by ICAR-NRRI-CRURRS Hazaribag, Jharkhand (5) Nutritional analysis by AVON Lab Kolkata. (6) FSSAI licence for marketing. Copy attached in Annexure 3.
5. Brief description of research output/technology: a. Objective of the product/technology	Objectives: ➤ To revive indigenous scented rice varieties Bhutku and Tulsi Mukul for livelihood sustainability. ➤ To standardize of package of practices to match economic profitability level in compare to HYVs (High Yielding Varieties) ➤ Maintenance of seed supply chain of selected indigenous scented rice varieties to facilitate further expansion of areas.
b. Detailed methodology of the proposed product/technology	After green revolution the high yielding varieties have replaced the indigenous varieties in every part of the country. Despite being very high in nutrition and comprising numerous qualities, low yield and poor marketability of indigenous varieties has forced the farmers to shrink the net shown area of these varieties and adopt HYVs having considerably low nutrition. Jharkhand state alone is native place for more than one thousand rice varieties, of which few are having scented characteristics with distinct pleasant aroma and flavour. These scented rice varieties are mostly short grained type and some are having medium grained character. Aroma of these scented rice varieties are very much location specific. Separate indigenous aromatic rice varieties are grown for all type of land topography viz. Upland, mid-land and low land, under rainfed conditions in the state. Changing climatic conditions, introduction of high yielding/ hybrid varieties, lack of scientific interventions and unorganised market had forced farmers to confined indigenous scented rice varieties cultivation for own consumption only. Keeping the above facts in view, KVK, Ranchi has been working in conservation and promotion of scented rice varieties since 2013 in collaboration with Protection of Plant Varieties and Farmers Right Authority (PPVFRA). Under this campaign 2 to 3 awareness programs are organized every year at different villages of Ranchi district. As of now about 1500

farmers have joined this campaign. During this campaign, KVK has identified 159 varieties of indigenous rice which have specific characteristics and sent it to PPVFRA, New Delhi for registration in the name of respective farmers. Out of these, 33 farmers have received their certificates till 2019. Now it is increased and 53 farmers have received certificates till date.

Out of 33 farmer's varieties, 10 potential indigenous rice varieties like Jeerabhog, Tulsimanjar, Tulsimukul, Prasad Bhog, Bhutku, Dhaniyaphul, Mekhjawain, Rajnigandha, Saraikela and Panisayir were selected by KVK under the project sponsored by NABARD Ranchi for Promotion, Conservation and commercial production with an aim of making it the main source of income to farmers of Ranchi district. KVK demonstrated these varieties in **Namkum, Silli, Mandar, Bero and Chanho** block in 2.5-acre land under multi-location trial for varietal selection of scented rice. Two scented rice varieties namely **Bhutku** and **TulsiMukul** were selected on the basis of yield, lodging resistance and wider adaptability. KVK has put special efforts on development of improved package and practices thus increasing the yield of this variety. KVK has been producing pure seed of these varieties and making it available for farmers on time in every year. Seed production programme for large scale area expansion was also carried out on participatory mode at farmer's field. Promotion programme was organised to aware consumers and generate demand. Farmers were provided marketing linkages which has insured the boost up of B: C ratio of rice growers from 1.33 to 2.56. With the better return, increasing market demand and climate resilient cultivation techniques, area as well as production of these two heirloom varieties has turn up many folds.

Rice is integral part of Indian tradition and it is considered "Holy Grain" in country. India is centre of origin of rice thus it has great level of diversity. Jharkhand state alone is native place for more than one thousand rice varieties, of which few are having scented characteristics with distinct pleasant aroma and flavour. These scented rice varieties are mostly short grained type and some are having medium grained character. Aroma of these scented rice varieties are very much location specific. Separate indigenous aromatic rice varieties are grown for all type of land topography viz. Upland, mid-land and low land, under rainfed conditions in the state. Changing climatic

conditions, introduction of high yielding/ hybrid varieties, lack of scientific interventions and unorganised market had forced farmers to confined indigenous scented rice varieties cultivation for own consumption only. An attempt was made for promotion of indigenous rice varieties of Jharkhand state by with ten most popular indigenous varieties viz. Rajnigandha, TulsiMukul, Jeerabhog, Prasad Bhog, Tulsimanjar, Bhutku, DhaniyaPhul, Mekhjawain, Sarakela and Panisayir. These varieties were grown to obtain pure seeds by removing off type mixture. A multi-location trial was conducted at five different locations of Ranchi district on farmer's field to assess most promising variety with market preference following standard improved growing practices through organic inputs. Biological methods for disease and pest control were followed. Two varieties namely Bhutku and Tulsi Mukul were selected for revitalization and commercialization based on farmer's response and market needs. Seed production programme for large scale area expansion was carried out on participatory mode at farmer's field for these two varieties. Promotion programme was organised to aware consumers and generate demand. Farmers were provided marketing linkages which has insured the boost up of B: C ratio of rice growers from 1.46 to 2.01. With the better return, increasing market demand and climate resilient cultivation techniques, area as well as production of these two heirloom varieties has turn up many folds.

KVK developed improve package and practices to increase yield of traditional scented rice varieties which are as follows:

Selection of land:

Most of the scented rice varieties are long duration and suitable for low land areas. The area selected for cultivation of scented rice varieties like Bhutku and TulsiMukul was Don Ino. (Lowland) as these varieties mature in 135 to 150 days after sowing. In less rainfall condition, these varieties performed well in Silli and Tamar block of the district where the soil gets deposited from the forest uplands and they are very fertile in nature.

Climatic Condition:

Quality traits are known to be influenced by temperature, particularly at the time of flowering, grain filling and maturity. Synthesis of aromatic compounds and their retention in grain is

better at lower temperature during grain filling stage whereas high temperature at this stage adversely affects various attributes.

For producing high quality aromatic rice, the lower temperatures during the season are not only important, but also the differences between the daily maximum and minimum temperatures, particularly during flowering time are important. So, the transplanting of these paddy varieties was done in the month of July for better yield, quality and aroma.

Agronomic practices

Seed rate: 12-15 kg/ha of pure seed was used for sowing a hectare of land by following single plant transplanting method, which proved good for growth and greater biomass.

Seed Treatment:

Seeds were treated with Beej Sanjivani (1:1:2, Cow urine: cow Dung: water is mixed together and decomposes for 7-10 days in clay pot). Before sowing, seeds dipped in Beej sanjivani solution (1 lit in 750 ml of water) for 12 hrs and such solution is required for 1.0 kg of seed. Floating chaffy seeds were discarded and heavier seed which settle at the bottom were selected. These seeds were kept in jute bag in moist condition for sprouting. After 24 hrs seeds sprouted.

Seedling treatment with PSB (Phospho- Solubilizing Bacteria) lead to strengthen root system so that crop with 150 cm height having no any lodging problem. Suspension of one kg PSB in 10 litres of water for treating of seedlings for one Acre was required. Sometimes seed may also be treated with *Trichoderma viride*.

Sowing Time: For nursery raising seeds was sown in the month of June.

Nursery raising:

One-tenth part of the main field was enough to raise healthy seedlings. The field was ploughed twice or thrice under dry condition along with incorporation of 500 kg well decomposed farm yard manure (FYM) with *Trichoderma viride* in an area of 1000 m². Thorough puddling was done, followed by levelling. Thereafter, the field was divided in convenient size of beds to have a better control on irrigation and drainage. Sprouted seeds were broadcasted

uniformly in each bed. Irrigation was preferably given in evening. Hand weeding was performed at 10 days after sowing (DAS). Prior to transplanting in main field, seedling root was treated with PSB solution (2.5 kg per 25 lit of water solution is required for seedling treatment for 1 ha) for 30 minutes.

Main field preparation:

Main field was prepared with the use of green manure like Sesbania and the green manure crop was trampled at 10 days prior to transplanting to allow proper decomposition. 5 tonn Farm Yard Manure with Trichoderma viride was incorporated with main field at the time of ploughing. Karanj cake @1 qtl per acre was also incorporated in the main field as it acts as a fertilizer and pest repellent too. Required amount of liquid manures like Sanjivani, Sasyagavya, Panchgavya was applied in further growth stage at 10 days interval to compensate the organic matter requirement.

Transplanting:

20 days old seedlings were transplanted with row spacing of 25 cm. Single plant transplanting method was followed for better growth of each single plant.

Incorporation of Azolla:

Azolla was broadcasted after 10 days of transplanting. It suppresses growth of associated plants (weeds) and encourages crop growth.

Water management:

In Jharkhand paddy is cultivated in rainfed condition only. In case of limited rain, irrigation was done at the time of tillering, anthesis and grain filling stage of scented rice field.

Weed Management:

Cono-weeder was used for mechanical incorporation of weeds for 2 to 3 times at 10 days interval starting from 10-15 DAT. One round hand weeding was done at 20 DAT for removal of weed between the plants.

Field inspection and roguing of seed production plot:

Off type plants or mixture plants were rogued out from the field at before flowering stage, flowering stage and at maturity

	stage. Field inspection was done by KVK scientist time to time. Plant Protection Measures: It has already been mentioned that Indigenous scented rice varieties like Bhutku and TulsiMukul are not easily affected by diseases and insect pests. In organic cultivation, precautionary measures are more important and effective than curative measures of disease control. Stem borer and silver shoot infestation were noticed in some plots but it was at threshold level. Precautionary spray of some bio pesticide and application of bio agent were done in the seed production plots. Funnel T Trap with <i>leucScripophagaIncertulus</i>, Yellow sticky trap, Blue Sticky Trap, Azadiractin 1500 ppm, <i>Pseudomonas</i>, <i>TrichodermaviridaeBeauveriaabassiana</i> were used as precautionary measures. The egg cards (<i>Tricho</i> cards) containing 1,000 parasitized eggs are to be stapled to the underside of the leaves at 100 points ha-1 uniformly distributed across the field. <i>Trichodermaviride</i> 3.0 g l-1 can be sprayed for 2-3 times starting from 20DAT at an interval of 15 days to prevent different diseases. A bio pesticide Dasparni (A herbal pesticide made from extracts of 10 types of poisonous & inedible leaves found in the forest of Jharkhand like <i>Vitexnegundo</i>, <i>Lantana camara</i>, <i>Argemonemexicana</i>, <i>Adhatodavasika</i>, <i>Calotropis gigantean</i>, <i>Pongamiapinnata</i>, <i>Anonasquamosa</i> etc.) was sprayed at 15 days interval starting from 20 days after of transplanting (DAT) to control sucking pest. Harvesting and Threshing Harvesting was done from the middle of the field for seed purpose. Seeds of border areas were discarded so as to avoid contamination or cross pollination. Seed was properly dried in sunlight and cleaned before storage.
c. Yield/productivity gain	Potential yield of Bhutku is 38 quintal/hectare and Yield of Tulsi Mukul is 30 Quintal /ha. Scented rice growers are getting yield of 34 quintal /ha and farmers who are cultivating HYVs are getting 45 to 50 quintal yield/hectare. But due to unique aroma and taste Bhutku and TulsiMukul growers are selling paddy @ Rs.3000/ quintal whereas, HYVs growers are selling @ Rs.1800/- per quintal. Hence scented rice growers

are getting 40% higher price than HYVs growers. Some farmer groups are selling milled rice of Bhutku and Tulsimukul and getting 55.07% higher income than non-scented rice sellers.

S.No.	Economics of Rice milling	Bhutku/ Tulsi Mukul	HYVs
1.	Production cost of 100 kg Rice	1377	1370
2.	Milling price	166	166
3.	Transportation cost	200	200
4.	Cleaning and Packaging etc.	660	675
Total cost of production (In Rs.)		2603	2411
Final Product		62 Kg	65 Kg
Selling Price (In Rs.)		100	60
Total Income (In Rs.)		6544	4220
Net Income (In Rs.)		3167	424
B:C		2.51	1.75

d. Saving of water, labour, time and energy

NA

e. Conservation of soil

NA

f. Capacity

NA

g. Efficiency

Local indigenous varieties have adjusted over long periods to the ecosystems of their growing regions including environmental and climatic variations, thus ensuring at least sustainable level of output even in bad years.

h. Cost effectiveness including B:C ratio

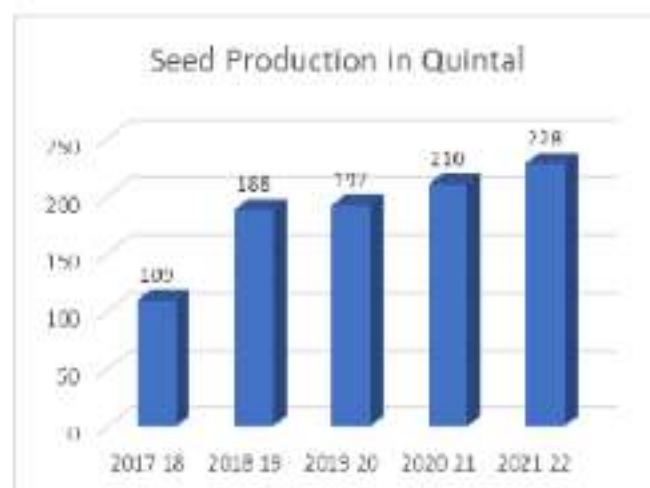
The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e. fetching Rs. 30 per kg for indigenous paddy as compared to Rs.18 per kg for HYVs. Now they are getting premium price for their quality product. At present, farmers are selling scented rice at Rs.100/- per kg after milling and packaging. There are two major benefits to the scented rice growers like 18.5 % saving in cost of production due to organic practice and getting 40 % higher price than other paddy.

Particulars	Bhutku/TulsiMukul	HYVs
Cost of cultivation (Rs. /Hectare)	53630.00	65782.00
Gross Income	108000.00	96000.00
Net Income	54370.00	30218.00

	B: C Ratio	2.01	1.46
i. Uniqueness of the technology in comparison to existing ones	Two scented rice varieties namely Bhutku and Tulsimukul were selected on the basis of yield, lodging resistance and wider adaptability after conducting multi location trial. KVK has put special efforts on development of improved package and practices thus increasing the yield of these two varieties. KVK has been producing pure seed of these two varieties and making it available for farmers on time. As on Kharif 2022, 2722 farmers are now cultivating scented rice and earning their livelihood. The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e. fetching Rs. 30 per kg for indigenous paddy as compared to Rs.18 per kg for HYVs. Some farmers are selling scented rice at Rs.100/- per kg after milling and packaging.		
j. Passport data of the product/technology	Details enclosed as Annexure 3. Horizontal spread of Indigenous scented rice varieties Bhutku and Tulsimukul: Selected indigenous scented rice varieties Bhutku and Tulsimukul showed high level of polymorphism as well as aroma, which has put these varieties among highly consumer preferred category. KVK developed package of practices enhanced the potential yield to 38 Qtls/ha for Bhutku and 30 Qtls/ha for Tulsimukul from 20-25 Qtls/ha. with an average yield of 34 Qtls/ha. The benefit cost ratio from cultivation of these varieties by paddy growers has raised to 2.01 in compare to 1.46 from HYVs. Whereas milled rice of Bhutku and Tulsimukul provided even better BCR i.e. 2.51 and 1.75 respectively to growers. Maintaining pure seed by KVK of these varieties facilitating the seed production as well as cultivation has supported the area expansion within the district and region as well. During 2022-23 KVK supplied total 228 Qtls pure seed of these varieties on payment basis which is sufficient for cultivation in 570 ha. area clearly tell the story of large area adoption. Through KVK these varieties have spread in 108 villages and more than 2722 farmers are involved in cultivation of these varieties. It is estimated that these two varieties have covered more than 1200 ha. area in Ranchi, Khunti, Gumla and East Singhbhoomi district.		
6. Details of relevant data generated during the development/validation	Annexure 3 and 4		
7. Proposed stakeholders	Small & marginal farmers, NGOs and other private seed agencies.		
8. Commercial potential, if any	Without quality seeds, the output would be very less despite of		

huge expenditure on other agricultural inputs. Hence, after initial work for screening and standardization it was necessary to produce quality seed to facilitate further expansion of area under these varieties. One Seed producer group in each selected village and trained in seed production of paddy. After proper training farmers were engaged in participatory seed production programme. Seed production was taken in 12.75 acres land against targeted area of 5 acre due to increasing demand among stakeholders. All the quality control measures were followed for pure seed production. Specially roguing was done 3 to 4 times for getting pure seed and avoid any type of mixture in seed. 109 qtl seed of Bhutku and TulaMukul seed were produced in very first year (2017-18). To provide market to farmers and expansion in area under scented rice production KVK purchased seed from farmers and processed for further sale and production. In year 2021-22, 228 qtl seed of scented rice was produced under farmer's participatory seed production programme as shown in Chart-1. Farmers expressed their reaction on the palatability of straw of these varieties as the straw was preferred by cattles over the straw of HYVs.

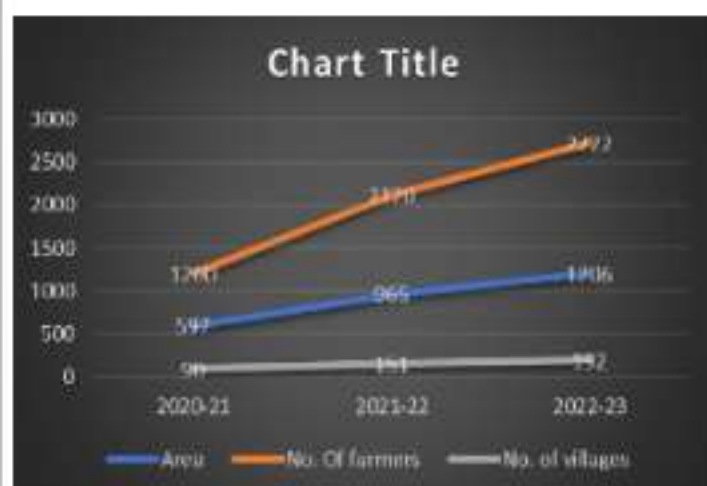
Chart-1: Year wise seed production (in qtl) of Scented rice



KVK formed five groups (One at each village) for commercial production of scented indigenous rice and to establish proper marketing channel. A survey was done by KVK to assess the demand and supply of scented rice in Ranchi. It was observed that indigenous scented rice is not being marketed however rice with same phenotype with artificial aroma is being sold on name of Sonachur between ₹80-100 per Kilogram. Therefore, indigenous scented varieties with naturally good taste and aroma will have great scope in organized market.

Farmers were trained in commercial production, milling and packaging of scented rice. All supports like seed, bio fertilizers, bio agents etc. for production, milling facility, automatic sealing machine, and triple layer perfectly designed rice packet were given to the group for successful marketing of scented rice. Farmers of the group were visited ICAR-National Rice Research Institute, Cuttack, Odhisa for better exposure and skill training. In 2017 -18 various types of promotional activities were conducted by KVK like Kisan Mela, Kisan Gosthi, and other promotional program on scented rice for wide publicity of the organically grown indigenous scented rice produced by farmers. The steps being taken to tie the farmers with the market so that they would get good return and will be encouraged to continue the practice. KVK has given marketing support to scented rice farmers and provided place in well-established sale counter, which is situated in the heart of the Ranchi city for selling of their rice. Today demand is very high of this scented rice due to its unique aroma and taste. Many groups inspired from the intervention also opted these varieties and started their cultivation in adjoining districts like Gumla, Khunti, East Singhbhum etc. with the guidance and seed from KVK, Ranchi. The trend of increasing in area, number of farmers and villages covered is shown in chart-3.

Chart-2 showing increase in area, no. of farmers & villages covered year on year basis under Scented Rice Cultivation



9. Publications/photos/video clipping, if any	Publications enclosed in Annexure 4 and 5 <u>Video Clipping</u> https://youtu.be/_BhKuCgi8Ow?si=esPFd53_x7yAtGih https://youtu.be/N_zBRbI4EFk?si=BwnDjXTCQjReML3n
1. Any other information not covered above	A link of video film on indigenous scented rice varieties Bhutku and Tulsi Muku <i>i.e.</i> Ek Safal Pahal Puratan Ki Or is attached here. https://youtu.be/JVXqQ_Ug8dg

Annexure-1

24 March 2016

The Secretary,
Kamajirahma Mission Ashrams,
(Divyayan Krishi Vigyan Kendra),
11, Swami Vishuddhanand Road,
Morabadi, Ranchi
Jharkhand- 834008

Dear Sir

FSPT: Grant Assistance for promotion of Indigenous Scented Rice Varieties for Development of Sustainable Livelihood of Farmers in Silli & Burmu Blocks of Ranchi District

Please refer to your letter No. NABARD/291/1168/2016-1 dated 04.03.2016 vide which the captioned project has been submitted for consideration. In this connection, we are pleased to convey our sanction for grant assistance of ₹8,42,500/- (Rupees Eight Lakh Forty Two Thousand Five Hundred only) for the project. The item-wise approved expenditure details for the project is given in the Annexure-I.

2. The detailed "Terms and Conditions" of the sanction of grant assistance is given in the Annexure-II. As a mark of acceptance, you are advised to submit the signed and stamped duplicate copy of this letter together with the terms and conditions.

3. Subject to acceptance of the terms and conditions stipulated in Annexure-II, you may apply for the 1st installment of grant assistance. Subsequent request for release of grant assistance may be submitted in accordance with the compliance of "Grant Release Schedule" as indicated in the Para-7 of Annexure-II.

4. The progress of the project will be monitored by a "Project Monitoring and Review Committee" (PMRC) on quarterly intervals in accordance with the activity schedule as proposed by you which has been approved by NABARD which is also reflected in the Annexure-I. The PIA will submit "Quarterly Progress Report" (QPR) in the format as given in the annexure-IV.

5. NABARD reserves the rights to terminate the sanction and recall the grant assistance disbursed, if the work at any stage is not found satisfactory.

Please acknowledge the receipt of this letter.

Yours faithfully

(T K Banerjee)
Asstt. General Manager

Enclosure: as above

राष्ट्रीय कृषि और ग्रामीण विकास बैंक
National Bank for Agriculture and Rural Development
आर्यभट्ट क्षेत्रीय कार्यालय, कर्मठोली रोड, जयधामाई हस्पिटल के सामने, रांची- 834001, दूरभाष- 0651-2361107, फैक्स- 0651-2361108.
BARKHAND REGIONAL OFFICE, Karmatholi Road, Opp- Adwani College Hospital, Ranchi - 834 001.
Phone- 0651-2361107 Fax- 0651-2361108 E-mail- barkhand@nabard.org

L/PSDD/RKM-SCRP/ 4163 /2015-16
ch 2016



Secretary,
Krishna Mission Ashrama,
ayan Krishi Vigyan Kendra),
varm Vishwakulhanand Road,
tudi, Ranchi
hand- 834008

Sir

**F: Grant Assistance for promotion of Indigenous Scented Rice Varieties for Development
Sustainable Livelihood of Farmers in Mandar, Bedo & Chanho Blocks of Ranchi District**

ase refer to your letter No. NABARD/251/1168/2016-2 dated 04.03.2016 vide which
captioned project has been submitted for consideration. In this connection, we are
ased to convey our sanction for grant assistance of ₹6,08,200/- (Rupees Six Lakh
ght Thousand Two Hundred only) for the project. The item-wise approved
penditure details for the project is given in the *Annexure-I*.

The detailed "Terms and Conditions" of the sanction of grant assistance is given in
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Please acknowledge the receipt of this letter.

Yours faithfully

(T K Banerjee)
Asstt. General Manager

Enclosure: as above

राष्ट्रीय कृषि और ग्रामीण विकास बैंक
National Bank for Agriculture and Rural Development
राष्ट्रीय क्षेत्रीय कार्यालय, कलकत्ता रोड, आदिवासी हॉमिन्स के सामने, रांची- 834001, झारखण्ड- 0651-2361107, फैक्स: 0651-2361108.
BHARUANG REGIONAL OFFICE, Karamsa Road, Opp. Adivasi College Hostel, Ranchi - 834 001.
Phone: 0651-2361107 Fax: 0651-2361108 E-mail: raanchi@nabard.org

ATMA/221

कृषि प्रौद्योगिकी प्रबंधन अभिकरण (आत्मा), राँची

कृषि भवन कैम्पस, कॉले रोड, राँची (झारखण्ड)

e.mail - atmaranchi_123@rediffmail.com

पत्रांक 528

आत्मा/राँची

दिनांक 31/08/2020

सेवा,

परियोजना निदेशक,
आत्मा, राँची।

सेवा में,

सचिव,
राम कृष्ण मिशन आवाज,
दिखावन कृषि विज्ञान केन्द्र,
मोरबादी, राँची।

विषय :- वित्तीय वर्ष 2020-21 में एक्सटेंशन रिपोर्ट्स योजना अन्तर्गत अप्रयोजित तकनीकों का शोधन, मान्यकरण एवं अंगीकरण (Assessment, Refinement, Validation and Adoption of Frontline Technology & Researchable Issues Through KVKs) कार्यक्रम के संबंध में।

महोदय,

उपरोक्त विषय के संदर्भ में कहना है कि वित्तीय वर्ष 2020-21 में कृषकों के आय दुगुनी (Doubling Farmers' Income, 2020) के तहत एक्सटेंशन रिपोर्ट्स योजना अन्तर्गत अप्रयोजित तकनीकों का शोधन, मान्यकरण एवं अंगीकरण कार्यक्रम को दिखावन कृषि विज्ञान केन्द्र, मोरबादी, राँची से मान्यता से किया जाता है। कार्यक्रम के प्रिनसिपल हेतु 1,00,000.00 (एक लाख सौ) मात्र आवंटित है।

उक्त कार्यक्रम को दिनांक 04.07.2019 उपमुख्य-सह-अध्यक्ष, आत्मा, राँची की अध्यक्षता में आत्मा शरणागत निषेध (GB) की बैठक की कार्यवाही संख्या-09 पर अनुमोदन प्राप्त है।

अतः महोदय से विवेक है कि उक्त कार्यक्रम को प्रिनसिपल करते हेतु अनिवार्य कार्यक्रम की Proposal तैयार करते हुए अधोहस्ताक्षरी को उपलब्ध करावे की कृपा की जाए।

विश्वरामाजय



जिला कृषि प्रदायिका-सह-
परियोजना निदेशक, आत्मा, राँची।



RAMAKRISHNA MISSION ASHRAMA

(A Branch Centre of Ramakrishna Mission, P.O. Belur Math, Dist. Howrah, W.B. 711202)

Divyayan Krishi Vigyan Kendra

11 & 12, Swami Vivekananda Road • Morabadi • Ranchi - 834008 • Jharkhand • India

Tel: +91-351-2551008, 2551970 • Fax: +91-351-2551437 • E-mail: krishi.morabadi@ramakrishna.org • Website: www.ramkrishi.org

पत्रांक: Agro/204/358/20

दिनांक: 1.10.20

शेरा में,
परियोजना निदेशक,
आत्मसंघी ।

विषय: वित्तीय वर्ष 2020-21 में एक्सटेन्शनरेफोर्म्स योजना अंतर्गत शोधनप्रोजेक्ट्स हेतु प्रस्ताव उपलब्ध करने के संदर्भ में।

प्रसंग: आपका पत्रांक 528 दिनांक 31 अगस्त 2020

महोदय,

उपरोक्त विषय एवं प्रासंगिक पत्र के संबंध में आपके संज्ञान में लाना है की दिव्यायन कृषि विज्ञान केंद्र, मोराबादी, रांची द्वारा वित्तीय वर्ष 2020-21 में एक्सटेन्शनरेफोर्म्स योजना अंतर्गत देशी सुगंधित धान के आर्थिक क्षमताओं के जांचक हेतु प्रस्ताव इस पत्र के साथ संलग्न किया जा रहा है।

अतः आपसे निवेदन है की उपरोक्त संबंध में आवश्यक कार्यवाही करने की कृपा की जाए।

सधन्यवाद।

Sriam Chandra
(स्वामी चंद्रशेखर)
सचिव



• Donations are exempted from Income Tax under Section 80-G of the Income Tax Act 1961.

• All correspondence are to be addressed to the Secretary, Ramakrishna Mission Ashrama,

Belur Math, Howrah, & Stop Not Till The Goal is Reached" - Swami Vivekananda



ANNUAL REPORT 2021



DIVYAYAN KRISHI VIGYAN KENDRA RANCHI, JHARKHAND

Ph-0651-2551008, 2551970 email-kvk.divyayan@gmail.com
website: ranchi.kvk4.in

RAMAKRISHNA MISSION ASHRAMA MORABADI, RANCHI - 834008

Ph-0651-2551008, 2551970 email-ranchi.morabadi@kmm.org
website: www.rkmranchi.org



Years to maturity	Organic Disease Management	Seedling treatment with solution containing 10 gms each of manganese and molybdena dissolved in one liter of water.	1.5	5.0	48.0	17%	27.50	9	20	19	22	110000	480000	170000	4.36	116184	270000	220010	2.22
Prod 7	Crop Production ton	Yield/acre new strains	1.5	6.0	3.4	4.2	Yield with new inoculum due to indigenous various and which were high yielding variety.	-	-	-	-	22000	82000	82000	3.76	27290	62000	22200	1.68

Photographs of FLD on Seedling Treatment in Tomato



Training

Input Distributions

Schedule V in PLD Pilot

Crop at fruiting stage

Fruit of *Arbutus-Santali*

Photographs of PLD on Indigenous Scented Rice (Bharat)



Training

Import Data Download

Scientific Value to FLD 1966

Crop at Timbering Stages

Crop at flowering stage



**RAMAKRISHNA MISSION VIVEKANANDA EDUCATIONAL AND
RESEARCH INSTITUTE (RKMVERI)**

(Deemed-to-be-University as declared by Govt. of India w.e.f. 1st UGC Act., 1956)

Accredited by NAAC with A++ Grade

School of Agriculture and Rural Development

Faculty Centre: Agriculture, Rural and Tribal Development (ARTD)

Ramakrishna Mission Ashrama, Morabadi, Ranchi - 834 008, Jharkhand, India

Phone: (0651) 2552260, Email: rkma@rkmveripuram.ac.in, Website: www.rkmveripuram.ac.in

Ref. No. RKMVERI/RNC/ ARTD /RM/2.2.1/2023

December 07, 2023

This is to certify that Mr. Rupankar Mandal, Registration number - R2230035, Batch ARTD 2022; is enrolled in M.Sc. program of RKMVERI, Ranchi. He is doing his M.Sc. dissertation work on the topic.

"Characterization studies on aromatic indigenous rice genotype of Jharkhand"

Supervisor

Dr. Pooja Yadav
Assistant professor
Plant genetics and breeding

Co-Supervisor

Dr. Neha Rajan
Subject Matter Specialist
(Plant Breeding Divyayan KVK Ranchi)

Head of the Dept.

Dr. Arunava Sengupta
Assistant professor
Agriculture Extension

Associate Dean

Dr. Raghlava Thakur
Associate Dean
RKMVERI, Ranchi

All correspondence to our office should be addressed to the Administrative Head
"Hence to show them new means of production of food is our first and foremost duty"
-Swami Vivekananda



भारत-अनुप - कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, ज़ोन-IV
गर्भुचक, जगदीशपुर, पटना-800014 (बिहार)
ICAR-Agricultural Technology Application Research Institute, Zone-IV
(Indian Council of Agricultural Research, Ministry of Agriculture and Farmers Welfare)
Garbhuchak, Jagdeo path, Patna-800014, (Bihar)

F.No.2(16)/ATR-PTN/Farm Innovation/2023-24 / 10/24

Dated: 11.10.2023

To

The Director ICAR-RCER, Patna
The Comptroller, BAU, Sabour.
The Secretary, Bihar & Jharkhand NGOs

Subj: Release of fund for Farm Innovation under General Head for F.Y. 2023-24 -reg.

Sir,

Please find the details of release in respect of grant for Farm Innovation under General Head for F.Y. 2023-24.

S.No.	KVKs Name	Proposed Amount	DPA No. & Date
1	Rohas	300000	
2	Saharsa	700000	
	BAU Sabour Total	1000000	C102322741835 Dated: - 10.10.2023
3	Buxar	1000000	
	ICAR-RCER, Patna Total	1000000	C102322805579 Dated: - 10.10.2023
4	RANCHI (TSP)	200000	
	NGO's Jharkhand Total	200000	C102322805708 Dated: - 10.10.2023
	Grand Total Amount	2200000	

Please acknowledge the receipt through email.

Thanking you

Yours faithfully

[Signature]
For I/c AF AO
(ICAR-ATARI, Patna)

Copy to:-

1. DEE, BAU, Sabour.
2. Head of KVKs,
3. Guard file

For E-mail: auripatna@gmail.com or to Pk. No. 0612-2226006 / 2226030



RAMAKRISHNA MISSION ASHRAMA
DIVYAYAN KRISHI VIGYAN KENDRA
MORABADI RANCHI- 834008.



Ref: KVK/211/406/2023

Date: 20.10.23

Office Order

This is with reference to office order No. F.No.2(16)/ATR-PTN/Farm Innovation/2023-24/424 dated 11th October 2023 received from ICAR-ATARI Patna, Bihar, it is intimated that the project entitled "Characterization of Two Potential Indigenous Scented Rice Varieties Bhatku and Tulsi Mukul: well Suited for Geographical Indication in Jharkhand, India" under Farm Innovation Project would be carried out under Divyayan Krishi Vigyan Kendra, Ramakrishna Mission Ashrama, Morabadi, Ranchi. It will be supervised by Dr. Neha Rajan, SMS (Genetics and Plant Breeding) as Principal Investigator and Dr. Ajeet Kumar Singh, Programme Coordinator as Co- Principal Investigator. The Total Budget of the project is 750000.00 (Seven Lakh Fifty Thousand only) for the three consecutive years (2023-24, 2024-25 & 2025-26).

Swami Bhaveshananda
(Swami Bhaveshananda)
Secretary

Copy to:-

- ✓ 1. Dr. Neha Rajan (PI)
2. Dr. Ajeet Kumar Singh (Co-PI)
3. Account section
4. Office file

Annexure 2



संख्या नं./Sl. No. 2



प्रकार O-2, FORM O-2

(कृषक नियम 36 और 37 देखें) (See rules 36 and 37)

भारत सरकार GOVERNMENT OF INDIA

पौधा किस्म रजिस्ट्री PLANT VARIETIES REGISTRY

एनएससी कॉम्प्लेक्स, डीवेलप मार्ग, निकट टोडापुर गांव, नई दिल्ली / Opp. Todapur Village, NASC Complex, New Delhi - 110

रजिस्ट्रीकरण प्रमाण-पत्र / Certificate of Registration

आवेदन नं./ Application No.: F458/05491 14 673	दखल करने की तारीख/ Date of Filing: 21 मार्च/ March, 2014
पंजीकरण नं./ Registration No.: 332 of 2016	जाती देने की तारीख/ Date of Grant: 17 अक्टूबर/ October, 2016

आमद मान्डी, गांव: पिरसा, पोस्ट: पिरसा, जिला: रांची, राज्य: झारखंड ने घोषित किया है कि उसने आवृत तुही मकई (Tuhni Makai) फसल की कृषक पौधा किस्म (Farmer plant variety) विकसित किया है और वह उसका वास्तविक प्रजनक (या वास्तविक प्रजनक का विधिक प्रतिनिधि या सानुदेशिक) है और पौधा किस्म सार्वजनिक और कृषक अधिकार अधिनियम, 2001 के प्रावधानों को ध्यान में रखते हुए वह उस पौधा किस्म के अधिकार का हस्तांतर है और वह कि उसने उस पौधा किस्म के पंजीकरण की प्रति घोषित नहीं की है।

और, वह उस पौधा किस्म के लिए आवेदन करते हुए अनुरोध करता है कि कृषक पौधा किस्म का पंजीकरण उसके नाम पर हो जाए।

और, उसने अपने आवेदन द्वारा और उसके, उस पौधा किस्म के विभिन्न विशिष्ट लक्षणों और उसके अधिकार का चर्चा किया है।

अतः यह निवेदन है कि उपर्युक्त आवेदन (जिसमें उसकी विधिक प्रतिनिधि और सानुदेशिकों का हस्ताक्षर है कोई भी है) पौधा किस्म सार्वजनिक और कृषक अधिकार अधिनियम, 2001 के प्रावधानों और उस अधिनियम की धारा 47 में निर्दिष्ट शर्तों और संलग्न प्रयुक्त किसी अतिरिक्त द्वारा निर्दिष्ट शर्तों और प्रावधानों के अधीन रहते हुए वर्ष 2016 के अक्टूबर माह की 17 तारीख से छह वर्षों की अवधि के लिए एक शेष वर्षों के लिए नवीनीकरण की अवधि, इस किस्म के उत्पादन, विक्रय, निर्यात, निर्यात, आयात का निर्यात करने और ऐसे करने के लिए किसी अन्य व्यक्ति को प्राधिकृत करने का अत्यंत अधिकार होगा, इस शर्त के अधीन रहते हुए कि इस पंजीकरण विधि सम्बन्ध प्रयुक्त नहीं की जाती है और इस पंजीकरण को बनाए रखने के लिए विहित फीस का सम्यक रूप से सदाय नि जमा है।

Whereas Anand Manhi, Village: Piska, Post: Piska, Dist: Ranchi, State: Jharkhand has declared that he has developed Tuhni Makai of Rice (Oryza sativa L.) as Farmer plant variety and that he is the true breeder thereof (or the legal representative or assignee of the true breeder) and that he is entitled to a plant variety right on the said variety, have regard to the provisions of the Protection of Plant Varieties and Farmers' Rights Act, 2001 and that there is no objection the registration of plant variety in favour of him.

And whereas he has, by an application, requested that registration of Farmer plant variety may be allowed to him for the said plant variety;

And whereas he has, by and in his application, particularly described the various distinctive features and mentioned the denomination of the said plant variety;

Now, these presents that the above said applicant (including his legal representatives and assignees or any of them) who subject to the provisions of the Protection of Plant Varieties and Farmers' Rights Act, 2001 and the conditions specified section 47 of the said Act, and the conditions and provisions specified by any other law for the time being in force, have the exclusive right to produce, sell, market, distribute, import or export the variety for initial term of Six years & renewable for the remaining years from the 17th day of October, 2016 and of authorizing any other person to do so, subject to the conditions that the validity of this registration is not guaranteed and that the fee prescribed for the continuance of the registration are duly paid.

इसको राज्य स्वयं रजिस्ट्रार ने वर्ष 2016 के अक्टूबर माह की 17 तारीख को पंजीकरण पर मुहर लगाई है। In witness thereof, the Registrar has caused this registration to be sealed as of the 17th day of October, 2016.

रजिस्ट्रार

321. सचिव, राम कृष्ण मिशन आश्रम, दिव्यायन, कृषि विज्ञान केंद्र, मोरहाबादी, रांची, झारखंड-834008 की ओर से श्री सीटू ओरोंव, गाँव और पंचायत: जुड़ी, पोस्ट: टांगर, जिला: रांची, झारखंड ने दिनांक 24.04.2015 को कृषक किस्म की भुटकु धान नामक चावल (ओरिजा सैटिवा एल.) फसल को पंजीकरण हेतु आवेदन सं.

F437	OS472	15	801
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 को निम्नलिखित विशिष्टताओं व उन्नित्वित चित्रों और फोटोग्राफ के साथ स्वीकार कर पंजीकरण संख्या दी गई है कथित किस्म के संदर्भ में, संयोजन आवेदन पत्र, संख्या... (संग्र नहीं) ... को पंजीकरण संख्या.....(संग्र नहीं) ... में फाइल किया गया।

पीपल किस्म और कृषक अधिकार संरक्षण निगमावली, 2003 के नियम 29 के तहत कार्यवाही के प्रतिरोध के लिए रजिस्ट्रार, पीपीवी और एफआर प्राधिकरण, नई दिल्ली-110012 उपयुक्त कार्यवाही है।

किस्म के पासपोर्ट आंकड़े	: भुटकु धान				
आवेदनक	: श्री सीटू ओरोंव				
आवेदनक का पता	: गाँव और पंचायत: जुड़ी, पोस्ट: टांगर, जिला: रांची झारखंड				
आवेदनक की राष्ट्रीयता	: भारतीय				
आवेदन का विवरण					
(क) आवेदन संख्या	: <table border="1"><tr><td>F437</td><td>OS472</td><td>15</td><td>801</td></tr></table>	F437	OS472	15	801
F437	OS472	15	801		
(ख) प्राप्ति-तिथि	: 24.04.2015				
(ग) स्वीकृति तिथि	: 21.07.2023				
फसल (वर्गीकरणविज्ञानी वंश परंपरा)	: चावल (ओरिजा सैटिवा एल.)				
नाम	: भुटकु धान				
किस्म का प्रकार	: कृषक				
किस्म का वर्गीकरण	: प्रसूती				
पहले प्रस्तावित नाम	: लागू नहीं				
पैतृक सामग्री का नाम	: लागू नहीं				
पैतृक सामग्री का स्रोत	: -				
संदर्भ किस्मों का नाम	: एनएलआर 30491 और वीएल धान 221				

किस्म का विवरण:

क्र. संख्या के गुण	टिप्पणी (मापित मान)
अधर पत्ती: अच्छद का रंग (गुण 2)	हरा
शीर्षक का समय: (50% पीपल के साथ पुष्पगुच्छ)(गुण 20)	विलम्ब
तना: जम्बाई (पुष्पगुच्छ को छोड़कर) (गुण 29)	मंदा
छिन्ना हुआ टना: जम्बाई (गुण 54)	मध्यम
छिन्ना हुआ टना: आकार (पार्श्व दृश्य में) (गुण 56)	छोटा मोटा
छिन्ना हुआ टना: रंग (गुण 57)	हल्का भूरा

Annexure 3



RAMAKRISHNA MISSION ASHRAMA

(A Branch Centre of Ramakrishna Mission, P.O. Belur Math, Dist. Howrah, W.B. 711202)

Divyayan Krishi Vigyan Kendra

11 & 12, Swami Mahadhamanda Road • Morabadi • Ranchi • 834008 • Jharkhand • India

Tele: +0661-2501808, 2501970 • Fax: +0661-2552427 • E-mail: ranchi@ramakrishnamission.org • Website: rkmission.org

To

Ref: NABARD/251/620/2019

20.11.2019

The Chief General manager

NABARD, Ranchi

Sub: Submission of Project Completion Report, Utilization Certificate, Quarterly Progress report and proceeding of PMIC

Sir,

Please refer to your email dated 6th Nov 2019 on the captioned subject. We would like to inform you that we are sending Project Completion Report, Quarterly Progress report and proceeding of PMIC held on 19th Nov.2019 at Divyayan KVK, Ranchi regarding Scented Rice project for Sili and Hamkum. We are also sending utilization Certificate for the grant received towards scented rice project for your kind perusal and records.

Kindly release the receivable amount Rs. 1,88,335 (Rupees One Lakh Eighty Eight Thousand Three Hundred Thirty Five only) as early as possible.

Kindly acknowledge the enclosures.

Thanking you,

Yours in the service of God,

Swami Bhaveshananda

Secretary

Secretary

Encl:-

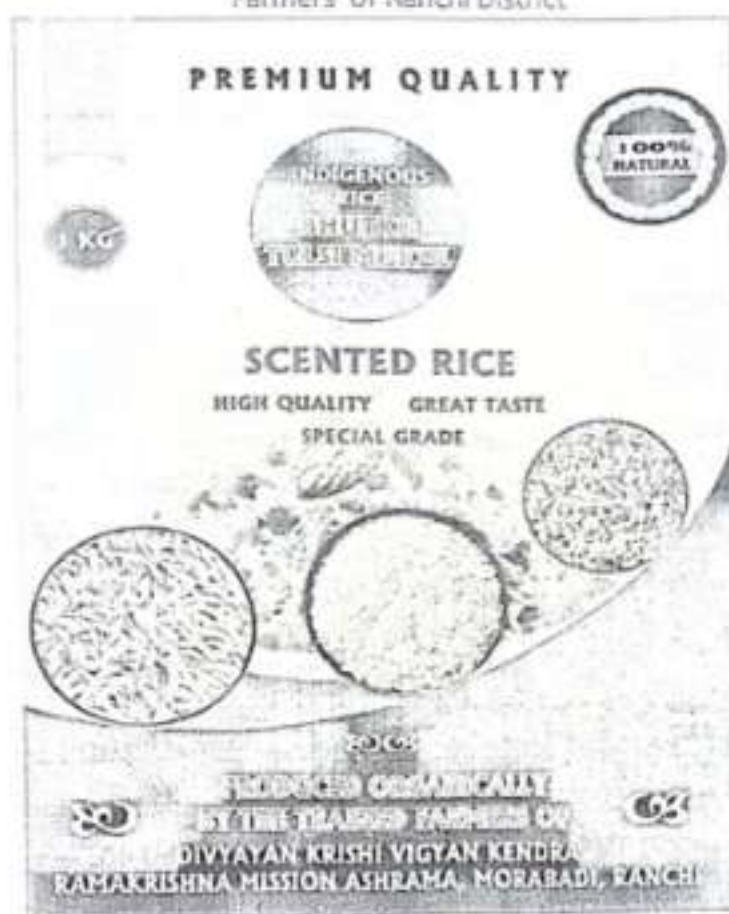
1. Project Completion Report (PCR)
2. Utilization Certificate
3. 13th Quarterly Progress Report
4. PMIC proceeding and Signature copy
5. Documentary Film of Scented Rice



- Donations are exempted from the income tax under Section 80-G of the Income Tax Act 1961.
- All correspondence are to be addressed to the Secretary, Ramakrishna Mission Ashrama.

"Arise, Awake, & Stop Not Till The Goal is Reached" - Sri Sri Sri Paramahansa

Project Completion Report
of
Conservation, Promotion and Commercialization of
Indigenous Rice Varieties for development of Sustainable Livelihood of
Farmers of Ranchi District



Submitted to:



National Bank for Agriculture and Rural Development (NABARD)
Ranchi

Submitted By:

Divyayan Krishi Vigyan Kendra
Ramakrishna Mission Ashrama
Morabadi, Ranchi



PROJECT REPORT

Title : Conservation, promotion and commercialization of indigenous rice varieties for development of sustainable livelihood of farmers' of Ranchi district.

Duration : From 1st April 2016 to 30th March 2019 (3 years)

Sponsored by : NABARD Ranchi

Project Cost : ₹6,58,200

Implemented by : Divyayan KVK Ramakrishna Mission Ashrama, Morabadi, Ranchi - 834008;
e-mail: ranchi.morabadi@rkmm.org

Project Area : Mandar, Bero and Chanho Block Ranchi Jharkhand

Total No. of Beneficiaries : 43 farmers

Total area covered : 16 acre

Project Investigator:- Neha Rajan

Co- Project Investigator:- Dr. Ajeet Kr. Singh

Swami Bhaveshananda

Secretary

Ramakrishna Mission Ashrama

Divyayan Krishi Vigyan Kendra

Morabadi, Ranchi - 834 008

PROJECT REPORT

Title	: Conservation, promotion and commercialization of indigenous rice varieties for development of sustainable livelihood of farmers' of Ranchi district.
Duration	: From 1 st April 2016 to 30 th March 2019 (3 years)
Sponsored by	: NABARD Ranchi
Project Cost	: ₹ 8,40,000
Implemented by	: Divyayan KVK Ramakrishna Mission Ashrama, Morabadi, Ranchi - 834008; e-mail: ranchi.morabadi@rkmm.org
Project Area	: Silli and Namkum Block Ranchi Jharkhand
Total No. of Beneficiaries	: 42 farmers
Total area covered	: 15.5 acre

Project Investigator:- Neha Rajan

Co- Project Investigators:- Dr. Ajeet K. Singh


Swami Bhoo eshananda
Secretary
Ramakrishna Mission Ashrama
Divyayunkrishna Vigyan Kendra
Morabadi, Ranchi - 834008

Multilocation trial conducted in three agro climatic sub-zones of Jharkhand for assessment of effect of location in aroma of Bhutku and Tulsi Mukul rice





DNA Fingerprinting report of
Mekhwain, Bhutku and Tulsi Mukul

Prepared by:

Dr. Sutapa Sarkar,
Scientist, Crop Improvement Division,
ICAR- National Rice Research Institute,
Cuttack, Odisha-753006

Submitted to:

Swami Bhaveshananda
Secretary
Ramakrishna Mission Ashrama
Divyayan Krishi Vigyan Kendra
11 & 12 Swami Vishuddhananda Road, Morabadi,
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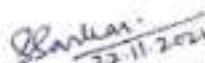
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erricr@nrrr.in



Date: 22.11.2021

TO WHOM IT MAY CONCERN

This is to certify that the present DNA fingerprinting report of *Mekhywan, Bhutka* (PPV&FR; Ack No. REG/2015/801) and *Talsi Mukul* (PPV&FR; Reg No. 312 of 2016) has been generated at ICAR- National Rice Research Institute, Cuttack under the supervision of Dr. Sutapa Sarkar, Scientist Crop Improvement Division using the samples of the mentioned genotypes as received from the applying agency, Secretary, Ramakrishna Mission Ashrama, Divyayan Krishi Vigyan Kendra 11 & 12 Swami Vishuddhananda Road, Morabadi, Ranchi-834008, Jharkhand. The present report has been compiled to extend the DNA finger printing data support to be utilized for the registration of the mentioned genotypes by the applying agency under PPV&FR. The DNA Fingerprinting data for the three genotypes have been presented with respect to 61 SSR loci using Swarna (MTU7029; a non-aromatic popular variety) and CR Dhan 910 (an aromatic variety of ICAR-NRRI, used as local check in AICRP) as the reference genotypes. The report consist of 22 pages including the front page.


(Sutapa Sarkar)
Scientist,
Crop Improvement Division


(Director)



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Date: 22.11.2021

DISCLAIMER

ICAR- NRRI will be responsible for queries w.r.t. the DNA fingerprinting data, the amplicon sizes only. The Institute shall not be held responsible for any kind of discrepancy arising due to the sample identity of the genotypes. The seed samples received from the applying agency have been utilized for germination for DNA extraction and further DNA fingerprinting using Simple Sequence Repeat (SSR) loci. The institute shall be responsible for the amplicon size data produced in the report corresponding to the respective genotypes that is to be used for further necessary action by the applying agency.

Note: The submitted seed samples of the five genotypes mentioned in the report will be maintained till one year after submission of the report, beyond which any claim/ discrepancy w.r.t. the genotypes, submitted by any agency, the Institute will not be obliged to address the same.


(Sutapa Sarkar)
Scientist,
Crop Improvement Division


(Director)

PUBLICATION CERTIFICATE

ORIGINAL/DUPLICATE/TRIPPLICATE/TO REMAIN WITH THE HEAD, PME Cell/SENIOR
AUTHOR/PROJECT FILE OF CONCERNED DIVISION

1. Certified that the manuscript entitled "DNA Fingerprinting report of Methjwain, Bhutkhand Tulei Mukul" represents entirely the work of persons who were authors of the paper and does not exclude the name of anyone who has effectively contributed to the conduct of work embodied in this publication.

2. Certified that the above manuscript is based on research work conducted by the authors as part of the project detailed below:

- i) Project No. and Title: 1.5 (Breeding for aroma and grain quality in rice)
ii) Authors: SUTAPA SARKAR
iii) Source of Fund: Institute fund

3. The Manuscript/Abstract is to be submitted for publication in the following Journal/Conference/
Seminar/Symposium/Newsletter:

Submitted to Secretary, Ramakrishna Mission Ashram, Ranchi, Jharkhand.

4. The precise brief note for the above said purpose on this topic is enclosed for PME Cell record (Attach copy):

Report copy attached

5. Plagiarism Check certificate: To be signed by senior author.

Pure work generated report. No plagiarism.

6. Signature of Authors:

- (1) Sarkar (2) (3)
(4) (5) (6)
(7) (8) (9)

7. Contribution of Authors in detail

- (1) Work and report writing done by the single author.
(2)
(3)
(4)
(5)
(6)
(7)

Sub
22.11.21
Head of Division

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Date

332
25/11/2021
868

Alam
22/11/21
In-Charge
PME Cell

The above mentioned paper is approved in principle for publication.

Dipak
24/11/21
DIRECTOR

DNA Fingerprinting report of Mekhijwain, Bhutku and Tulsi Mukul

Summary of the report:

Details	<i>Mekhijwain</i>	<i>Bhutku</i>	<i>Tulsi Mukul</i>
Seed sample received on	22.07.2021	22.07.2021	21.08.2021
Germination%	100	100	100
DNA extraction completed	11.10.2021	11.10.2021	11.10.2021
No. of SSR loci used	61	61	61
No. of polymorphic bands w.r.t. Swarna	59	58	57
No. of polymorphic loci w.r.t. CRDhan 910	58	59	56

The SSR marker information provided in the report is purely based on the information available in GRAMENE database. AlphaView SA version 3.5.0, an online freely available software (Copyright ©1993-2018 Protein Simple) was used for determination of PCR amplicon size.

Report of Testing aroma in indigenous rice Bhutku

Ref: Agro/204/28/2023 Dt 04/08/2023

Name of genotype tested: Bhutku (REG/2015/801 under PPV&FRA)

Checks used: Rajendra mashuri (aromatic), Pusa Basmati 1 (aromatic), Sahbhagi Dhan (Non aromatic)

Sensory test of Aroma

The aroma determination from kernels was done according to the 1.7% potassium hydroxide (KOH) solution-based method (Sood and Siddiq, 1978). Aroma was scored following a scale of 1-3 (by a common panel of three individuals as: 1 - absent or very weak aroma, 2 - weak aroma, 3 - strong aroma.

Both Bhutku and Pusa Basmati 1 scored 3, while Rajendra Mashuri scored 2 in sensory testing, indicating that all these varieties are highly aromatic. The aroma flavour of Bhutku, which is a short-grain aromatic rice, is different from Pusa Basmati 1.



Bhutku dhan

Genotyping of using aroma (*BADH2*) functional marker

DNA extracted from 14 day-old seedlings and used for polymerase chain reaction to detect the 8-bp functional nucleotide polymorphism of *Betaine aldehyde dehydrogenase* (*BADH2*) gene using allele-specific primers (Bradburry et al., 2005). To visualize and score the PCR amplified products, agarose gel electrophoresis was carried out.

Allele-specific primers used:

	Primer name	Sequence (5'-3')	Amplicon size (bp)
1	External Sense Primer (ESP)	TTGTTTGGAGCTTGCTGATG	ESP & IFAP- 257 bp (aromatic); EAP & INSP - 355 bp (non-aromatic); EAP & ESP - 580 bp (positive control)
2	Internal Fragrant Antisense Primer (IFAP)	CATAGGAGCAGCTGAAATATATACC	
3	Internal Non-fragrant Sense Primer (INSP)	CTGGTAAAAAGATTATGCTTCA	
4	External Antisense Primer (EAP)	AGTGCTTTACAAAGTCCCGC	

Bhutku along with Rajendra Masuri and Pusa Basmati 1 have amplified aroma specific 257 amplicons along with the 580 bp amplicon which is a positive control and thus amplified in both aromatic and non-aromatic varieties. The non-aromatic check showed presence of 355 bp non-aromatic amplicon (Figure 1A).

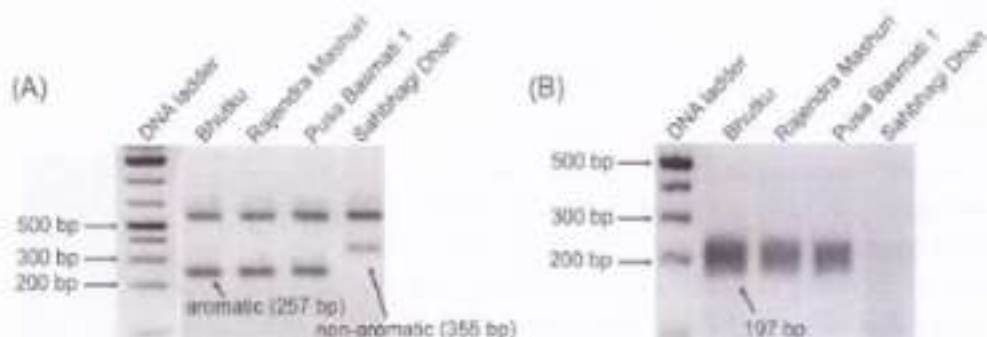


Figure 1. Detection of 8-bp INP of *BADH2* gene by (A) using allele-specific primers (Bradbury et al., 2005); (B) by RPA (Banerjee et al., 2023).

Recombinase polymerase amplification for aroma

RPA was done using a recently developed protocol (Banerjee et al., 2023). The primers used for detecting the functional polymorphism in the aroma gene. The protocol would generate 192 bp amplicon in aromatic varieties, and it was evident in Bhutku along with other two aromatic varieties (Figure 1B).

Conclusion

Overall, based on sensory test, PCR and RPA assay, it is found that the test genotype Bhutku (see grain photo), is a highly aromatic variety.

This report was generated by:

Amrita Banerjee
27/11/23
Amrita Banerjee
Senior Scientist

Somnath Roy
14.08.2023

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TEST REPORT

Page : 1 of 2

Issued to : M/s. Ramakrishna Mission Ashrama
16/04, Ramakrishna Mission Ashrama, Swami
Vishuddhananda Road, Morabadi, Ranchi, Jharkhand-834008

ULR No. : TC1115123000010921F
Sample code : F200200200013
Report No. : AFLPL/F/200923013
Date of issue : 05/10/2023

SAMPLE PARTICULARS

1. Name of the Sample :	Rice	8. Test Method Deviation :	N/A.
2. Group/Grade :	Food & Agriculture Product	9. Date of Recd. :	20/09/2023
3. Brand Name, if any :	N/A.	10. Customer Ref. No. :	N/A.
4. Sample Description :	Off white colour rice	11. Sample Pkg. :	Sealed pack
5. Sampling Method :	Sample not drawn by Lab	12. Mfg. Date :	N/A.
6. Attachments :	N/A.	13. Exp. Date/Best Before :	N/A.
7. Lot No./Batch No. :	N/A.	14. Sample Qty. :	200g

TEST RESULTS

Test Started on : 20/09/2023

Test Completed on : 05/10/2023

SL. No.	Parameter	Unit	Results	Specifications/Requirement	Test Method
	Chemical Parameters	-	-	-	-
1	Glycemic Index	-	40.05	-	AFLPL/SOP/CLU/NB/F142
2	Energy	Kcal/100g	349.57	-	IS : 14433 : 2007 (2016)
3	Protein (N x 6.25)	g/100g	17.00	-	IS : 7218 : 1975 (2020)
4	Carbohydrate	g/100g	72.66	-	IS : 1658 : 2007 (2016)
5	Fat	g/100g	1.12	-	IS : 4884 : 1975 (2016)
6	Moisture	g/100g	13.38	-	IS 4333 (P-1) : 2017
7	Total Mineral Content	%	0.64	-	IS : 4884 : 1975 (2000)
8	Dietary Fibre	g/100g	BLO (LOQ-0.5)	-	AOAC 985.29, 2019
9	Iron	mg/kg	4.88	-	AFLPL/SOP/CH/NH/255
10	Zinc	mg/kg	6.16	-	AFLPL/SOP/CH/NH/255

- Information at serial no. 1,3,4,7,10,12 & 13 being covered under SAMPLE PARTICULARS, has been provided by customer.
- The results listed refer only to the tested sample and applicable parameter.
- This report, in full or in part, shall not be used for advertising or as evidence in any court of law.
- This report can not be reproduced, except when in full, without the written permission of the Director.
- The remnant sample will be disposed off after 30 days (in case of non-perishable products) and 15 days (for low and high perishable products) unless otherwise specified from the date of issue of the test report.
- The liability of the laboratory is limited to the invoiced amount.
- All disputes are subjected to the Delhi Jurisdiction.
- Doc No. : AFLPL/FMT/MSP-7 4(A)



Form C
Government of Jharkhand
Department Of Health
Food Safety and Standards Authority of India
License under FSS Act, 2006



Application / License Number: 111800100109



- | | |
|--|--|
| 1. Name & Registered Office address of Licensee / applicant & office address as per affidavit. | Ramakrishna Mission Ashrama, Mirzapur, Ranchi
Training Unit of Ramakrishna Mission Ashrama, Chayapan Kandi village Kandra, Mirzapur, Ranchi, Jharkhand-834008 |
| 2. Address of Authorized Premises / office as per affidavit. | Training Unit of Ramakrishna Mission Ashrama, Chayapan Kandi village Kandra, Mirzapur, Ranchi, Ranchi Urban 3, Ranchi, Jharkhand-834008 |
| 3. Kind of Business / nature of work. | Manufacturer - General Manufacturing
Repairer - General Manufacturing |
| 4. Does Business Details / Self within State Bg. | No. |
| 5. Category of License / applicant. | State License |

This license is granted under and is subject to the provisions of FSS Act, 2006 all of which must be complied with by the Licensee / the applicant and all those within, into & with regard to the office as stated in and it under FSS Act 2006 and its rules and regulations.

Place / Date: Ranchi
 Issued On / Date: 19-04-2023 (Renewal License)
 Valid upto / Date: 19-04-2024 (for details, refer Annexure)

Designated Officer

- Annexures:
 1. Product Annexure
 2. Facility Annexure
 3. Sub Part C Annexure
 4. Conditions Of License

Note:

- Application for renewal of License can be filed as early as 180 days prior to expiry date of License. You can file application for renewal or modification of License by login into FSSAI's Food Safety Compliance System (<https://fssai.food.gov.in>) with your user id and password or call us at 1800112100 for any clarification.
- This License is only to commence or carry on food businesses and not for any other purpose.
- This is computer generated license and doesn't require any signature or stamp by authority.



Office of District Agriculture Officer, Ranchi

Kanke Road - 834008

Letter No. - 1553

Dated: 18/10/2022

From

District Agriculture Officer,
Ranchi (Jharkhand)

To

Dr. Anjani Kumar
Director, ICAR- Atari, Zone IV, Patna (Bihar)

Subject- Development of value chain indigenous rice varieties by KVK - Ranchi - reg.
Sir,

I wanted to take this opportunity to congratulate your team involved in 'Recognition and popularization of indigenous rice varieties in Ranchi district under a project funded by PPVFRA, New Delhi. Farmers of Ranchi district have been involved in cultivation of many traditional rice varieties for a long ago but not in large scale and commercial level. The rigorous effort of your team members for identification and validation of 56 indigenous rice varieties of Ranchi District brought this treasure to the notice of people and farmers scaled up the production of these varieties. The platform provided by KVK, Ranchi to buy back the farmers' seed, its processing and sale particularly of Bhatka and Tulsi Mukul (two varieties selected for commercialization) is significantly increased their area in Ranchi district and presently more than two thousand farmers are not only producing these varieties but are getting premium price also for their produce.

Your team members deserve a great appreciation for their significant contribution in conservation of these valuable varieties.

Once again, I congratulate the following team members of the project.

Dr. Ajeet Kumar Singh, Senior Scientist & Head, Divyayan KVK - Ranchi

Dr. Anjani Kumar, Director - ATARI Zone IV, Patna

Smt. Neha Rajan, Subject Matter Specialist - Genetics and Plant Breeding, Divyayan KVK, Ranchi


District Agriculture Officer
Ranchi

जिला कृषि पदाधिकारी
राँची

Annexure-4

PROJECT REPORT

**Assessment of Economic Potentialities of Indigenous
Aromatic Rice for a Sustainable Livelihood Security.**



SUBMITTED TO:

ATMA, Ranchi

SUBMITTED BY:



**DEVYAYAN KHIRSI VIDYAN KENDRA
RAMAKRISHNA MISSION ASHRAMA
RANCHI**



Research Report under Extension Reforms Scheme 2020-21

Title of Research: Assessment of Economic Potentialities of Indigenous Aromatic Rice for a Sustainable Livelihood Security.

Name & Address of KVK: Divyayan Krishi Vigyan Kendra, Ramakrishna Mission Ashram, Morabadi, Ranchi 834008.

Introduction: Rice is major energy food in Jharkhand and it is farmer's choice crop in the state. The state has 1.5-million-hectare area under rice cultivation. About 300 varieties of scented rice were grown in respective state before the era of high yielding varieties. However, at present only 8-10 indigenous aromatic rice varieties are being cultivated in some scattered pockets of different districts in an unorganized manner. After green revolution the high yielding varieties have replaced the indigenous varieties in every part of the country. Despite being very high in nutrition and comprising numerous qualities, low yield and poor marketability of indigenous varieties has forced the farmers to shrink the net shown area of these varieties and adopt hybrid varieties having considerably low nutrition. Owing to its unique aroma and taste aromatic rice has high demand in the market. Keeping the above facts in view, A research trial has been proposed in the selected farmers field and KVK farm also to fulfill these objectives:

Objective:

- To demonstrate potentialities of Indigenous Aromatic rice for doubling the farmers income.
- To increase area and productivity by using scientific organic cultivation practices.
- To assess inherent qualities of indigenous scented rice for fetching premium price in market.

Major activities which were undertaken in this project

- 11 locations which was low land areas, were selected in Banta Village of Silli block for scientific cultivation of indigenous scented rice.
- 'Bhutlu' an indigenous scented rice variety was selected by KVK for commercial production with an aim of making it the main source of income to farmers of Ranchi district.
- Group meetings, off campus trainings, field visits were used for educating and motivating the farmers of the villages for indigenous scented rice production.

- Critical inputs like seed and organic manure were provided to farmers for commercial production of scented rice.
- 11 Farmers were trained in organic production of indigenous paddy.
- They followed improved organic package and practices for enhancement of yield, aroma and quality of the variety.
- In KVK instructional farm, Getalsud Angara Bhutku rice was demonstrated in 1-acre area for seed multiplication.
- KVK provided Buyback system to farmers to assure market of paddy seed and rice.
- Quality test of indigenous scented rice is in process.

Scientific Interventions to Boost Yield of Indigenous Scented Paddy

- *Five-year intensive work on indigenous scented rice of Ranchi district KVK was selected an indigenous rice 'Bhutku' which yielded 45 qtl/ha in 150 days for production under this program. Despite being a traditional variety and extra-long plant height (150cm), the variety proved to be lodging resistant. This variety has become popular in the district due to its unique aroma and taste.*
- *The traditional farming was coupled with scientific organic farming to retain the aroma and taste which is uniqueness of this variety.*
- *As this variety was a long duration (150 days) variety, it was ensured that sowing was done timely (by Last week of June) to get maximum yield.*
- *The sowing was done by adopting a mixture of procedures adopted in traditional and SRI method. To elaborate on the procedure adopted for sowing, the seedlings were transplanted after 20 days in lines with spacing 25 cm with only one and two seedlings.*
- *The nursery was grown by using 'Dapog' method of nursery to minimize the root shock of seedling during uprooting.*

Outcome:

The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e., fetching Rs. 30 per kg for indigenous paddy as compared to Rs. 15 per kg for HYVs. Now they are getting premium price for their quality product as KVK is acting as buyer and purchasing the entire paddy from the farmers.

Comparative Study on Production between Scented variety & HYV Paddy

S.No.	Particulars	Scented Rice	Improved variety
1.	Cost of cultivation (Rs./acre)	14050.00	26313.00
2.	Yield (qtl/acre)	12.00	20.00
3.	Selling Price (Rs./qtl)	3000.00	1750.00
4.	B: C Ratio	2.56	1.33

Farmers have become self-sufficient in seed and inputs (fertilizers, pesticides) because these farmers are saving their seeds from every year's crop and using it in the next season.

Activity Photographs



Training at village Banta, Silli



Nursery of Bhatku rice



Line Transplanting of Paddy seedling



Bhatku at tillering stage



Scientist visit at KVK farm



Spacing 25 cm (row to row)



Farmers field visited by scientist



Bhutku at Panicle initiation stage



Field View of Bhutku at Banta village



Harvesting of Bhutku paddy

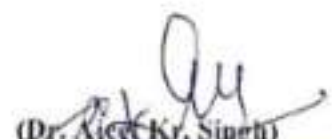
List of Beneficiaries

S. No.	Name of Farmer	Village	Block	Mobile No.	Caste	Sex
1.	Babita Devi	Hajam	Silli	7050596955	OBC	Female
2.	Ramesh Chandra Kunhar	Banta	Silli	7488040918	OBC	Male
3.	Sanjay manjhi	Hajam	Silli		OBC	Male
4.	Lakshmi Narayan Koiri	Hajam	Silli	9835568396	OBC	Male
5.	Birendra Mahto	Loahatu	Silli	9931790794	OBC	Male
6.	Nitayi Koiri	Banta	Silli	9835589606	OBC	Male
7.	Kamal Singh Munda	Buradih	Silli		ST	Male
8.	Babita Kumari	Hajam	Silli		OBC	Female
9.	Ratna Devi	Banta	Silli	6206465133	OBC	Female
10.	Budhram Kunhar	Banta	Silli	7759886116	OBC	Male
11.	Nitayi Koiri	Banta	Silli		OBC	Male



(Neha Rajan)

Co- Project Investigator


(Dr. Ajit Kr. Singh)
Programme Co-ordinator
Project Investigator

REVITALIZING NATIVE AROMATIC RICE VARIETIES: A NEW HOPE FOR THE RURAL BIOTECHNOLOGY SECTOR IN INDIA

Abstract

Rice is integral part of Indian tradition and it is considered 'Holy Grain' in country. India is centre of origin of rice than it has great level of diversity. Jharkhand state alone is native place for more than one thousand rice varieties, of which few are having scented characteristics with distinct pleasant aroma and flavour. These scented rice varieties are mostly short grained type and some are having medium grained character. Aroma of these scented rice varieties are very much location specific. Separate indigenous aromatic rice varieties are grown for all type of land topography viz. upland, mid-land and low land, under rainfed conditions in the state. Changing climatic conditions, introduction of high yielding/ hybrid varieties, lack of scientific interventions and unorganised market had forced farmers to confined indigenous scented rice varieties cultivation for own consumption only. An attempt was made for promotion of indigenous rice varieties of Jharkhand state by with two most popular scented varieties. These varieties were grown to obtain pure seeds by removing off type mixture. A multi-location trial was conducted at five different locations of Ranchi district on farmer's field to assess most promising variety with market preference following standard improved growing practices through organic inputs. Biological methods for disease and pest control were followed. Two varieties namely Bhutaina and Tulsi Mukul were selected for commercialization based on farmer's response and market needs. Seed production programme for large scale area expansion was worked out on participatory mode at farmer's field for these

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two varieties. Promotion programme were organised to aware consumers and generate demand. Farmers were provided marketing linkages which has insured the boost up of D: C ratio of rice growers from 1.33 to 2.56. With the better return, increasing market demand and climate resilient cultivation techniques now as well as production of these two heirloom varieties has turn up many folds.

Keywords: aroma; food security; native varieties; rainfed condition; rural biotechnology; scented rice

I. INTRODUCTION

Biodiversity especially in crop plants is very essential to ensure food security for present and future world. It provides raw material needed for ensuring continuing food supplies for tomorrow. Crop diversity enables farmers and plant breeders to develop high yielding varieties with desired quality characteristics like taste, nutrition, flavour, aroma etc. [1]. Crop diversity also known as plant genetic resources, is a key component of crop improvement programs in which breeders can produce varieties having tolerance to biotic and abiotic stresses which give sustainable production in extreme climatic conditions[2]. These resources are not only essential to reduce hunger but also to strengthen global food security in the medium and long term by contributing in crop improvement programmes. Bio diversity in agriculture is foundation of our sustainable production system due to its importance in socio-cultural, economic and environmental elements[3].

Agro biodiversity is defined as the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties & breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators) and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems[Source: FAO, 1999a]. In the present scenario biodiversity is of prime importance to cope emerging challenges like climate change, increasing diseases and pests, pressure to feed growing human population and water scarcity etc [4]. There is increasing evidence that agricultural biodiversity needs to be a central element of sustainable agricultural development.

Jharkhand is a part of Chhotanagpur plateau of Eastern India. Being the oldest landmass of the earth, the plateau is geo-historically considered as unique region. The plateau is one among the 22 Agro biodiversity hot spot in India, as it is very rich in floristic diversity and endemism of species. It has immense diversity of rice (*Oryza sativa*), maize (*Zea mays*), kodo (*Paspalum scrobiculatum*), gundli (*Panicum antidotale*), sorghum (*Sorghum bicolor*), barley (*Hordeum vulgare*), pigeon pea (*Cajanus cajan*), horse gram (*Macrotyloma uniflorum*), black gram (*Vigna mungo*), niger (*Guizotia abyssinica*), sunhemp (*Crotalaria juncea*), rice bean (*Vigna umbellata*), moth bean (*Vigna aconitifolia*), Brassica Species (*Brassica oleracea* var. botrytis, *B. oleracea* var. gemmifera, *B. oleracea* var. capitata), brinjal (*Solanum melongena*), cucumber (*Cucumis sativus*), ivy gourd (*Coccoloba indica*), taro (*Colocasia esculenta*), yam (*Dioscorea esculenta*), ginger (*Zingiber officinale*), turmeric (*Curcuma longa*) and wild relatives like *Cajanus scarabaeoides*, *C. cajanifolia*, *Curcuma aromatica*, *Dioscorea belophylla*, *D. kalkapershadii*, *D. wightii*, *Momordica balsamina*, *Musa sapientum*, *Oryza nivara*, *O. rufipogon*, *Rhynchosia brevisata*, *R. minima*, *R. reflexa*, *Vigna hainiana*, *V. trilobata*[5].

II. ROLE OF KVK IN CONSERVATION OF AGRO BIODIVERSITY IN COLLABORATION WITH PPV&FR

India is among the first few countries in the world to have passed a legislation granting farmers right in the form of the protection of plant varieties and farmers rights act, 2001 (PPV&FR Act). India's law is unique in that, as it simultaneously aims to protect both plant



Awareness Program in Khunti District, Jharkhand



Tribal Farmer's Participation in Awareness Program

Krishi Vigyan Kendra, Ranchi, Jharkhand (which was in zone II then and presently under Zone IV) has taken up awareness programme for PPV & FR from the 2013 with financial support of PPV & FR Authority, New Delhi which were concluded during the year 2018. Every year 2 to 3 awareness programme were conducted by the KVK in remote tribal areas of the district and adjacent district Khunti to create awareness among the farmers. These programmes were very effective in accelerating registration process of farmers' varieties. Year wise details of awareness programme organised by KVK Ranchi have been given in table 1. In the very first year *i.e.* 2013-14 with the participation of 125 farmers, 148 applications were filed for registration as farmer's variety under 18 different crops. Out of 148 farmer's application, 96 were for paddy varieties, as it is a traditional crop of Jharkhand with huge diversity in state. By the year 2019, about 5000 varieties were registered through the Krishi Vigyan Kendras of the country (Source: ICAR-Agricultural Technology Application Research Institute, Kolkata).

Table1: Year Wise Details of Awareness Programme Conducted by KVK, Ranchi

Year	No. of Awareness Programme organized	No of total participants	No. of Applications filled by Farmers	No of crops
2013-14	1	125	155	18
2014-15	2	300	127	18
2015-16	4	515	130	14
2016-17	2	218	24	11
2017-18	1	210	30	12
Total	10	1368	466	

Altogether 450 applications of farmer's varieties were submitted to PPV & FR Authority for registration through KVK, Ranchi between the year 2013 to 2018 (Table 2) as a result of its awareness activities. Among these 276 applications were filed in the category of cereal crops like paddy, wheat, maize, finger millet, pearl millet, barley, sorghum, 57 applications were filed for pulses varieties like pigeon pea, field pea, black gram, lentil, chick pea, green gram, 25 applications were for oilseed crops like mustard, sunflower, sesame, safflower, castor, linseed and groundnut, 46 applications for vegetable crops like potato, brinjal, dolichosbean, pumpkin, cucumber, ridge gourd, cow pea, chilli, tomato and bitter gourd, 26 for spices like turmeric and ginger, 17 applications were related to fruit plants like mango, ber, papaya, banana, guava, acid lime, and 3 applications for fibre crop jute. Highest number of applications is received in Rice (213) followed by finger millet (23), black gram (19), turmeric (14) etc.



Application Filing and Sample Collection under PPV & FRA

Table 2: Crop Group Wise Application Send to PPV and FRA for IPR

Category	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Cereals	108	72	71	11	14	276
Pulses	17	13	19	4	4	57
Oilseed	12	5	6	1	1	25
Vegetables	3	22	8	6	7	46
Spices	8	14	-	1	3	26
Fruit Plants	-	12	5	-	-	17
Others (Jute)	-	1	-	1	1	3
Total	148	139	109	24	30	450

Against these applications, 42 claims were accepted and certificates of registration were issued to them till December 2020 by PPV&FR Authority, New Delhi. Highest numbers of certificates of registration for farmer's varieties were issued for paddy (39), whereas 2 certificates in pigeon pea and 1 in mustard were issued. The certificate of registration issued will be valid for nine years in case of trees and vines and six years in case of other crops, which may be further reviewed and renewed for another nine years in both cases.

Table 3: Registered Farmers' Varieties of Jharkhand under Ppv and Fra Through Kvk Ranchi

Sl. No.	Name of Farmers' Variety (Denomination)	Crop	Registration Number
1.	HarkhantDhan	Paddy	307 of 2016
2.	Netakalun	Paddy	199 of 2016
3.	Barabali	Paddy	198 of 2016
4.	TewanDhan	Paddy	197 of 2016
5.	Sindoor Sal	Paddy	203 of 2016
6.	Chhotadahiya	Paddy	206 of 2016
7.	Rajagandha	Paddy	302 of 2016
8.	DhadhmuniDhan	Paddy	311 of 2016
9.	RagoriSona	Paddy	200 of 2016
10.	Bashnoli	Paddy	211 of 2016
11.	NagraboliDhan	Paddy	381 of 2018
12.	RumdiArhar	Pigeon Pea	383 of 2018
13.	MayinSarson	Mustard	155 of 2016
14.	Maghjawan	Paddy	56 of 2020
15.	Safed Lalak	Paddy	201 of 2016
16.	Lal Sita Sal	Paddy	310 of 2016
17.	DigambarDhan 1	Paddy	204 of 2016
18.	Buchakolma	Paddy	215 of 2016
19.	HajrakhandDhan	Paddy	308 of 2016
20.	JeeraBhog	Paddy	317 of 2016
21.	TulaManjar	Paddy	205 of 2016

22.	Hachmari	Paddy	212 of 2016
23.	Lauhonchi	Paddy	202 of 2016
24.	KolhuKhosa	Paddy	303 of 2016
25.	TulsiMukul	Paddy	312 of 2016
26.	Sursuriya	Paddy	232 of 2019
27.	Sita Sal Dhan	Paddy	315 of 2016
28.	Balamari	Paddy	223 of 2016
29.	BamunGodalDhan	Paddy	316 of 2016
30.	ArakhutaDhan	Paddy	1 of 2017
31.	DeekaDhan	Paddy	2 of 2017
32.	SarnaArhar	Pigeon Pea	382 of 2018
33.	Dahan/GodalDhan	Paddy	233 of 2019
34.	Safed Hambela	Paddy	234 of 2019
35.	SonagutiDhan	Paddy	237 of 2019
36.	Sufal Dhan-1	Paddy	239 of 2019
37.	JerengDhan	Paddy	240 of 2019
38.	LalMotaDhan	Paddy	241 of 2019
39.	GodnKanau	Paddy	Rcg/2014/2265
40.	Bachu Kolma	Paddy	215 of 2016
41.	Dev Dhan	Paddy	314 of 2016
42.	KodhaPhool	Paddy	217 of 2016

III. TRADITIONAL RICE VARIETIES OF JHARKHAND

Paddy is the major staple food in Jharkhand and it is farmer's choice crop in the state. Existences of large number of indigenous varieties having good traits are helpful in development of new varieties for further agricultural development. Expansion of area under HYVs/ hybrids for enhanced production and productivity is leading to drastic reduction in area under indigenous varieties which is a major cause of genetic erosion. Use of fewer HYVs over large areas for increasing yield has reduced the crop resistance to a lower level thereby more chemical application as nutrient supplement and pesticides are required. Local indigenous varieties have adjusted over long periods to the ecosystems of their growing regions including environmental and climatic variations, thus ensuring atleast sustainable level of output even in bad years.

Rice occupies 1.64million hectare area in Jharkhand with production of 3.98milliontonnes and productivity 2423 kg/ha during the year 2020-21. (Source: Agriculture Department, Ranchi, Jharkhand). In 2013-14 the total area covered by rice crop in Jharkhand was 1.35 million ha. 30 percent area under rice is occupied by hybrids, 49 percent high yielding varieties and 21 % by traditional rice varieties in the state [7]. In Ranchi district Area under high yielding varieties is 88000 ha and in hybrid varieties 80000 ha. (Source: District Agriculture Office, Ranchi)

In Jharkhand rice is an integral part of its tradition. It is a symbol of cultural identity of the state. There are number of rituals and ceremonies related with the cultivation of rice. This crop is cultural sole of state and various festivals like Ero-Sim, Aouba before starting seed sowing, Hetang and Rohinduring seed sowing, Baha festival before flowering of rice and Maghe just after the harvesting of paddy crop are associated with various growth stage of

crop. People in Jharkhand celebrate Navakhani after harvesting of upland paddy (GodaDhan&Gondali).

Jharkhand has a rich diversity of indigenous rice varieties. Gene Campaign, an NGO, has been working on conservation of agro-biodiversity rice and other crops since 1993. Traditional varieties of rice are being collected from Jharkhand and they have reported 1048 varieties of paddy during year 2006-2007. 560 varieties of paddy were from Ranchi district alone. Central Rainfed Upland Rice Research Station (CRURRS), Hazaribagh, Jharkhand, a Regional station of ICAR-National Rice Research Institute, Cuttack, identified 600 rice varieties from Jharkhand. These traditional rice varieties have different special characteristics like insect-pest resistant, flood and drought resistant, nutritional and medicinal properties etc. (Table 4)

Table 4: Traditional Rice Varieties of Jharkhand with their Specific Characteristics

Sl. No.	Specific Characters	Traditional Rice Varieties
1.	Short Duration and drought tolerant	Chennagora, Dani gora, Goindi, Hanskalma, Hendunuri, Kariagora, Punagora and sarpagora
2.	Long duration and flood tolerant	Agnisal, Baghpanjar, Chitrabhog, Dhuniaphool, Gangauli, Hazrimchika, Talsiketki, Tilasari, Tuismanjar, Zolunga
3.	Disease Resistant	Agnisal, AmbaDhopa, Barahasal, Bhodu, Chenna Gora, Dahiya, Haliguri, Hardiphool, Kalajora and Lakra
4.	Insect Resistant	Balagora, BarkalDahiya, BarkalDhusri, Barkagora, Dahnigora, Karhaini, Karmisal, Kherkakhuchi, LalDhun
5.	Aromatic	Bhanaphool, Chandamphool, Chankachoor, Dhaniyaphool, Gobindbhog, Hardiphool, Kalajora, Kapoor bhog, Kalazoha, Manharaphool, Vastabhog, Jeeraphool, Zohakajal
6.	Medicinal	Karhaini, Jayachha, Gudra, Danigora, Karanga

Source: Community gene seed bank, Gene Campaign, BAU, Ranchi

About 300 varieties of scented rice were grown in respective state before the era of high yielding varieties. After green revolution the high yielding varieties have replaced the indigenous varieties in every part of the country. Despite being very high in nutrition and comprising numerous qualities, low yield and poor marketability of indigenous varieties has forced the farmers to shrink the net shown area of these varieties and adopt HYVs having considerably low nutrition. Keeping the above facts in view, KVK, Ranchi has started a new campaign in conservation and promotion of traditional rice varieties since 2013 in collaboration with Protection of Plant Varieties and Farmers Right Authority (PPVFRA). During this campaign, KVK has identified 213 varieties of indigenous rice which have specific characteristics and sent it to PPVFRA, New Delhi for registration in the name of respective farmers. Out of these, 39 farmers (Table 5) have received their certificates as on

date. KVK Ranchi with other Four KVKs of Jharkhand jointly received first prize for special contribution in protection of traditional varieties at Keonjhar, Odisha during a national seminar in 2015.

Table 5: List of Registered Farmer's Varieties and their Distinct Characters

Sl. No.	Registered Farmer's Varieties	Distinct Characters by which farmers' varieties got certificate of registration under PPV & FRA
1	TewunDhan	Decorticated grain:Length : Medium
2	Barabali	Spikelet:Colour of stigma : Purple; Stem : Anthocyanin colouration of nodes: Present; Panicle: Awns: Present
3	Neta Kalani	Flag Leaf : Attitude of blade (Late Observation) : Erect; Spikelet : Colour of tip of Lemma: Purple
4	RageriSona	Panicle: Awns : Absent
5	Safed Lalak	Leaf Pubescence of blade surface: very strong
6	Lauhouchu	Leaf Auricles : Absent
7	Sendoosal	Panicle : Curvature of main axis : Dropping
8	Digambar Dhan-1	Panicle : Attitude of branches : Erect to semi-erect
9	TulsiManjar	Lemma : Anthocyanin colouration of apex : Very strong; Panicle : Length of main axis : Very long; Spikelet : Colour of tip of lemma : Black
10	ChhotaDahiya	Decorticated grain :Colour : Variegated brown
11	Barhabali	Leaf :Colour of ligule : Light purple
12	HadrasalDhan	Decorticated grain : Width : Broad
13	KodhaPhool	Decorticated grain :Colour : Dark Brown
14	Bachu Kolma	Leaf : Anthocyanin colouration of auricles : Purple; Stem : Anthocyanin colouration of nodes : Present; Spikelet : Colour of tip of lemma : Purple; Spikelet : Colour of stigma : Purple
15	Goda	Panicle : Awns : Present
16	Belamsar	Spikelet : Density of Pubescence of lemma : Strong
17	Rajnigandha	Leaf :Colour of ligule : Purple; Spikelet : Colour of stigma : Purple; Stem : Anthocyanin colouration of nodes
18	Kolhinkhosa	Spikelet :Colour of tip of lemma : Purple
20	Hajrakhuta	Leaf : Pubescence of blade surface : Strong; Panicle : Exertion : Well exerted; Decorticated grain : Width : Broad
21	HarikhuntaDhan	Panicle : Awns : Absent
22	Lalsita Sal	Leaf : Pubescence of blade surface : Very strong
23	TulsiMukul	Lemma : Anthocyanin colouration of Apex : Very Strong
24	Dev Dhan	Spikelet :Colour of tip of lemma : Purple
25	Sita Sal Dhan	Panicle : Awns : Absent
26	BaraunGodaDhan	Panicle : Length of main axis : Short
27	JeeraBhog	Flag Leaf : Attitude of blade (late observation) : Deflexed; Panicle : Curvature of main axis: Dropping

28	ArakhataDhan	Leaf : Auricles : Absent; Flag leaf : Attitude of blade (early observation) : Horizontal; Spikelet : Colour of tip of lemma : Yellowish. Sterile lemma : Colour : Red, Decorticated grain : Length : Long shape (in lateral view) : Extra Long slender
29	Charka Dhusri	Panicle exertion mostly exerted 43 of 2017
30	DadkaDhan	Lemma : Anthocyanin colouration of apex : Strong; Panicle : Length of main axis : Strong Panicle : Awns : Present, Decorticated grain : Colour : Dark Brown
31	Nanhya	Panicle : Attitude of branches : Semi-erect
32	NagrabaliDhan	Panicle : Awns: Present
33	Sursuriya	Presence of stem anthocyanin colouration of nodes; Acute leaf colour of ligule; Light purple leaf anthocyanin colouration of auricles
34	DalungodaDhan	Medium panicle length of main axis
35	Safed Hambala	Coloptrile colour : Purple; Presence of stem anthocyanin colouration of nodes; Broad decorticated grain width
36	SonagutiDhan	Medium lemma. Anthocyanin colouration of apex; Broad decorticated grain width
37	Sufal Dhan-1	Absence of panicle awns; High endosperm content of Amylase
38	JerengDhan	Absence of panicle awns
39	LalMotaDhan	Broad decorticated grain width
40	Meghjawain	Spikelet colour of tip of lemma is black

Source: www.plantauthority.com

Short grain scented rice of Jharkhand: Scented rice is being grown in the Indian Subcontinent since the times of Susruta [200 BC (c.400BC-eds.)]. Later (circa 800-900 AD) a large number of aromatic and medicinal properties of rice have been mentioned in *Charak Samhita* and *Kashyapiyakrishiukti*. In *Charak Samhita* aromatic rice is termed as Mahasali, Sugandhaka and Promodaka. In the 9th century Kashyap mentioned that Sali, Kalma, Simbhaka and Vrihi are the types of scented sub group. In ancient era scented rice was favourite of kings and popular in royal families as well as common people. Scented rice varieties have always had a special place in the country due to its unique taste and aroma.

Scented rice is classified into three types on the basis of grain morphology. Long grain type which is usually longer than 6.2 mm, medium grain type which is approx. 2.1 to 2.9 mm and short grain type which is less than twice as long as it is wide. Although, globally popular aromatic rice varieties are mostly long grained, majority of indigenous aromatic rice varieties in India are small and medium grained [8]. These varieties are highly thermo-photosensitive. Scented rice possess aroma in their plant parts and grain also. Molecular study revealed that aroma arose as a mutation in normal rice in the BAD 2 gene. Apart from aroma these rice have good texture and are sweet in taste. Some varieties have medicinal values too. Though, scented rice is found in almost all parts of India, Eastern states, North Eastern States and North Western States have a large number of such varieties. Rice grown in the Eastern and North Eastern states like West Bengal, Orissa, Chattagadh, Bihar, Jharkhand, Assam, Manipur etc. are very short fine grained and highly scented (Table 6). North Western

states like Punjab, Haryana, and Western UP have long grained scented rice known as 'Basmati'. Basmati rice is the premium grade of traditional rice. India is the largest producer and exporter of Basmati rice. India makes up 65% of the export in the world market. Rice (including Basmati and Non-Basmati) occupy the major share in India's total cereals export with 93.7% during the year 2019-20 (apeda.gov.in). The country has exported 50, 40,707.75 MT of Non-Basmati Rice to the world for the worth of Rs. 14,364.64 crores (\$2,014.59 million) during the year 2019-20. As per Indian Agricultural Research Institute (IARI) and APEDA varieties such as Kalanamak, TilakChandan and Jeerabati (Uttar Pradesh), Kalajeera (Orissa), Katrani (Bihar), Ambemohar (Maharashtra), Gobindbhog and Badshahbhog (West Bengal), Dubraj, Badshahbhog and Jawaphool (Chhattisgarh) and Kalajoha (Assam) have been identified which could be harnessed and developed for their export potential [9].

Table 6: List of Popular Short and Medium Grained Scented Rice in India

Sl. No.	Name of State	Heirloom varieties of Scented Rice
1.	Assam	Johna rice, Prasad bhog, Tulshibhog, Kalajeera etc.
2.	Bihar	Gopal Bhog, Sonachur, Shamsjeera, Katrani, Kamsjeera etc.
3.	Chhattisgarh	Dubraj, Vishnu Bhog, JauPhool, Chinnor 1,2, Elaychi etc.
4.	Jharkhand	Tukumkul, Jeerabhog, Rajnigandha, Bhutku, TulsiManjer etc.
5.	Manipur	Chak-hao
6.	Orissa	Dubraj, Thakur bhog, Kala jeera etc.
7.	Uttar Pradesh	Kalanamak, Dhaniya, Hansraj, Ramawain etc.
8.	West Bengal	Badshahbhog, Kala jeera, Tulshibhog, Govindbhog, Sitabhog etc.

Scented rice varieties are highly location specific hence each state has its own special variety of scented rice. One more popular short grained black scented rice of Manipur 'Chak-hao' has medicinal and nutritional value. It protects from cancer and soothes inflammation due to allergies and asthma. The rice gets its dark black or purplish colour because it is rich in anthocyanins, which are powerful antioxidants. The rice contains more vitamin B, niacin, vitamin E, calcium, magnesium, iron, and zinc compared to white rice. Rich in fibre, the grain has a sweet and slightly nutty taste. Recently Manipur has got GI for 'Chak-hao' in the name of 'Manipur Black Rice' (www.outlookindia.com).

More than 1000 indigenous rice varieties are native to Jharkhand but very few of them are having scented rice. Majority of scented rice found in Jharkhand are short grained and some are medium grained. Black husk scented rice varieties are more common than white husk varieties. It is more nutritious due to presence of anthocyanin as antioxidant and iron content. Most of the scented rice varieties are tall (135 cm), Long duration (135 to 155 days) suitable for Lowland. Most of the varieties are prone to lodging but some varieties like Bhutku are lodging resistant. In Jharkhand farmers presently grow scented rice for their own consumption and ceremonial purposes. The short fine grain scented rice is sticky, aromatic and delicious to make sweet dishes like Kheer, Panna etc. The rice is also consumed as steamed rice and the throat gets full of fragrant breeze once eaten.

Table 7: List of Indigenous Scented Rice Identified by KVK, Ranchi

Sl. No.	Name of Scented rice	Grain type	Suitable land for Cultivation
1.	Safed Lalak	Short coarse grain	Upland
2.	Thadmaini	Medium coarse grain	Medium Land
3.	Lal Sita Sal	Medium coarse grain	Medium Land
4.	DigambarDhan 1	Medium coarse grain	Medium Land
5.	TevanDhan	Short Coarse grain	Medium Land
6.	Bachakolma	Medium coarse grain	Low Land
7.	Rajnigandha	Short fine grain	Low Land
8.	HajrakhuntaDhan	Medium coarse grain	Low Land
9.	JeeraBhog	Short fine grain	Low Land
10.	TulsiManjar	Short fine grain	Low Land
11.	Hadrasal	Medium coarse grain	Low Land
12.	Lauhonchi	Short Coarse grain	Low Land
13.	Kolhinkhosa	Medium coarse grain	Low Land
14.	TulsiMukul	Short fine grain	Low Land
15.	MekhiJawan	Medium Fine grain	Low Land
16.	DhaniyaBhog	Short Coarse grain	Low Land
17.	Bhutku	Short fine grain	Low Land

KVK Ranchi has identified some indigenous scented rice (listed in Table 7) which are cultivated in different topography of Jharkhand. Out of the seventeen varieties of scented rice mentioned above, fifteen varieties are registered under PPV & FRA and two varieties namely DhaniyaBhog and Bhutku are under process of registration. Bacha Kolma, Rajnigandha, Meghawnin, TulsiMukul and TulsiManjar are black husk rice and rich source of micro nutrient such as iron and zinc. DhaniyaBhog, is neither slender nor small, it has round grained, unusual looking, aromatic rice has a unique flavour and strong aroma is preferred for making Biryani. Bhutku is one of the most preferred scented rice because it has the potential to give high yield like high yielding varieties. JeeraBhog is a variety which is similar to a very popular scented rice of Tamil Nadu 'Jeeraga Samba'. The grain of the rice is very tiny and it gets its name due to its resemblance to Camu seeds, also called as Seeragam/Jeera in Tamil. Like Jeeraga Samba, JeeraBhog has a very distinct taste and aroma, preferably used in preparation of sweet dish like Kheer and Pysum. Many of the scented rice varieties are having potential to get commercialized and could fetch high premium value in the national and international markets.

IV. KVK INTERVENTIONS FOR REVITALIZING INDIGENOUS SCENTED RICE VARIETIES FOR DEVELOPMENT OF SUSTAINABLE LIVELIHOOD TO THE TRIBAL FARMERS

Since introduction of high yielding varieties (HYVs) during green revolution era native land races have been rapidly squeezed out from production chain (Sharma *et al.*). A number of traditional rice varieties consumed prior to the Green Revolution have now become extinct. A report published in Newspaper, The Hindu stated that, only 6000 traditional rice varieties are now in existence and not all of these varieties are under

cultivation. India has lost more than 1 lakh varieties of indigenous rice after the 1970s that took several thousand years to evolve. Expansion of area under HYVs for enhanced production and productivity has led to fast shrinking of area under indigenous rice varieties which is a major cause of genetic erosion.

Keeping the above facts in view, KVK, Ranchi has been working for conservation and promotion of traditional crop varieties since 2013 in collaboration with Protection of Plant Varieties and Farmers Right Authority (PPV&FRA). The programme was very successful in terms of collection and registration of farmers' varieties but with respect to immediate economic benefits to the farmers there was little scope in near future. Most of the farmers of Ranchi district are marginal and small and the socio-economic condition is very poor to meet both end needs they have to sell their agricultural produce on daily basis. In view, KVK took an initiative with financial support from NABARD, Ranchi to stabilize and promote existing livelihoods portfolio of the farmers of Ranchi district who were involved in PPV&FRA programme. Agriculture is the mainstream livelihoods activity for farmers; KVK has played special focus on sustainable production of indigenous scented rice through maiden project started in the year 2016.

Ten indigenous rice varieties namely Jeerabhog, Tulsimanjar, Tulsimukul, Prasad Bhog, Bhutku, DhaniyaDhog, Mekhjawain, Rajnigandha, Sarakela and Panisayir were selected by KVK under the project with an aim of making it the main source of income to farmers of Ranchi district. Out of ten varieties eight varieties of rice were aromatic rice. Most of the selected varieties were registered on farmers name under PPV&FRA through KVK in 2016 itself. 100 farmers of five blocks were selected under this project. Out of 100 farmers those five farmers who had rightful ownership of the chosen varieties were selected as lead farmers under this project. As indigenous rice is location specific so to maintain the quality, locations were selected in such a way that the varieties pertained to that specific location and where being cultivated there in small pockets. Initially awareness programs were organized in five blocks namely Numkum, Silli, Mandur, Bero and Chanhoof Ranchi district to motivate farmers for restarting cultivation of traditional rice varieties. Crux of these programs was to inculcate the faith among farmers that cultivation of indigenous rice varieties will fetch them higher price over the period.

Table 8: Details of Varieties Chosen for Promotion

Sl. No.	Indigenous rice varieties	Location	Characteristics
1.	Rajnigandha	Soba, Burun, Ranchi	Aromatic rice with small grain type
2.	Tulsimukul	Paka, Silli, Ranchi	Long duration aromatic rice with small grain type suitable in flood condition
3.	Jeerabhog	Losera, Silli, Ranchi	Aromatic rice with small grain type
4.	Prasad Bhog	Hakedig, Silli	Aromatic rice with small grain type
5.	Tulsimanjar	Lundari, Chanho, Ranchi	Aromatic rice with medium long grain type
6.	Sarakela	Juriya, Bero, Ranchi	long grain type
7.	Panisayir	Juriya, Bero, Ranchi	long grain type
8.	BhutkuDhan	Lundari, Chanho, Ranchi	Aromatic rice with small grain type
9.	Dhaniyaphul	Gurgurari, Mandar, Ranchi	Aromatic rice
10.	Mekhjawain	Ratu, Ranchi	Aromatic rice with small grain type



1. **Farmer's participatory varietal screening:** Multi location varietal screening trials were conducted at five locations of lead farmer's field. Farmers were trained in organic rice cultivation. The main aim was to deliver the same quality of the scented rice as well as reduction in cost of cultivation.



Training and formation of seed producer group

The scented rice varieties have abilities to maintain soil health, give sustainable yields and fetch more profit using less input, as their cost of production under good organic management practices is low. After proper training each lead farmer conducted a

varietal screening-cum- package of practices standardization trial in 0.5 acre of his land. All the critical inputs like seed, bio-fertilizers, bio control agents, see weed extracts, pheromone traps etc. were used as part of organic crop management. Pre- and post-harvest data of all the varieties were recorded and evaluated. On the basis of field performance and market preference two scented rice varieties TusiMukul and Bhutku were given better yield than others. These two varieties showed higher yield, lodging resistance and wider adaptability too. These varieties were selected for further multiplication as it has a potential to commercialize seed production.



Nursery Raising of Selected 10 Indigenous Varieties

2. Improved package and practices for traditional scented rice varieties

- **Selection of land:** Most of the scented rice varieties are long duration and suitable for low land areas. The area selected for cultivation of scented rice varieties like Bhutku and TusiMukul was lowland as these varieties mature in 135 to 150 days after sowing. In below average rainfall condition too, these varieties performed well in lowland at Silli and Tamar block of the district. As these soils get deposited from the forest uplands and they are very fertile in nature.
- **Agronomic practices**
 - **Seed rate:** 12-15 kg/ha of pure seed was used for sowing a hectare of land by following single plant transplanting method, which proved good for growth and greater biomass production.
 - **Seed treatment:** Seeds were treated with Beej Sanjivani (1:1:2, Cow urine: cow Dung: water is mixed together and decomposes for 7-10 days in clay pot). Before sowing, seeds dipped in Beej sanjivani solution (1 lit in 750 ml of water) for 12 hrs and such solution is required for 1.0 kg of seed. Floating chaffy seeds were discarded and heavier seed which settle at the bottom were selected. These seeds were kept in jute bag in moist condition for sprouting. After 24 hrs seeds will sprout, this can be shown in nursery beds.

Seedling treatment with PSB (Phospho- Solubilizing Bacteria) leads to strengthen root system so that crop with 150 cm height can resist lodging problem. Suspension of one kg PSB in 10 litres of water for treating of seedlings for one acre was required. Seed and seedling can also be treated with *Trichoderma viride*.

- **Sowing Time:** For nursery rising seeds should be sown in the month of June.
- **Nursery rising:** One-tenth part of the main field is enough to raise healthy seedlings. The field was ploughed twice or thrice under dry condition along with incorporation of 500 kg well decomposed farm yard manure (FYM) with one kilogram *Trichoderma viride* in an area of 1000 m². Thorough puddling followed by leveling is required. Hereafter, divide field in convenient size of beds to have a better control on irrigation and drainage. Sprouted seeds should be broadcasted uniformly in each bed. Irrigate nursery in evening. Hand weeding required at 10 days after sowing (DAS). Prior to transplanting in main field, seedling root should be treated with PSB solution (2.5 kg per 25 lit of water solution is required for seedling treatment for 1 ha) for 30 minutes.
- **Main field preparation:** Green manuring with *Sesbania spp.* is very good for soil conditioning. It should be trampled at 10 days prior to transplanting to allow proper decomposition. 5 ton *Trichoderma viride* seeded Farm Yard Manure need to be incorporated in main field at the time of ploughing along with Karanj enke @1 qtl per acre. Application of liquid organic manures like Sanjivani, Sasyagavya, Panchgavya at 10 days interval is required to compensate the nutrient requirement.
- **Transplanting:** 20 days old seedlings should be transplanted with row spacing of 25 cm. Single plant transplanting method should be followed for better growth of each single plant.
- **Incorporation of azolla:** Azolla has to be broadcasted after 10 days of transplanting. It suppresses growth of associated plants (weeds) and encourages crop growth.
- **Water management:** In Bharkhadal paddy is cultivated in rainfed condition only. In case of limited rain, irrigation should done at the time of tillering, anthesis and grain filling stage of scented rice field.
- **Weed management:** Cono-weeder should be used for mechanical incorporation of weeds for 2 to 3 times at 10 days interval starting from 10-15 DAT. One round hand weeding is also required at 20 DAT for removal of weed between the plants.
- **Plant protection measures:** In organic cultivation, precautionary measures are more important and effective than curative measures for disease, pest control. Funnel T Trap with lure of *Scripophaga incertulus*, Yellow sticky trap, Blue Sticky Trap, Azadiractin 1500 ppm, *Pseudomonas*, *Trichoderma viridae*, *Beauveria bassiana* can be used as precautionary measures. The egg cards (*Tricho* cards, *Trichogramma chilonis*, *Trichogramma japonicum*) containing 1,000 parasitized eggs

are to be stapled to the underside of the leaves at 100 points ha⁻¹ uniformly distributed across the field. *Trichoderma viride* 3.0 g per litre water can be sprayed for 2-3 times starting from 20DAT at an interval of 15 days to prevent different diseases.

A bio pesticide Dasparni (A botanical made from extracts of 10 different types inedible leaves found in the localitye.g.*Vitex negundo*, *Lantana camara*, *Argemone maxicana*, *Adhatodavasika*, *Calotropis gigantean*, *Pongamia pinnata*, *Anona squamosa* etc.) should be sprayed at 15 days interval starting from 20 days after of transplanting (DAT) to control sucking pest.

- **Harvesting and threshing:** Harvesting should be done when the panicles are mature (about 70%) and the straw has just turned yellow. For the purpose of seed, harvesting should be done from the middle part of the field. Harvested paddy should be dried and cleaned properly for better & long time storage.

V. SEED PRODUCTION OF POTENTIAL VARIETY

Without quality seeds, the output would be very less despite of huge expenditure on other agricultural inputs. Hence, after initial work for screening and standardization it was necessary to produce quality seed to facilitate further expansion of area under these varieties. One Seed producer group in each selected village and trained in seed production of paddy. After proper training farmers were engaged in participatory seed production programme. Seed production was taken in 12.75 acre land against targeted area of 5 acre due to increasing demand among stakeholders.

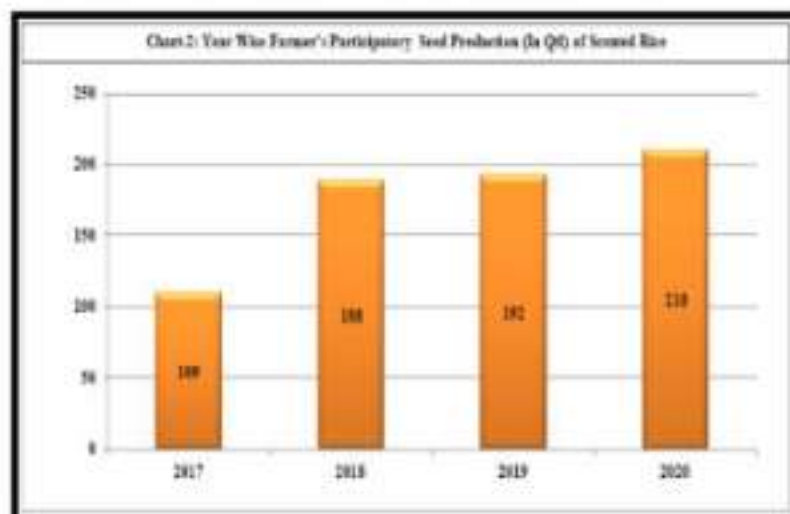


Seed Production of Tulsi Mukul at Farmer's Field



Processed Seed of Tulsi Mukul Ready for Sale

All the quality control measures were followed for pure seed production. Specially roguing was done 3 to 4 times for getting pure seed and avoids any type of mixture in seed. 109 qtl seed of Bhutku and Tulsi Mukul seed were produced in very first year (2017-18). To provide market to farmers and expansion in area under scented rice production KVK purchased seed from farmers and processed for further sale and production. In year 2020-21, 210 qtl seed of scented rice was produced under farmer's participatory seed production programme as shown in Chart-2. Farmers expressed their reaction on the palatability of straw of these varieties as the straw was preferred by cattles over the straw of HYVs.



Commercial production and area expansion of indigenous scented rice: KVK formed five groups (One at each village) for commercial production of scented indigenous rice and to establish proper marketing channel.



Bhutku Rice Field under Commercial Production

A survey was done by KVK to assess the demand and supply of scented rice in Ranchi. It was observed that indigenous scented rice is not being marketed however rice with same phenotype with artificial aroma is being sold on name of Sonachur between ₹80-100 per Kilogram. Therefore, indigenous scented varieties with naturally good taste and aroma will have great scope in organized market. Farmers were trained in commercial production, milling and packaging of scented rice. All supports like seed, bio fertilizers, bio agents etc. for production, milling facility, automatic sealing machine, and triple layer perfectly designed rice packet were given to the group for successful marketing of scented rice. Farmers of the group were visited ICAR- National Rice Research Institute, Cuttack, Odhisa for better exposure and skill training.

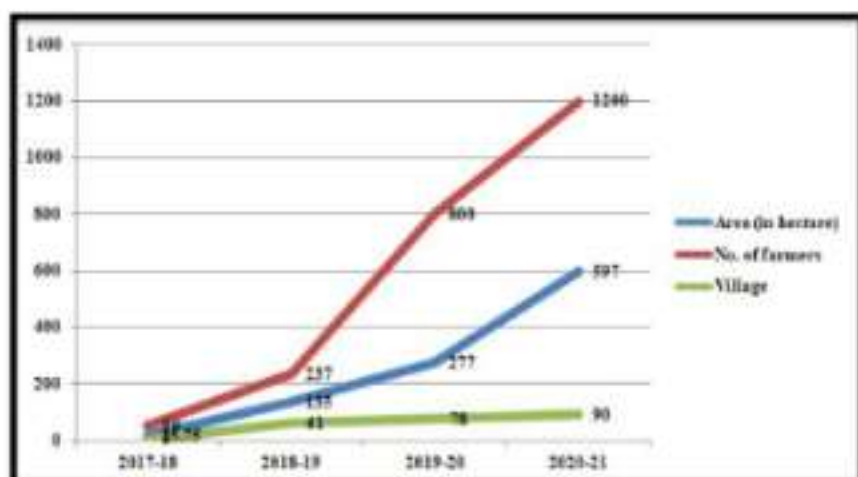


Promotion and Launching of Scented Rice Packet

In 2017 -18 various types of promotional activities were conducted by KVK like Kisan Mela, Kisan Gosthi, and other promotional program on scented rice for wide publicity of the organically grown indigenous scented rice produced by farmers. The steps being taken to tie the farmers with the market so that they would get good return and will be encouraged to continue the practice. KVK has given marketing support to scented rice farmers and provided place in well-established sale counter, which is situated in the heart of the Ranchi city for selling of their rice. Today demand is very high of this scented rice due to its unique aroma

and taste. Many groups inspired from the intervention also opted these varieties and started their cultivation in adjoining districts like Gumla, Khunti etc. with the guidance and seed from KVK, Ranchi. The trend of increasing in area, number of farmers and villages covered is shown in chart-3.

Chart 3: Showing Increase in Area, no. of Farmers and Villages Covered Year on Year Basis under Scented Rice Cultivation



Final Product Ready for Sale

The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e. fetching Rs. 25- 30 per kg for indigenous paddy as compared to Rs.15 per kg for HYVs (Table 9). Now they are getting premium price for their quality product. At present, farmers are selling scented rice at Rs.80/- per kg after milling and packaging. There are two major benefits to the scented rice growers like 47 % saving in input cost and getting 42 % higher price than other paddy.

Table 9: Comparative Study on Production between Scented variety and HYV Paddy

SL No.	Particulars	Scented Rice	Improved variety
1.	Cost of cultivation (Rs. /acre)	14050.00	26313.00
2.	Yield (qtl/acre)	12.00	20.00
3.	Selling Price (Rs. /qtl)	3000.00	1750.00
4.	B: C Ratio	2.56	1.33

VI. WAY FORWARD

Cultivation of Hybrid paddy deserves continuation for economic and food security. This is essential for GDP growth and economic empowerment of farming community as rice is providing direct employment to 70% people in rural areas in the country. So it is important to explore a viable economic use of traditional varieties which will prevent these from getting extinct as well as help in maintaining cultural heritage. Though the diversity of small grained scented rice is un-explored and researchers give little emphasis on them, there is still a great scope to improve their ideotype, better yielding and molecular aspects[10].

Research and extension for traditional rice varieties having marketing potential should be taken into consideration and their inherent qualities may be exploited for value addition. As the cultivation of traditional rice varieties is dependent on the price received, GI (Geographical Indication) tagging will help in realizing premium prices and attract more farmers to traditional rice cultivation [11].

VII. CONCLUSION

Since traditional rice varieties are well adapted to marginal lands requiring less inputs, it gives an opportunity to reintroduce the scented rice varieties, in particular, for sustainable production with local resource based low-cost organic cultivation. Farmers who are involved in organic production should be encouraged through different Govt. schemes initially. For better pricing of traditional rice varieties focus should be given on characterization and evaluation of nutritional and medicinal properties of these particular rice varieties. Farmers who are already involved in scented rice cultivation have become self-sufficient in seed because these farmers are saving their seeds from every year's crop and using it in the next season. Seed production of indigenous rice variety is also helping in restoring back the lost biodiversity. Pure seed is very critical input for increasing productivity and quality of scented rice. Cultivation of indigenous varieties by using balanced natural resources is efficiently strengthening soil as well as restoring the depleting ecosystem.

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Ramakrishna Mission Vivekananda Educational & Research Institute
(Deemed-to-be-University)
Ranchi Faculty Centre

Heirloom Varieties of Scented Rice- Reviving Food, Taste, Nutrition and Improving Sustainability of Farmers

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Rice is a "Holy Grain" and an integral part of our tradition. It is a symbol of cultural identity and global unity. The earliest records indicate the use of rice as an offering to god. This tradition is also carried out in the present time. The Mahabhog Prasad which is an offering to Goddess Durga in Durgapuja is prepared by scented rice. Scented rice is being grown in the Indian Subcontinent since the times of Susruta [200 BC (c.400BC-eds.)]. Later (circa 800-900 AD) a large number of aromatic and

medicinal properties of rice have been mentioned in *Charak Samhita* and *Kashyapkrishisukti*. In *Charak Samhita* aromatic rice is termed as Mahasali, Sugandhaka and Promodaka. In the 9th century, Kashyap mentioned that Sali, Kalina, Sambhaka and Vrihi are the types of scented sub group. In ancient era, scented rice was favourite of the kings and popular in royal families. Scented rice has always had a special place in the country due to its unique taste and aroma.

Table 1. Basmati vs. Non- Basmati type of scented rice

Features	Basmati	Non- Basmati
Commonly grown	Northern and West part of the country	Eastern part and North-eastern part of the country
Climatic requirement	Warm & humid	Temperate
Grain Size	Long grained	Small & medium grained
Kernel length	more than 6.2 mm	2.1-2.9 mm
Quality	Export quality	do not have well developed market
Demand	World-wide	region specific
Reason for cultivation	Fetches three times high prices than Non-Basmati rice	Producers mainly grow for their own consumption and ceremonial purpose

Scented rice is classified into three types on the basis of grain morphology. Long grain which is usually longer than 6.2 mm, Medium grain is approx. 2.1 to 2.9 mm and short grain type is less than twice as long as it is wide. These varieties are highly thermo-photosensitive. Scented rice possesses aroma in their plant parts and grain. Molecular study revealed that aroma arose as a mutation in normal rice in the BAD-2 gene. Apart from aroma these rice have good texture and are sweet in taste. Some varieties have medicinal values too. Though scented

rice is found in almost all parts of India, only Eastern states, North Eastern States and North western States have a large number of such varieties. Rice grown in the Eastern and North Eastern states like West Bengal, Orissa, Chhattisgarh, Bihar, Jharkhand, Assam, Manipur etc. are very short but fine grained and highly scented. North Western states like Punjab, Haryana, and Western UP have long grained scented rice known as 'Basmati'. The term Basmati has been derived from two Sanskrit word 'Vas' and 'Mayup'. The meaning of Vas is

aroma and Mayup means ingrained. Basmati rice are the premium grade of traditional rice. India is the largest producer and exporter of Basmati rice. India makes up 63% of the export in the world market. Basmati has its unique flavour and fragrance due to

chemical compound 2-acetyl-1-pyrroline. The export varieties of Basmati are Basmati 385, Basmati 370 and B.5. Para Basmati which is of extra-long grain type.

Table 2. List of popular short & medium grained Scented Rice in India

S. No.	Name of State	Heirloom Varieties of Scented Rice
1.	Assam	Joha rice, Praiad bhog, Tulsi bhog, Kalajeera etc.
2.	Bihar	Lupat Bhog, Samachur, Shamsheera, Katura, Kamajheera etc.
3.	Chhattisgarh	Dubraj, Vishnu Bhog, Jau Phoul, Chinnur 1,2, Elaychi etc.
4.	Jharkhand	Tulsi mukul, Jecra bhog, Rajnigandha, Dhutka, Tulsi Manjar etc.
5.	Manipur	Chak hoo
6.	Orissa	Dubraj, Thakur bhog, Kala jeera etc.
7.	Uttar Pradesh	Kalanamak, Dhanya, Hansraj, Ramjawali etc.
8.	West Bengal	Badshahbhog, Kala jecra, Tubi bhog, Govind bhog, Sita bhog etc.

Scented rice is highly location specific hence each state has its own special variety of scented rice. One more popular short grained black scented rice of Manipur 'Chak how' has medicinal and nutritional value. It protects from cancer and soothes inflammation due to allergies and asthma. The rice gets its dark black or purplish colour because it is rich in anthocyanins, which are powerful antioxidants. The rice contains more vitamin B, niacin, vitamin E, calcium, magnesium, iron, and zinc compared to white rice. Rich in fibre, the grain has a sweet and slightly nutty taste. Manipuri's consumed it during the community feast.

Diversity of Scented Rice in Jharkhand

More than 1000 indigenous rice varieties are native to Jharkhand but among them scented rice varieties are very few. Majority of scented rice found

in Jharkhand are short grained and some are medium grained. Black husk scented rice varieties are more common than white husk varieties. It is more nutritious due to presence of anthocyanin as antioxidant and iron content. Scented rice varieties are tall (155 cm), Long duration (135 to 135 days) and suitable for Dm 1 (Lowland). Most of the varieties are prone to lodging but some varieties like Bhutka are lodging resistant. In Jharkhand farmers grow scented rice for their own consumption and ceremonial purposes. The short fine grain scented rice is sticky with aroma, is delicious to make sweet dish like Khoe, Pysam etc. The rice is also consumed as steamed rice and the throat gets full of fragrant breeze once eaten. A variety of scented rice, Bhana Phool, is neither slender nor small, this round grained, unusual looking, aromatic rice has a unique flavour and strong aroma is preferred for making Biryani.

Table 3. Heirloom varieties of scented rice cultivated in different topography of Jharkhand

S. No.	Name of Scented rice	Grain type	Suitable land for Cultivation
1	Safed Lalak	Short coarse grain	Upland
2	Chudmani	Medium coarse grain	Medium Land
3	Lal Sita Sal	Medium coarse grain	Medium Land
4	Digambar Dhan 1	Medium coarse grain	Medium Land
5	Tevan Dhan	Short Coarse grain	Medium Land

6	Rachakelma	Medium coarse grain	Low Land
7	Rajnigandha	Short fine grain	Low Land
8	Hajraklanta Dhan	Medium coarse grain	Low Land
9	Jeera Bhag	Short fine grain	Low Land
10	Tulsi Manjar	Short fine grain	Low Land
11	Hadrasal	Medium coarse grain	Low Land
12	Laubhanchi	Short Coarse grain	Low Land
13	Kalhin khosa	Medium coarse grain	Low Land
14	Tulsi Mukul	Short fine grain	Low Land
15	Mekhlajewain	Medium Fine grain	Low Land
16	Dhaniya Phul	Short Coarse grain	Low Land
17	Bhanka	Short fine grain	Low Land

Specific Features of Scented Rice Varieties of Jharkhand:

- ❖ Scented rice has nutritional and medicinal value.
- ❖ The caloric content in the indigenous varieties is high and for this reason the tribal people prefer to eat these varieties. The cooked rice is nonperishable in nature and can be consumed after second day also when soaked in water and this type of preparation is locally known as "Pakhhal Bhat".
- ❖ Some scented rice varieties like Mekhlajewain, Rajnigandha, Tulsimukul, Dhaniphalul etc. have commercial value in the present-day world, which are locally available in Ranchi district.
- ❖ In the present scenario where impact of climate change on crop is a major concern, the indigenous scented rice varieties like Dhaniphalul, Tulsi Manjar etc. are tolerant to biotic and abiotic stresses.
- ❖ Indigenous varieties of rice are naturally suited to organic farming, as they need less inputs in the form of fertilizers or support in the form of pesticides and herbicides. This quality is the answer to growing health hazards due to excessive use of fertilizers and pesticides in high yielding varieties.

Present Status

About 3(0) varieties of scented rice were grown in respective state before the era of high yielding varieties. After green revolution the high yielding varieties have replaced the indigenous

varieties in every part of the country. Despite being very high in nutrition and comprising numerous qualities, low yield and poor marketability of indigenous varieties has forced the farmers to shrink the net shown area of these varieties and adopt HYVs having considerably low nutrition.

Limitations to Expansion

- ❖ Scented rice is area specific and they perform only in their respective areas.
- ❖ No organized market for small and medium grained scented rice.
- ❖ The prices of short grained scented rice are lower than long grained Basmati type.
- ❖ No price support or any incentives from Govt. to farmers of native aromatic rice growing areas to convince them not to shift to other cultivars.
- ❖ Unavailability of quality seed and unorganized seed production of scented rice.
- ❖ Absence of proper irrigation facility to ensure availability of water in scarcity of rain and erratic rainfall as scented rice cultivation needs more water than non-scented rice.
- ❖ Lack of technical knowhow or improved management practices.

Role of KVK in Conservation & Promotion of Scented Rice

Paddy is the major staple food in Jharkhand and it is farmer's choice crop in the state. Existence of large number of indigenous varieties are having good traits like disease resistance, flood resistance, drought resistance, nutritional qualities, taste, medicinal qualities etc. helps in development of new

varieties for further agricultural development. Expansion of area under HYVs for enhanced production and productivity leading to fast shrinking of area under indigenous varieties, is a major cause of genetic erosion. Use of HYVs over large areas for increasing yield has reduced the crop resistance to a lower level thereby more chemical application as nutrient supplement and pesticides are required. Local indigenous varieties have adjusted over long periods to the ecosystems of their growing regions including environmental and climatic variations, thus ensuring at least sustainable level of output even in bad years.

Highlights of KVK Interventions

- ❖ Varietal selection in multi-location trial, Bhutka and Tulsi Mukul are potential varieties having high yield, lodging resistant and wider adaptability. They are selected for seed production as well as commercial production in the succeeding year.
- ❖ The traditional farming is coupled with scientific organic farming to retain the aroma and taste which is uniqueness of this variety.
- ❖ The method of sowing is a mixture of procedures adopted in traditional and SRI method. The paddy seedlings are transplanted after 20 days in lines with spacing 25 cm with only one and two seedlings.
- ❖ Nursery is grown by using 'Dapog' method to minimize the root shock of seedling during uprooting.
- ❖ Seedling treatment with PSB culture and Green manuring by *Sesbania* spp.

Keeping the above facts in view, KVK, Ranchi has been working in conservation and promotion of scented rice varieties since 2013 in collaboration with Protection of Plant Varieties and Farmers Right Authority (PPVFR) and NABARD, Ranchi. Under this 2 to 3 awareness programmes are organized every year at different villages of Ranchi district. As of now about 1500 farmers have joined this campaign. During this campaign, KVK has identified 159 varieties of indigenous rice which have specific characteristics and sent it to PPVFR, New Delhi for registration in the name of respective farmers. Out of these, 33 farmers have received their certificates as on date. Around 10 scented rice varieties were selected by KVK for commercial production with an aim of making it the main source of income to farmers of Ranchi district. KVK demonstrated these varieties under multi location trial for varietal selection of scented rice. Two scented rice varieties namely Bhutka and Tulsimukul were selected on the basis of yield, lodging resistance and water adaptability. KVK has put special efforts on development of improved package and practices thus increasing the yield of these two varieties. KVK has been producing pure seed of these two varieties and making it available for farmers on time. As of March 2019, 237 farmers are now cultivating scented rice and earning their livelihood. The benefit of cultivation of indigenous scented rice is evident from farmer's income getting doubled i.e. fetching Rs. 30 per kg for indigenous paddy as compared to Rs.15 per kg for HYVs. In addition, there is support from NABARD, Ranchi in packaging and marketing of scented rice. At present, farmers are selling scented rice at Rs.70/- per kg after milling and packaging.

Table 4. Comparative Study on Production between Scented variety and HYV Paddy

S. No.	Particulars	Scented Rice	Improved variety
1	Cost of cultivation (Rs./acre)	14050	26313
2	Yield (q/acre)	12	20
3	Selling Price (Rs./q)	4000	17500
4	D: C Ratio	2.56	1.33

Cultivation of hybrid paddy deserves continuation for economic and food security. This is essential for GDP growth and economic empowerment of farming community as rice providing direct employment to 70% people in rural

areas in the country. So, it is important to explore a viable economic use of traditional varieties which will prevent these from being extinct as well as help in maintaining cultural heritage. Though the diversity of small grained scented rice is un-

exploited and researchers give little emphasis on them, there is still a great scope to improve their and methionine), chlorophyll and metabolites including coenzyme A, biotin, thiamine, or vitamin B1 and glutathione. It activates many proteolytic enzymes, increase root growth and nodule formation and stimulate seed formation. Soil of 40 percent of the area is low (20 mg kg⁻¹) in available Sulphur content. It can be concluded that application of fertilizers as per soil health card recommendation will be helpful in soil fertility and crop production. Soil health card may play significant effect on increasing crop yield. There is a still scope to increase crop production and in turn productivity. Distribution of soil health card will not serve the purpose of the scheme, serious efforts are needed by the extension machinery to convince the farmers to use recommended doses for obtaining sustainable yields over a period of time.

ideotype, better yielding and molecular aspects,

Media Coverages



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09 07 2008

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There is evidence to suggest that the use of a single dose of a vaccine is more effective than a series of doses. This is because the immune system is able to respond to a single dose of a vaccine and produce a long-lasting immune response. This is why a single dose of a vaccine is often used for the prevention of certain diseases.



with the same results.

[illegible]

10-10-1998

संविधान के अन्तर्गत, भारत के नागरिकों को निम्नलिखित अधिकार प्राप्त हैं:

66 *Don't think people are more athletic anymore. It's just that the old economy had more time to get into the gym. Now, when you have a job, you have to get out.*

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

66 中国书画函授大学肇庆分校建校二十周年纪念册

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1998

वैज्ञानिकों ने उन्नत खेती से लाभ की दी जानकारी



Source: The author's calculations based on data from the 1990 Census of the United States.

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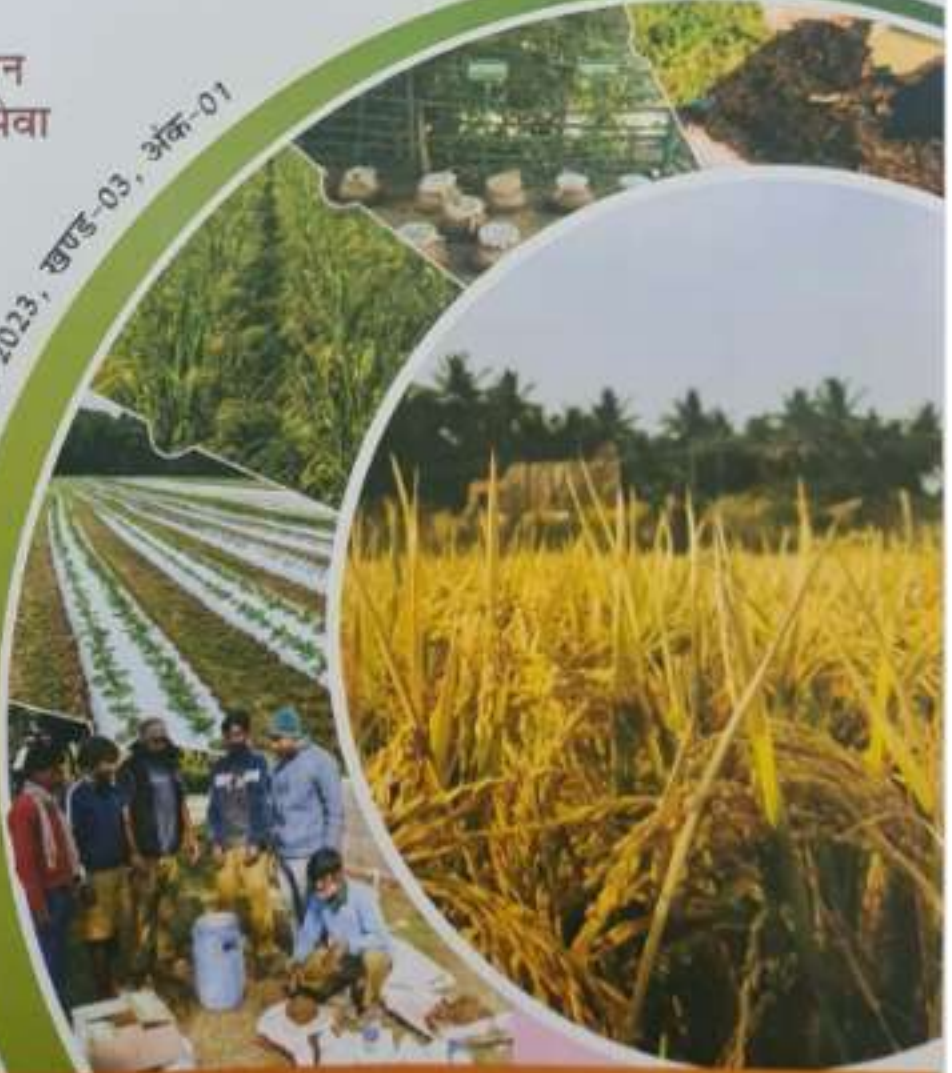
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(Quarterly Journal of Agriculture and Rural Development)

शिव ज्ञान
से जीव सेवा

अप्रैल-जून, 2023, खण्ड-03, अंक-01



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कृषि विज्ञान संवाद

देशी किस्मों का संरक्षण: नये किस्मों के विकास के लिए आवश्यक

द्वितीय विश्व युद्ध के पश्चात् बढ़ती आबादी एवं खाद्यान्न सुरक्षा के कारण हमारे देश में रसायनिक उपादानों का उपयोग आरम्भ हो गया। सन् 1965 में भारत में हरित क्रांति का आगमन हुआ जिससे अन्धाधुंध रसायनिक उर्वरक एवं कीटनाशी का उपयोग बढ़ा साथ ही अधिक उपज देने वाली किस्मों के प्रयोग से हमारे देश की फसल उत्पादकता बढ़कर दुगुनी हो गई। तत्कालीन परिस्थितियों को देखते हुए एवं अन्न की स्व-निर्भरता के लिए निश्चित ही यह आवश्यक कदम था परन्तु इसका एक विपरीत स्वरूप हमारे आज की एवं भविष्य में आने वाली पीढ़ियों के लिए नई समस्या बनकर सामने आ खड़ा हुआ है उन्हीं समस्याओं में से एक है अधिक उपज देने वाली किस्मों के विकास एवं उसके बढ़ते प्रचलन से देशी किस्मों का विलुप्त होना और जैव विविधता का हास। आज के समय में कृषि वैज्ञानिकों के लिए यह समस्या एक बड़ी चुनौती के रूप में सामने आई है। जहाँ एक ओर अधिक उपज देने वाली किस्मों के उपज में स्थिरता आ गई है वहीं दूसरी तरफ़ वैसी किस्मों की कमी होती जा रही है जो आज के जलवायु परिवर्तन का सामना कर सके साथ ही निरन्तर उत्पादन दे सके। इन समस्याओं का एकमात्र हल देशी किस्मों का संरक्षण है जो कि भविष्य में तैयार किए जाने वाले विभिन्न किस्मों के विकास का मुख्य अङ्गार होगी।

देशी किस्मों के संरक्षण की आवश्यकता क्यों ?

- देशी किस्मों में प्राकृतिक रूप से प्रतिकूल परिस्थितियों से लड़ने की क्षमता अधिक होती है जैसे सूखा सहने की क्षमता, अधिक पानी सहने की क्षमता आदि।
- देशी किस्मों में रोग रोधी एवं कीट रोधी गुण होते हैं जिससे ये कीटनाशी एवं फफूंदनाशी के दुष्प्रभावों से स्वतंत्र होते हैं।

- देशी किस्मों में विभिन्न क्षेत्रीय दशाओं के प्रति अधिक अनुकूलता पाई जाती है जिससे जिन क्षेत्रों में खेती नहीं होती है वहाँ भी इन किस्मों की खेती की जा सकती है।
- जैविक विधि द्वारा खेती करने पर देशी किस्में अधिक उपज देती हैं। देशी किस्में उर्जा से भरपूर एवं स्वाद में बेहतर होती हैं। कई देशी किस्मों में औषधीय गुण विद्यमान होते हैं।

भारत सरकार कृषि मंत्रालय द्वारा देशी किस्मों के संरक्षण हेतु एक पहल

देशी किस्म एवं कृषक अधिकार के संरक्षण हेतु 2009 में भारत सरकार द्वारा एक अधिनियम पारित किया गया जिसे श्वीधा किस्म एवं कृषक अधिकार संरक्षण अधिनियम 2009 के नाम से जाना जाता है। इस अधिनियम में कृषक के हितों की रक्षा के लिए पर्याप्त प्रावधान किए गए हैं। अधिनियम के प्रावधानों को लागू करने के लिए कृषि एवं सहकारिता विभाग, कृषि मंत्रालय ने 11 नवम्बर 2005 को पौधा किस्म और कृषक अधिकार संरक्षण प्राधिकरण की स्थापना की। प्राधिकरण का मुख्य कार्य देशी किस्मों के संरक्षण हेतु उनका पंजीकरण, पंजीकृत किस्मों के गुणों का विकास व उनका प्रलेखन, कृषकों को देशी किस्मों के संरक्षण के लिए मान्यता प्रदान करना एवं पुरस्कृत करना आदि।

देशी किस्मों के संरक्षण के लिए पंजीकरण की आवश्यकता एवं प्रक्रिया

वर्ष 2009 से पूर्व देशी किस्में जो कृषकों द्वारा अपने खेत में परंपरागत रूप से उगाई व विकसित की गईं हो या ऐसी वन्य संबंधी या मूल प्रजाति जिसके बारे में कृषकों को सामान्य ज्ञान हो कृषक किस्म की श्रेणी में नहीं सम्मिलित थे। साथ ही उससे कृषकों को कोई अतिरिक्त लाभ प्राप्त नहीं होता था। कोई भी व्यक्ति

कृषक किस्म को अपना बताकर अपने नाम से विकसित कर देता एवं उससे होने वाले लाभ पर उसी का अधिकार होता था जबकि लाभ का कुछ भाग कृषकों को भी मिलना चाहिए था। इसी समस्या के समाधान हेतु देशी किस्मों का पंजीकरण कार्यक्रम भारत सरकार द्वारा आरम्भ किया गया जिससे कि कृषकों को अपने किस्मों का मालिकाना हक प्राप्त हो सके साथ ही यदि ये किस्में किसी अन्य किस्म के विकास में सहायक होती हैं तो कृषकों को रॉयल्टी एवं आर्थिक लाभ प्राप्त हो।

प्रक्रिया

- पंजीकरण हेतु सर्वप्रथम कृषकों को प्राधिकरण द्वारा निर्गत फॉर्म में आवेदन करना होता है। कृषकों के लिए यह आवेदन नि:शुल्क है।
- आवेदन कृषक कृषक का समुदाय एवं कृषक के समूह किसी भी रूप में कर सकते हैं।
- आवेदन के लिए संबंधित संस्था से सम्पर्क कर कृषक आवेदन भरते हैं एवं वहाँ से उनके आवेदन पत्र स्थापन हेतु जिला कृषि पदाधिकारी को भेजा जाता है।
- स्थापन के पश्चात् आवेदन को मुख्य कार्यालय नई दिल्ली भेजा जाता है जहाँ पर फॉर्म का प्रारम्भिक जाँच करने के पश्चात् नमूने की माँग की जाती है।
- चयनित किस्मों के नमूनों को जाँच के लिए प्राधिकरण कार्यालय नई दिल्ली भेजा जाता है।
- जाँचोपरांत यदि ये किस्में विशिष्टता, एकरूपता एवं स्वादित्व के मापदण्डों के अनुरूप होती हैं तो उसे प्राधिकरण द्वारा पात्रता प्रमाण पत्र दे दिया

जाता है जिससे कृषकों को उसके किस्म का मालिकाना हक प्राप्त हो जाता है।

देशी किस्मों के प्रति कृषकों की घटती रुचि

हरित क्रांति के पश्चात् अधिक उपज देने वाली किस्मों के विकास के कारण कृषकों द्वारा देशी किस्मों की ओर से रुचि घटने लगी जिसका मुख्य कारण देशी किस्मों में उपज की कमी थी। परन्तु ये देशी किस्में आज के अधिक उपजशील प्रजातियों के जनक हैं। इन्हें वापस से खेती में लाने के लिए इनकी पैदावार को बढ़ाने की आवश्यकता है साथ ही बाजार की अच्छी व्यवस्था करने की जरूरत है कृषकों को देशी किस्मों के महत्व को समझने की आवश्यकता है नहीं तो हमारी 50 प्रतिशत रोप बची जैव विविधता भी समाप्त हो जाएगी।

देशी किस्मों के संरक्षण से लाभ

- देशी किस्मों के पंजीकरण के पश्चात् किसान को 37 वर्षों के लिए मालिकाना हक प्राप्त हो जाता है।
- यदि कृषक/देशी किस्म किसी नई प्रजाति के विकास में सहायक होती है तो किसान को रॉयल्टी व आर्थिक लाभ मिलता है।
- जो किसान देशी किस्मों के संरक्षण का कार्य करते हैं उन्हें प्राधिकरण द्वारा प्रत्येक वर्ष राष्ट्रीय स्तर पर सम्मानित किया जाता है जिसमें दस कृषकों को एक लाख रुपये व प्रशस्ति पत्र दिया जाता है और बीस कृषकों को स्मृति चिह्न व प्रशस्ति पत्र दिया जाता है।

कृषक एवं जमीन कृषक किस्मों के संरक्षण के लिए

News / फसलें / आखड़ा / देशी किस्म के धान को संरक्षित करके रॉयल्टी कमा सकते हैं किसान, यह है तरीका

किसान तक के चैनल से जुड़ें

देशी किस्म के धान को संरक्षित करके रॉयल्टी कमा सकते हैं किसान, यह है तरीका

धान की परंपरिक किस्मों के संरक्षण के लिए कृषक अधिकार प्राधिकरण का गठन किया गया है जिसका मुख्य कार्य देशी किस्मों के संरक्षण के लिए उनका पंजीकरण, पंजीकृत किस्मों के गुणों का मूल्यांकन और उनका प्रलेखन, कृषकों को देशी किस्मों के संरक्षण के लिए गान्यता प्रदान करना एवं पुरस्कृत करना है।

ADVERTISEMENT



रishi कुमार

Ranchi, Jun 08, 2023, Updated Jun 08, 2023, 10:44 AM IST



सरीस सौजन शुरू होने वाला है, पहली बारिश के साथ ही किसान भाई खरीफ फसल की खेती के लिए खेत की तैयारी करना शुरू कर देंगे, देश में धान खरीफ की प्रमुख फसल है, सदियों से इसकी खेती देश में हो रही है, मौसम, जलवायु और क्षेत्र विशेष की भौगोलिक स्थिति के हिसाब से किसान धान की अलग अलग खेती करते थे, जो बिल्कुल देशी बीज थी, पर बदलते वक़्त के साथ हाइब्रीड बीजों का दौर आया, और किसानों के पास से पारंपरिक देशी नस्ल खत्म होते गए, हाइब्रीड धान से बेहतर अच्छा उत्पादन हासिल हुआ पर गुणवत्ता में कमी आई और इसके साथ साथ कई रोग और कीट भी खेतों में आ गए,

अब जब देशी किस्म के बीज विलुप्त होने के कगार पर पहुंच गए हैं तो इसके संरक्षण पर जोर दिया जा रहा है ताकि इन पारंपरिक किस्मों को बचाया जा सके, इसके लिए कृषक अधिकार प्राधिकरण का गठन किया गया है जिसका मुख्य कार्य देशी किस्मों के संरक्षण के लिए उनका पंजीकरण, पंजीकृत किस्मों के गुणों का विकास और उनका प्रलेखन, कृषकों को देशी किस्मों के संरक्षण के लिए गान्यता प्रदान करना एवं पुरस्कृत करना है, इसके अलावा अगर किसानों द्वारा दी गई धान की पारंपरिक किस्म का उपयोग नए किस्म के विकास के लिए होता है तो उसकी रॉयल्टी किसान को दी जाती है,

देशी धान को पंजीकृत कराने की प्रक्रिया

- पंजीकरण हेतु सर्वप्रथम किसानों को कृषक अधिकार संरक्षण प्राधिकरण द्वारा निर्गत फॉर्म में आवेदन करना होता है, यह आवेदन पत्र किसानों को निशुल्क दिया जाता है,
- आवेदन कृषक, कृषक का समुदाय एवं कृषक के समूह किसी भी रूप में कर सकते हैं,

- आवेदन के लिए संबंधित संस्था से सम्पर्क कर कृषक आवेदन भरते हैं एवं वहां से उनके आवेदन पत्र स्थापन हेतु जिला कृषि पदाधिकारी को भेजा जाता है,
- स्थापन के बाद आवेदन को मुख्य कार्यालय, नई दिल्ली भेजा जाता है जहां पर फॉर्म की प्रारम्भिक जांच करने के बाद नमूने की मांग की जाती है
- चयनित किस्मों के नमूनों को जांच के लिए प्राधिकरण कार्यालय, नई दिल्ली भेजा जाता है,
- जांच के बाद यदि ये किस्में विशिष्टता, एकरूपता एवं स्थायित्व के मापदण्डों के अनुरूप होती है तो उसे प्राधिकरण द्वारा वास्तव प्रमाण पत्र दे दिया जाता है जिससे कृषकों को उसके किस्म का मालिकाना हक प्राप्त हो जाता है.

Farmers Problems: न सिर्फ़ खेती किसानों को सताती हैं ये परेशानी, देखें वीडियो | ...



देशी किस्मों के संरक्षण से लाभ

- देशी किस्मों के प्रजीवकरण के बाद किसान को 15 वर्षों के लिए मालिकाना हक प्राप्त हो जाता है,
- यदि कृषक/देशी किस्म किसी नई प्रजाति के विकास में सहायक होती है तो किसान को खेपल्टी व आर्थिक लाभ मिलता है।
- जो किसान देशी किस्मों के संरक्षण का कार्य करते हैं उन्हें प्राधिकरण द्वारा प्रत्येक वर्ष राष्ट्रीय स्तर पर सम्मानित किया जाता है जिसमें दस कृषकों को एक लाख रुपये व प्रशस्ति पत्र दिया जाता है और बीस कृषकों को स्मृति चिह्न व प्रशस्ति पत्र दिया जाता है.

ये भी पढ़ें:

Paddy Farming: धान की पारंपरिक किस्मों का संरक्षण क्यों है जरूरी... जानें इसके फायदे

Programme:

में, / To,

प्रसार भारती
PRASAR BHARTI

दूरदर्शन
DOORDARSHAN

कृषि दर्शन
इंटरनेट सेन्टर

दूरदर्शन - कार्यक्रम-1

अनुच्छेद 4-10-8/4-10-9 देखिए

DD-P-1

(See Para 4-10-8/4-10-9)

भाषण/साक्षात्कार/परिचर्चा/लघु कथा
SPEECH/INTERVIEW/DISCUSSION/SHORT STORY

वैज्ञानिक प्रौद्योगिकी प्रजनन विभाग

के.वी.के. दिव्यायन, मोरावादी, रांची, 834001

08/07/2021

दिनांक

Date

श्री/श्रीमती/महोदय,

Sir/Madam,

इस पत्र के पीछे छपी शर्तों पर नीचे लिखे विषय, दिनांक और समय पर आपकी काल/लघुकथा सहित प्रसारित करेंगे। कृपया
न पुष्टिपत्र को बिना धरकर और उस पर अपने हस्ताक्षर करके दिनांक _____ तक हमें लौटा दें।

We shall be pleased to telecast your talk(s)/short story on the subject, date and time/detailed below upon the condi-

tion that the _____

क	"कृषि दर्शन" कार्यक्रम में विशेषज्ञ के रूप में।	
AL	विषय - सुगन्धित धान की जैविक खेती।	
ण की तारीख	छायांकन	: 09.07.2021 प्रसारण : 21.07.2021
of Telecasting		
ण का समय	समय	: 05.30 pm
of Telecast		
ण की अवधि	अवधि	: 08 मिनट प्रति एपिसोड
tion		
ण का स्थान		
of Telecast	दूरदर्शन केन्द्र	: रांची
5		

इस प्रसारण शुल्क 2000/- दो हजार रुपये मात्र।

sequent Telecast Fee

पत्र के पीछे छपी शर्तों के खण्ड 4 (क) / 4 (ख) के अन्वयेन

ject to Clause 4 (a) / 4 (b) of conditions printed overleaf)

हमारा विशेष निवेदन यह है कि आप कृपया इस शर्त का पालन करके हमारी सहायता करें कि टेलीकास्ट के लिए जो तारीख
1 की गई है उससे कम से दस दिन पहले काल/लघुकथा की पांडुलिपि निदेशक के पास पहुँच जाय। इस शर्त का पालन न होने पर
के सामान्य कार्यक्रम में गम्भीर अवरोध पैदा हो जाता है।

We would particularly ask you to assist us by complying with the condition that manuscript of the talk/short story

ously hampered if the conditions are not observed.

स्टैम्प शुल्क सरकार द्वारा वहन किया जायेगा।

The stamp Duty will be borne by the Government.

भवदीय

For Station Director

For Station Director

भारत के राष्ट्रपति के लिए और उनकी ओर से
For and on behalf of the President of India

कथा के पत्रले में लेखक उसका शीर्षक चढ़ाई थी।

use of Short Story, the title of the Short Story will be filed in by the author.

PRASAR BHARTI

अनुच्छेद 4-10-8/4-10-9 देखिए

To:

To:

1/1

Programme:

या में, / To:

प्रसार भारती
PRASAR BHARTIदूरदर्शन
DOORDARSHANकृषि दर्शन
डोक्टोरल प्रोग्राम
दूरदर्शन - कार्यक्रम-1
अनुच्छेद 4-10-8/4-10-9 देखिए
DD-P-1
(See Para 4-10-8/4-10-9)

नेहा राजन

पौधा अनुवांशिक विज्ञान

के.वी.के. मोराहबादी

भाषण/साक्षात्कार/परीक्षा/संक्षेप कथा/कृषि दर्शन/वी.सी./16-17/1103
INTERVIEW/DISCUSSION/SHORT STORY

09.02.2017

सं०/No _____

दिनांक _____

Date _____

प्रिय महोदय/महोदया,

Dear Sir/Madam,

इस पत्र के पीछे छपी शर्तों पर नीचे लिखे विषय, दिनांक और समय पर आपकी कर्ता/लघुकथा सहर्ष प्रसारित करेंगे। कृपया निम्न पुष्टिपत्र को विधिवत भरकर और उस पर अपने हस्ताक्षर करके दिनांक _____ तक हमें लौटा दीजिए।

We shall be pleased to telecast your talk(s)/short story on the subject, date and time/detailed below upon the conditions printed overleaf. We shall be obliged if you will kindly sign, and return the attached confirmation sheet duly completed not later than the _____.

“कृषि दर्शन” जीवंत फोन इन कार्यक्रम में विशेषज्ञ हेतु।

विषय: 01. किसान संरक्षण एवं कृषक अधिकार अभियान।

प्रसारण की तारीख Date of Telecasting	छायांकन : 09.02.2017	प्रसारण : 09.02.2017
प्रसारण का समय Time of Telecast	समय : 05.30pm	
प्रसारण की अवधि Duration	अवधि : 25 मिनट	
प्रसारण का स्थान Place of Telecast	दूरदर्शन केन्द्र : रांची	

अनुवर्ती प्रसारण शुल्क 2000/- (दो हजार रुपये मात्र।)

Subsequent Telecast Fee

इस पृष्ठ के पीछे छपी शर्तों के खण्ड 4 (क) / 4 (ख) के अध्याधीन

Subject to Clause 4 (a) / 4 (b) of conditions printed overleaf

हमारा विशेष निवेदन यह है कि आप कृपया इस शर्त का पालन करके हमारी सहायता करें कि टेलीकास्ट के लिए जो तारीख भेज दी गई है उससे कम से दस दिन पहले कर्ता/लघुकथा की पांडुलिपि निदेशक के पास पहुँच जाय। इस शर्त का पालन न होने पर केन्द्र के सामान्य कार्यक्रम में सम्पूर्ण अवरोध पैदा हो जाता है।

We would particularly ask you to assist us by complying with the condition that manuscript of the talk/short story should be in the hand of the Director not less than 10 days before the date fixed for the Telecast. The normal routine of the Kendra is seriously hampered if the conditions are not observed.

स्टैम्प शुल्क सरकार द्वारा वहन किया जायेगा।

The stamp Duty will be borne by the Government.

भवदीय

Yours faithfully

सोनि ५.३.२०१७

कृषि दर्शन निदेशक

For Station Director

भारत के राष्ट्रपति के लिए और उनकी ओर से

For and on behalf of the President of India

* लघु कथा के मामले में लेखक का नाम भरना आवश्यक नहीं है।

* In case of Short Story, the title of the Short Story will be filled in by the author.

प्रसार भारती
PRASAR BHARTI

दूरदर्शन - ४३४
अनुबंध 4-10-8/4-10-1

दूरदर्शन
DOORDARSHAN

(See Para 4-10-8)

मैत्रा राजन भाषण/साक्षात्कार/परिचर्चा/लघु कथा/वीडियो/रेन/कृषि दर्शन/वी
कनीय/विज्ञानिक/बोली प्रजन्म विभाग
दिव्यायन, कृषि विज्ञान केन्द्र,
रौंछी 834001
दिनांक2019
Date

निम्ने छपी शर्तों पर नीचे लिखे विषय, दिनांक और समय पर आपकी वार्ता/लघुकथा सहर्ष प्रमाणित करें
धियात भरकर और उस पर अपने हस्ताक्षर करके दिनांकतक हमें लौटा दीं
pleased to telecast your talk(s)/short story on the subject, date and time detailed below upon t

"कृषि दर्शन" के जीवंत फोन इन कार्यक्रम में विशेषज्ञ के रूप में।
विषय-01. बीज उत्पादन, प्रसंस्करण एवं भंडारण।

छायांकन : 26.09.2019 प्रसारण : 26.09.2019

समय : 5.30pm

अवधि : 20 मिनट प्रति एपिसोड

दूरदर्शन केन्द्र : रौंछी

30 2000/- दो हजार रुपये मात्र।

के खण्ड 4 (क) / 4 (ख) के अध्याधीन

4 (b) of conditions printed overleaf)

नवेदन यह है कि आप कृपया इस शर्त का पालन करके हमारी सहायता करें कि टेलीकास्ट के लिए
म से दस दिन पहले वार्ता/लघुकथा को पांडुलिपि निदेशक के पास पहुँच जाय। इस शर्त का पालन
में गम्भीर अवरोध पैदा हो जाता है।

licuarly ask you to assist us by complying with the condition that manuscript of the talk/s

the conditions are not observed.

कार द्वारा वहन किया जायेगा।

y will be borne by the Government.

7/8

भवदीय

Yours faithfully

कृते केन्द्र निदेशक

For Station Director

भारत के राष्ट्रपति के लिए और उनकी :

For and on behalf of the President o

असका सौंपक यहाँ भरो।

s of the Short Story will be filled in by the author.

Glimpses of Activities done by KVK



Village level meeting with farmers during base line survey in the year 2015



Seed collection of Indigenous varieties during PPVFR programme



Awareness cum training on conservation of indigenous scented rice varieties



Multilocation trial of selected ten indigenous rice varieties at Gurgurjari, Mandar



Organic input distribution under NABARD sponsored project



CGM, NABARD Ranchi visited farmer's multilocation trial plot at Bero.



Training on seed production of indigenous scented rice



Farmer's participatory Seed production of Bhutku Rice



Data recording of Tulsi Mukul rice field



Scientist Visit to Seed Production plot at Burmu



Seed processing of Bhutku and Tulsi Mukul at KVK, Farm Ranchi



Seed of Bhutku and Tulsi Mukul ready for sale



Packaging of Scented Rice and ready for sale



Promotion of scented rice by Sri Jitu Charan Ram, MLA, Kanke

Promotion of scented rice during Kisan Mela



Launching Programme of Bhutku and Tulsi

Scented rice stall installed at KVK farm

Mukul Rice 	during Kisan Mela 2019 
Promotion of scented rice during Kisan Mela at KVK Ranchi in 2020 	Selling of scented Rice packet at Divyayan Sale counter 
Scented Rice stall visited by Director ATARI, Patna 	Scented rice seed purchased by local tribal farmers 
Grain characteristics of Bhutku rice	