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TECHNOLOGICAL INTERVENTIONS: SUCCESS & IMPACT

Krishi Vigyan Kendra

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Krishi Vigyan Kendra

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(Indian Council for Agricultural Research)

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FOREWORD

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Agricultural Extension is a difficult field which requires dedication and a mission mode approach so as to effectively transfer the fruits of research finding and relevant agricultural technologies on to the farmer's fields for their quick acceptability, adoption and diffusion in the locality by the stakeholders initially to bring about attitudinal change in behavior and skills in his traditional approach and later spread general community in long run.

The KVK attached to the ICAR Research Complex for Goa has been implementing various transfer of technology programme since it's inception like Lab to Land, Research - cum - Demonstrations, National Demonstrations which later were mandated as On farm Testing (OFT) and Frontline Demonstrations (FLDs) over last few decades, since its inception in 1984. It has so far provided technological interventions and skills to the stakeholders of North Goa district through various trainings, method and result demonstrations in various disciplines.

Gathering of relevant information and systematic documentation of case studies and success stories /impact from the field is very crucial and important task so that the information is shared by fellow farmers and various extension personnel as a reference material.

The present publication in this area is a welcome step and I congratulate the Programme Coordinator , KVK (North.Goa) and his team of Subject Matter Specialists in various disciplines for not only effectively implementing the mandated technology transfer programmes but for their initiative to record and document the case studies/ success stories as well as Impact created as a result of KVK intervention.

I am sure the farmers, extension workers as well as other stakeholders will find this publication useful in their future work in bringing about transformation of agriculture scenario in the District.

(N.P. Singh)
Director

Preface

Krishi Vigyan Kendra (KVK) or Farm Science Centre (North Goa) which serves as the extension wing of the ICAR Research Complex for Goa has a very crucial responsibility to not only engage in human resource development in farm sector and conduct Participatory Rural Appraisal (PRA) in the selected villages of the operational areas, but also suggest various technological interventions in respect of major cereal, oilseed, pulses and horticultural crops and live stock enterprises in addition to Home Science in the selected villages.

The mandated KVK programmes like On farm Testing and Assessmnet of new technology on farmer's field and it's refinement, creating large scale impact through the programme of Frontline demonstrations (FLDs) and human resource and skill development by conducting on farm and off campus trainings to develop entrepreneurship ability and empowerment among the stakeholder to bring about overall development of farm sector in the village.

Considering the various feedback and data generated over the years since the inception of KVK, a need was felt to assess the achievements made by various stakeholders through their case studies as well as success stories and Impact made in the relevant field.

We would like to appreciate the valuable contributions made by all the Subject Matter Specialists namely Shri V. Y. Gaonkar, SMS(Horticulture), Shri H.R.C. Prabhu, SMS(Plant Protection) and Shri H.R.Prabhudesai, SMS(Agronomy), Smt. Sunetra Talaulikar, SMS(Home Science) and Dr. V. S. Sakharkar, SMS(Agri. Extension) not only in transferring the relevant technology in the field and monitoring and guiding the stakeholders in creating these achievements on ground, but also for taking pains and trouble in gathering the information and data for documentation in this useful publication.

Needless to state that this work is inexhaustive and would serve as an guide for documentation of many other case studies and success stories from the ground for the benefit of the farming community in particular and general public in general

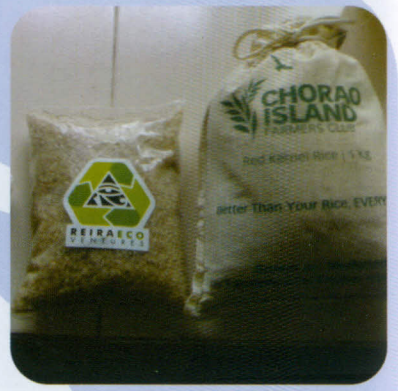
(Authors)

Contents

1. Public - Private - Partnership in Organic Red Kernel Rice Marketing

Local preference and marketability of red kernel rice are the major farmer's perspectiveswhich have seen growing interest in adoption of alternative variety assessed by KVK in most of the operational villages. The alternative varieties have twin advantages of non shattering nature, high yield compared to both Jaya and Jyoti in addition and non lodging habit. Among the traditional varieties farmers who have adopted the Red Kernel variety namely "Revati" and "Makam", due to it's positive traits, Mrs.Namita Khandeparkar from Chodan village of Tiswadi Taluka, After being a beneficiary of KVKs programmes like OFT and FLD, she has been able to actively propagate the technology in the village by systematically multiplying the Breeder seed and has so far made a major contribution of spreading of the variety in the village .During last season , she was able to sell five qts of quality seed (cv. Makam) in the said village. The traditionally grown red kernel rice (Korgut) was fetching a mere Rs 13/kg. But after proper post harvest/grading and packing in consumer friendly 1 kg pack the Chorao rice is being sold through superstores @ Rs.60/kg out of which Rs. 40/kg is being paid to the farmer of the group. This is threefold rise in their income

(307%).Farmers like Fr. Inacio Almeida, Pillar Society (Dhakte Neura) , Jaykumar Salgaonkar (Dhargal), Mrs Geeta Uscaikar, Namita Khandeparker, (Chodan), Anand Dhulapkar (Dhulapi) to name a few, are some of the farmer / farmwomen who have realized the additional benefits of this technology (Improved variety with ICM) and harvest 4.93/ha against the traditional variety (3.53t/ha).The technology demonstrated gave a mean gross income of



income of Rs 42939/ha with a net returns of Rs 1800 corresponding to a B:C.1:2.39. Chorao farmers club of which Mrs. Namita Khadeparkar the active member inputs. "Revati" which is procured by the state . The rest has been milled for marketing through supermarkets. KVK-TERI partnership resulted in branding the produce under the logo of "Chorao rice" in convenient 1kg packing and the produce is being sold @ Rs 60/kg. This enhanced revenue generation of marketing of Organic Red kernel rice with logo has caught the attention of many farmers not only in Chorao village but also nearby villages. So far nearly 4000 kg of rice has been sold through superstores. The Farmer's club has developed it's own web site namely *www.choraofarmersclub.wordpress.com.*

2. Mechanization in Rice cultivation

Among the various impediments faced by the farmers like non availability of labour coupled with land fragmentation, water scarcity during rabi extended summer, no availability of quality seeds and planting material, etc. unability of agricultural labour is a big threat keeping farmers away from active farming activity. KVK through its mandated programme on OFT on farm mechanization through demonstration of

various implements and machinery created awareness regarding improved tools and machinery in rice farming which is a labour intensive activity.

The results indicated that mechanical transplanting could cover 1 ha area in 5 hrs as against the manual transplanting which took 63 woman days to cover the same area. Further the OFT results indicated that was an mean yield increase in mechanically transplanted crop due to uniform plant population maintenance resulting in profuse tillering compared to either hand broadcasting or manual transplanting suggesting the field utility of the machine.

Field demonstration of harvesting combine at Saligao village was conducted in which 91 farmers and members of farmer clubs/SHGs were participated and imparted training in mechanization and custom service by KVK. The success of OFT also got the Department o Agriculture involved and the efforts have upscaled in major schemes of subsidy for rice mechanization including mechanical transplanting and harvesting with combine machine. By seeing the results and to overcome the labour problem, Govt. of Goa is giving the subsidy on farm machinery. At present about 35 kharif and 10 rabi combine harvestor are used by the farmers / farmers groups of various part of Goa covering an area about 12000 ha in Kharif and 4000 ha in Rabi in 70 villages during 2012-13

3. Groundnut cultivation under residual moisture

Perhaps the most significant contribution has been the introduction and popularization of a number of groundnut varieties in the State by KVK and developing most appropriate technology for rice based farming under residual soil moisture conditions. The FLD results gave encouraging results with TAG-24 and DH-86 (18.6q/ha) and (16.85q/ha) and both surpassed the local check JL-24 (11.67q/ha). The seed material out of this demonstration was exchanged among the farmers in Virnoda and Mahakhazan locations in Dhargal village during the rabi season.

Kharif areas within the taluka and the cycle is maintained. The village is a potential seed village which caters to a large extent the seed replacement. Distress sale of produce was a regular feature with the farmers with their traditional varieties growing the crop for oil purpose rather than seed purpose has resulted in horizontal spread of the technology not only in terms of replacement of traditional variety but also the agrotechniques to get higher yields under residual moisture situations as can be seen from the present coverage of TAG-24 which occupies more than 80 percent of the area in the state.

The success stories created by the farmers from Dhargal, Sangolda, Bhironda developed an effective seed supply chain within the village as well as outside the village Farmers like Shri Salgaokar from Virnoda, Pernem taluka, Shri Shripad Palienkar and Prakash Balli from Sangolda, Bardez taluka, Fr. Inacio Almeida from Bhironda, Sattari taluka to just name a few.

This has to a great extent helped in augmenting the seed replacement ratio in the state The seed village concept has gained momentum as a result of effective programme of FLD on cereals as well as groundnut. It is worthwhile to mention that there has been nearly more than 80 percent spread of the improved variety TAG-24 in the state and the old variety namely JL-24 has phasing out.

The sites serve as potential source of quality seed procurement. The horizontal spread over the years through seed replacement by mutual seed exchange (chain from Kharif to rabi) has enabled the state to replace the age old groundnut variety Phule Pragati (JL-24).

At present, about 65-70% of the area is under TAG-24,10-15% under TG37-A and the rest either under the traditional variety directly procured by farmers from neighbouring states. The Department of Agriculture has also brought area under these varieties during kharif as well as rabi through it's developmental schemes.

4. Crop Intensification through Water Harvesting

Saligao where farming was reduced to low sustenance activity with age old practice being followed. The village Saligao is located about 28Km from the KVK in Bardez taluka and most of the rice cultivation was done traditionally using primitive methods and in majority of cases the lands kept fallow or local cowpea was cultivated. The problem was the exploitation of ground water for

housing, industrial and hotels use thereby depleting the ground water resources in the village.

Mr Darryl Perreira, a prominent businessman and small time farmer with his interest in vermiculture and waste management was imparted the requisite skill and knowledge on the subject matter by KVK. After initial set up of vermiculture unit and bio composting was successful. Mr Perreira was motivated to form a user group with adjoining farms and he took up the leadership with 13 members. From kharif season of 2006 onwards the group has adopted series of technologies of KVK which have been imparted/ transferred to the group and till today the said pilot project organic red rice cultivation, farm mechanization, groundnut cultivation under polythene mulch, cowpea and vegetable cultivation under rice fallows including high value vegetable cultivation. With concern for revitalizing the sustenance farming by adding glamour to this noble profession Mr Darryl Pereira, a proactive leader has created vermiculture and bio composting units provides him all the organic manure for his entire area covering 1.6 ha and many of the adjoining farmers have shown willingness to have similar success in once a neglected paddy area. The infrastructure developed by the user group enabled them to take yet another crop of sweet corn by developing sprinkler irrigation system on the farm. The State Task force constituted for the Regional Plan for Goa has already taken cognizance.

The latest development under the partnership is the creation of water harvesting facility which has become an eye opener as to what can be achieved with such partnerships. The farm has now created rain water harvesting facility for storing 28000

cubic liters of water. This is the biggest achievement of the pilot project not only in the village but the entire state to learn what can be achieved with Public Private partnership in this state. The harvested water has fish culture and the water is utilized to irrigate the crops in rabi season to get maximum returns from rice based cropping system.

5. Diversified Agriculture for Regular Income

This case study is a typical model of Integrated Farming system owned by Mr C.K. Mathew from Goa Velha village of Tiswadi Taluka of North Goa district. His coconut based farm admeasuring 1.5 ha located at Goa Velha village in Tiswadi taluka is a ideal farm where one can see coconut intercropped with many seasonal vegetables like chillies, brinjal, spices like turmeric and ginger, root crops like colocassia and elephant foot yam etc. Mr Mathew is a regular visitor at KVK for guidance and sharing his experiences with KVK from 2003-04. He is very proactive and receptive farmer who adopts all the new technologies for last many years. His farm is an integration with Dairy, Poultry, as well as turkey. Mr Mathew is a retired teacher by profession and an expert in Orchids cultivation.. His farm is a store house of more than 25 varieties of Orchids which he propagates and sells. Besides anthuriums and other household indoor plants which augment his income since these high value plants are on demand in Goa.

He is an innovative farmer and experimenting with many techniques in agriculture and allied sectors. He also owns a 0.4 ha rice field where Mathew used to grow only traditional rice. After intervention by KVK he adopted the new red kernel rice Makam which he claims has given two fold increase in yield. He is also a beneficiary of KVK OFT as well as FLD programmes on rice based cropping systems where he has successfully grown alsando (local cowpea), black gram, green gram and vegetable tur, onion, marigold, tomato, brinjal, chilli, cucumber etc.. He admits that the rice base cropping with pulses and vegetables has given him three fold income as against what he used to get from monocropping of rice. He is also doing social work and creating awareness in the locally about new agriculture technologies propagated by KVK.

Mr. C.K. Mathew in a innovative farmer who has developed his farm into an aesthetic farm for visitors and has developed indigenous technique to control pod borer in vegetable tur which is a severe pest. The decoction made from neem oil, garlic paste has been successful in managing the tur pod borer.

The diversified activities of Mr C.K. Mathew also include teaching and serving as a honorary member of state level committee on Agriculture

6. Diversification through High Value Vegetable Crops

Taligao village which was once famous for local vegetables like Brinjal, Sweet Potato, chillies, Gourds etc. was becoming urbanized with pressures from real estate lobby and massive land conversion for construction activity with farmers abandoning the old profession. With KVK intervention and formation of Progressive Farmers Club inaugurated by. Dr. M.S.Swaminathan in 2009, the scenario is changing for revival of

farming activity.

The case study of Mr Candido Dias, the Chief volunteer of the Progressive Farmer's club of Taleigao has been able to create a template in the village to showcase the high value vegetable cultivation after rice in kharif He has been able to diversify into different non-traditional vegetables like red cabbage, tomatoes, sweet corn, water melon, French beans etc under open as well as under protected cultivation. He has been able to improve his livelihood security through additional income accruing out of sale of these fresh organically grown vegetables through a vegetable cart next to his farm which draws lot of elite urban dwellers. His success of vegetable cultivation with technological back up from KVK from 2009-10 till date has been widely reported by print as well as electronic media including u tube. Mr Dias has been instrumental in motivating other farmers of the village who have taken up to farming in a big way which were under pressure from builder lobby for land conversions.

7. Large Scale Cultivation of Turmeric

Mr. Shrihari Kurade, a progressive farmer from Vichundre, Sanguem, South Goa was inspired by seeing the turmeric cultivation at KVK. Accordingly one demonstration on turmeric was conducted at his field. The improved variety used was Pratibha. Initially he grown turmeric in coconut garden where he got yield of 22 tons/ha, Further he expanded turmeric cultivation in cashew Orchard. Now he is growing turmeric in 10 ha area as an intercrop in coconut and cashew.

50% of his turmeric production is used for seed purpose and sell his seed to needy farmers. Remaining 50%. He is using for making turmeric powder and sell it to traders and getting net profit of 1.4 lakhs/ha.

Likewise Fr. Inacio Almeda, Pillar Society, Bhironda, Sattari taluka and Mr. Sequira of Corlim, Tiswadi taluka, North Goa are also growing turmeric on large scale after KVK intervention on turmeric cultivation.

8. Management of Cashew Stem and Root Borer

Shri Omu Gauns is a progressive farmer aged 61 years from Surlabhat in Pilar village, Tiswadi taluka, North Goa. He Cultivates paddy in kharif and takes up vegetables specially brinjal during rabi in 1 acre area. He also owns about 200 cashew trees. The farmer was always enquiring about the management of stem and root borer locally known as

"Rotto", a serious pest in cashew.

The pest damage was ranging from 10-45%. As farmers were not taking any control measures, they were loosing 3-4 trees every year. Training programmes were organised by KVK - North Goa to explain about the nature of damage and different management

strategies to create awareness among the farmers about the pest. Then a demonstration was takenup in the said farmer field to manage the pest by spraying chlorpyriphos @ 10ml/ltr on trunk up to 1 mtr from ground level and stem injection with dimethoate @ 2ml/ltr in severe cases.

The results of the demonstration showed the mean infestation (%) of 2.69% in treated to 7.52% in check plots and yield (q/ha) was 14.37 q/ha to 6.22 q/ha in check plot. The benefit cost ratio was 4.55 in treated to 2.30 in control plot. Since the farmers have started getting good price for cashew kernel and now they don't want to lose a single tree and are very much convinced by the demonstration and adopted the technology to save the cashew trees. At present this technology is popular among the cashew growing farmers of Goa.

9. Trichoderma : A potent biopesticide

Vegetables are important crops taken up after kharif paddy. The different crops grown are Cowpea (Alsando), Sweet potato, Brinjal, Chillies, Amaranthus, Radish. Brinjal is one of the important crop taken up during rabi season and gives good income to farmer. The local types-Agassaim and Taleigao are commonly grown which are in great demand among the consumers. Many biotic and abiotic factors are responsible for

quality and yield loss. Both local types are highly susceptible to bacterial wilt caused by Ralstonia solanacearum. The studies conducted in our institute proved the effective management of brinjal wilt using *Trichiderma spp.*The management was achieved through nursery treatment, seedling dip and drenching the plant with *Trichoderma viride* @ 50g/ltr. The trials takenup during 2009-10 at Surlabhat and Pilar showed the incidence of 17.32 per cent compared to 39.07 per cent in treated plot. The yield level was 12.62 t/ha in treated to 7.26 in check plot.

The technology is popular and is being used by brinjal growing farmers of neighbouring villages - Neura and Mundur.

10. Waste Management through Vermicomposting & Biocomposting

Eco friendly technologies like vermicomposting and biocomposting were popularized through elaborate training programmes and technical support in setting up of such units at Pilar, Saligao, Parra and other sites. The technology transferred through workshops and trainings for NGOs, SHGs, CCP, PMCA, Schools, etc. have created bio-entrepreneurship with composting units being established in city of Panaji and surrounding areas as well as housing colonies

The KVK has trained more than 680 farmers and farmer groups besides many SHGs sand NGOs and provided earthworm culture to the needy. So far

more than 16 units have been established and the technology is being spreading.

Acknowledging the success of the technology, the ATMA as well as the Directorate of Agriculture has included the topic in their training schedules for general as well NHM training programmes. To further popularize this technology, a subsidy component has been introduced in their developmental schemes which provides subsidy to the tune of 50% for general farmers and individuals and upto 70% to SHGs, NGOs to have 50 m3 of vermiculture tanks to popularize vermiculture in the state.

Mr Darryl Pereira, Saligao, Bardez, North Goa who started his vermicomposting unit with technical guidance from KVK during 2006-07 has four tanks each measuring 5x1x0.9 mtsproducing annually 8-9 tons of vermicompost from farm waste. The annual income from this unit is Rs 85-90 thousand rupees/year and the unit is serving as demonstration unit for visitors and students of different schools sponsored by Department of Science and Technology who visit his farm on regular basis for exposure in waste management and environmental studies.

Mr. Mohan Tendulkar is today a pioneer in vermiculture and has a big commercial unit at Molcornem village in Quepem taluka of South Goa district who had earlier received the expertise and training by KVK during 2000-2001. His Annual production is more than 30 tons as well as he is the one of the prominent earthworm supplier in the state. His economic status has greatly improved due to regular income from the entrepreneurship. Presently, Mr Tendulker is actively providing consultancy to farmers, civic bodies, delivering lectures and also organizing training for farmers at his farm.

Many other units of small and medium sizes have been established among which the units at Jagoti Nature farm (60 m3), Bhironda in Sattari taluka, Pilar Seminary farm(150 m3) Mr Cabral from Diwar village, Mrs Bhandare from Azzossim village of Tiswadi talukas

11. Women Empowerment through Agricultural Enterprises

I. Mrs. Kalindi Salgaonkar is a small farm woman with meager holding of 0.1 ha in Parra village of Bardez taluka, North Goa. She was engaged in traditional and sustenance farming growing traditional rice "Jyoti" in Kharif and traditional vegetable like cluster bean, chillies, lady finger to make a living, the produce was largely used for self consumption and rarely marketed.

She was motivated by KVK to form a SHG and under her leadership "Siddi Vinayak" SHG was formally initiated with 20 members. And this group was exposed to latest technologies not only in Rice but also in confectionery Groundnut, high value vegetables and flowers like Capsicum, Gladiolus cultivation, intercropping in Coconut garden and Value addition in Groundnut.

During 2006-07 she ventured into Gladiolus cultivation in the entire field and could get a net income of Rs. 40,000/- by selling the produce to the nearby hotels. After this success she kept in constant touch with KVK for acquiring skills and techniques of various crops and also lead the group to University of Agri. Sciences, Dharwad, KVK (Hulkotti) and nearby areas to get exposure to advance agricultural practices.

Now days Mrs. Kalindi Salgaonkar is a prominent SHG leader in the village and through her leadership qualities, she has activated the group who are engaged in many agricultural activities including mechanization. Her monthly income from Rs. 2,000/- in 2004-05 has grown to Rs. 5,000/- during 2009-10.

II. Mrs. Teja Gaunka is a housewife from Bethoda village was motivated by the KVK to take up Vermicompost and other crafts items like jute bags, shell items, etc. as an enterprise in 2006. She is the active member of Mahadev Self Help Group from Bethoda village and Water Shed Development Project in Ponda Taluka, North Goa and KVK. This group has got 20 members and their thrift contribution is Rs. 50,000/-. They have also taken loan from Goa State Social Welfare Board, Panaji of Rs. 1,00,000/- to start income generating activities like Vegetable Cultivation, Craft like Shell items, Value addition of Local fruits like Cocum Squash, Papad making, Pickle making, etc. Mrs. Teja Sells, Vermicompost of about 200kgs/month to near Co-operative stores and other items like bags, etc. and gets an income of Rs.4,000/- per month.

III. Mrs. Simi Suktankar a housewife from Kumbharjua village approached to KVK for training in mushroom cultivation. She attended mushroom cultivation training in September 2012. After completion of training she started a small unit on 'Oyster mushroom' cultivation at Kumbharjua village. Initially she was producing 2kg mushroom daily. Now she is producing 5 – 6kg of mushroom everyday. She is earning Rs. 6000/- per month by sale of mushroom. She is intending to increase the production to 10kg per day. Since she got sufficient space, she is willing to start a small nursery. She sells oyster mushroom in Panaji and Porvorim for Rs. 60 per kg.

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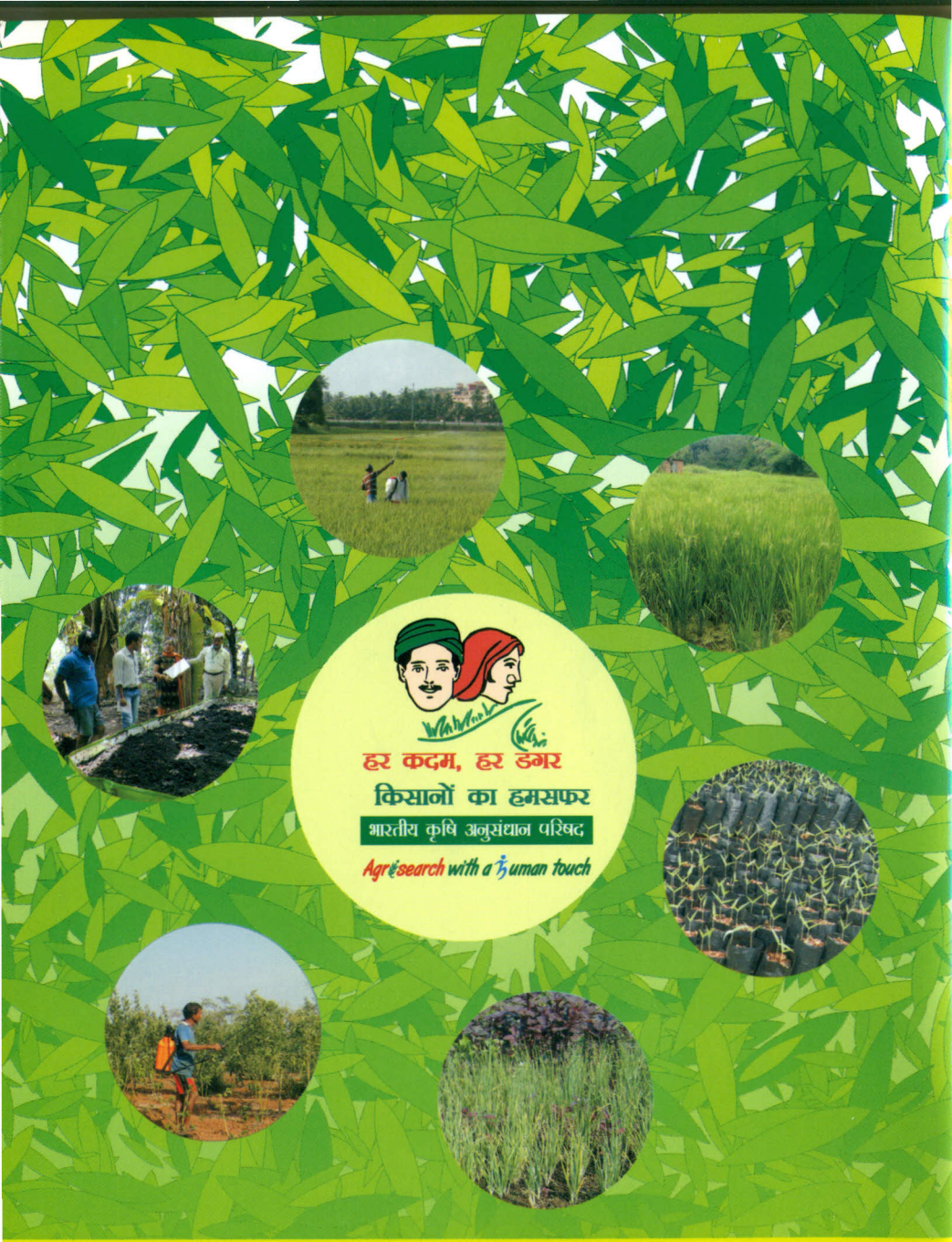

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