



# Farmer FIRST Innovation

*A role model for doubling of Chhattisgarh tribal farmers' income*



Farmer  
FIRST



## 2021

ICAR  
NATIONAL INSTITUTE OF  
BIOTIC STRESS  
MANAGEMENT

Rendering solution to biotic stresses

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P. K. Ghosh

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Indian Council of Agricultural Research, New Delhi  
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ICAR-ATARI, Jabalpur, Madhya Pradesh

*Farmers and scientists are two sentinels of new India  
and they have to work together to transform agriculture*



**Farmer  
FIRST**





# भाकृअनुप - राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान

बरौंडा, रायपुर - 493225, छत्तीसगढ़, भारत

## ICAR-NATIONAL INSTITUTE OF BIOTIC STRESS MANAGEMENT

Indian Council of Agricultural Research  
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**Dr. P K Ghosh, FNASc, FNAAS, FISA, FISPP, FWAST**  
Founder Director and Vice Chancellor

### FOREWORD

Farmer FIRST project of ICAR has been implementing by ICAR-NIBSM, Raipur since 2016 to improve the tribal farmer's livelihood through integration of agricultural enterprises in rice fallows. Total 54 agricultural interventions introduced and sustained in the farmer's field in cluster of five tribal villages in the Kasdol block of Baloda Bazar district, Chhattisgarh through five modules viz. crop based module, livestock-based module, enterprise-based module, horticulture-based module and NRM based module. Under each module, interventions are selected based on the matrix ranking and agro-ecosystem analysis. Farmer Communication Centres (FCCs), Custom Hiring Centers (CHCs), Agro-Processing Centers (APCs), Farmers Interest Groups (FIGs) and low-cost poly house have been established for timely availability of inputs and knowledge sharing with a view of enhanced income and livelihood security. Additional income of Rs. 12,054/- per farm family generated through the introduction of crop, livestock, horticulture, enterprise and NRM based modules by the tribal farming community from different enterprises is worth praising. Similarly, these interventions attracted 34% of farm women, 20% of rural youth in agricultural activities, 120% cropping intensity in the adopted villages besides 24-30% knowledge gain through Educational Multimedia Training Modules (EMTMs) on biotic stress management technologies. About more than, 500 tribal farm families benefitted under this programme.

I compliment the Farmer FIRST Project team for their sincere efforts in making the significant impact in tribal belt of farming community of Chhattisgarh.

(P. K. Ghosh)

Named in top 2% Agricultural Scientist at global level as world ranking analysis made by scientists of Stanford University, USA

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**Farmer  
FIRST**



# Introduction

- ★ The Farmer FIRST Programme (FFP) is an ICAR initiative to move beyond the production and productivity, to privilege the smallholder agriculture and complex, diverse and risk prone realities of majority of the farmers through enhancing farmers-scientists interface.
- ★ There are concepts and domains that are new in emphasis like resource management, climate resilient agriculture, production management including storage, market, supply chains, value chains, innovation systems, information systems, etc.
- ★ The Farmer FIRST as a concept of ICAR is developed as farmer in a centric role for research problem identification, prioritization and conduct of experiments and its management in farmers' conditions.
- ★ The focus is on farmer's **Farm, Innovations, Resources, Science and Technology (FIRST)**.
- ★ Two terms 'enriching knowledge' and 'integrating technology' qualify the meaning of Farmer FIRST in Indian context.



**F**arm



**I**nnovations



**T**echnology



**S**cience



**R**esources

# Summary

## Technology transferred

Tribal farm families covered

634

Technology introduced

54

Crop varieties introduced

35

Rice fallow covered with pulses

171 ha

Alternative Crops Introduced

12

Area Covered under Horticulture

90 ha

Animal Breeds Introduced

05

Capacity building programmes

515

Farmer Interest Groups (FIGs)

08

Kadaknath Farming cum Hatchery Unit

04

Custom Hiring Centres (CHCs)

04

Model Agro Processing Centre (APC)

01

Small Scale Soil Testing Unit

01

Low-cost Shade Net and Poly House

04

Farmer Communication Centre (FCCs)

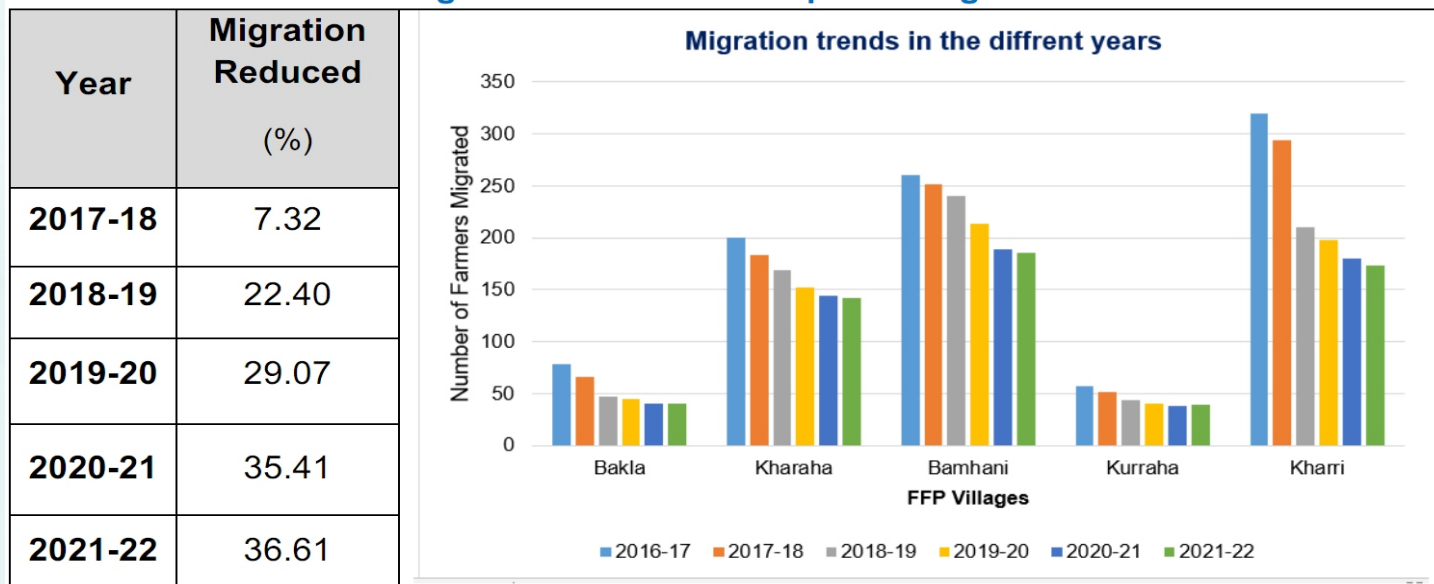
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Model Mushroom Production Unit

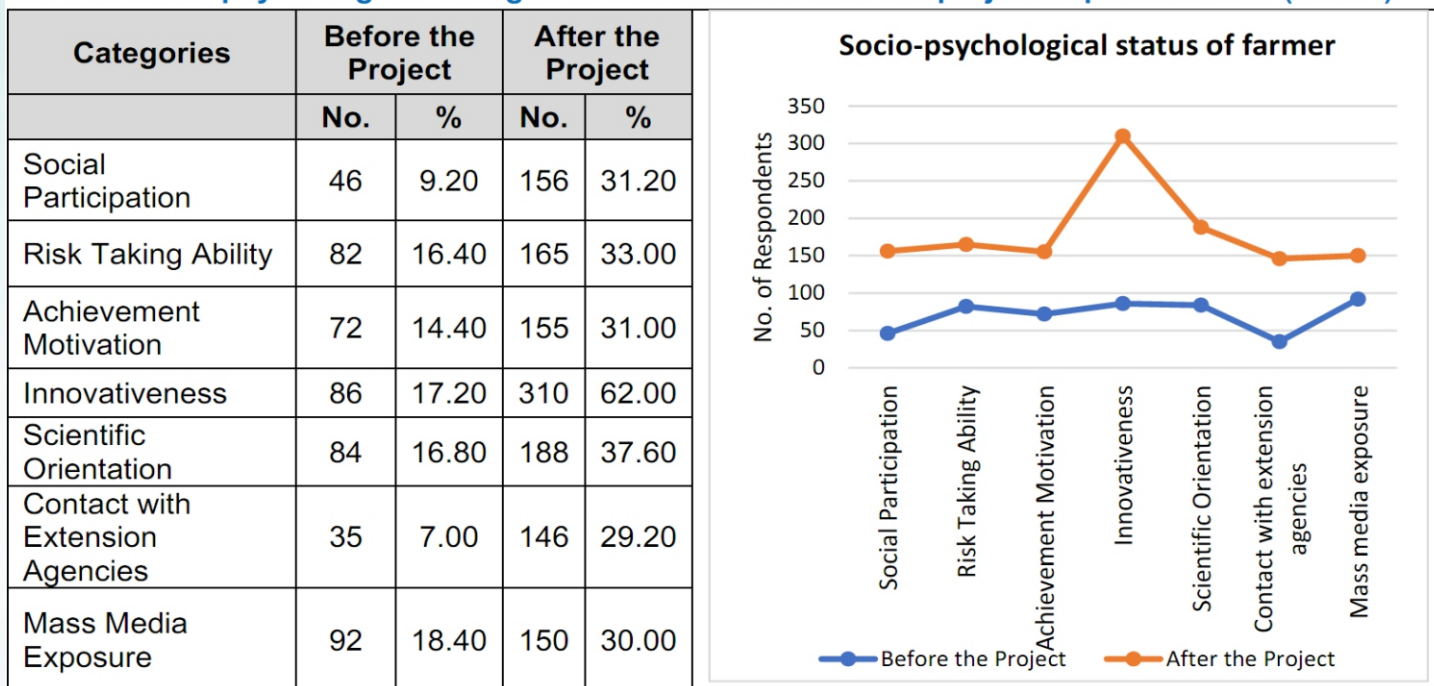
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## Reduction of seasonal migration in the FFP adopted villages



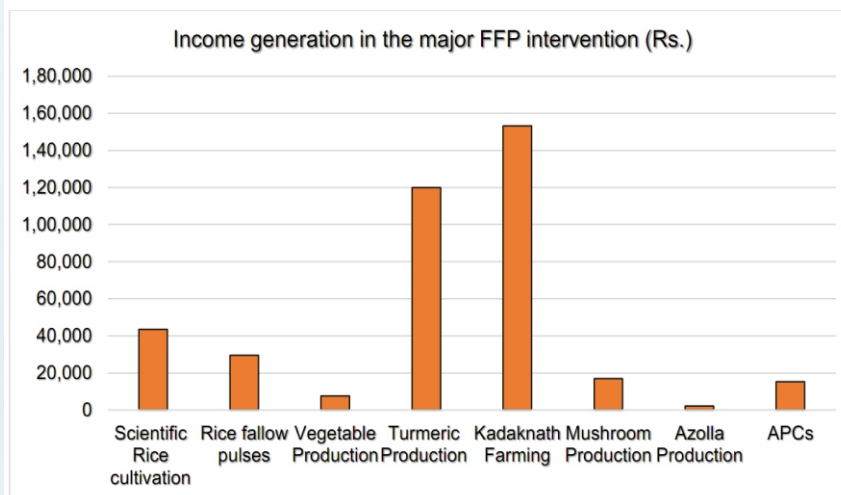
## Desired socio-psychological changes of tribal farmers after the project implementation (N=500)



### Major Infrastructure developed at cluster of villages

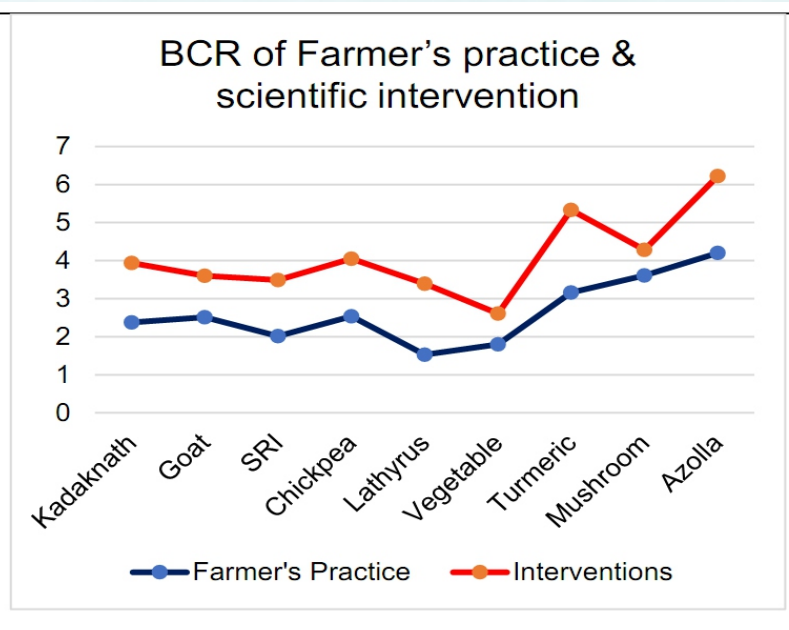
- Two Farmer Communication Centers (FCCs)
- Four Custom Hiring Centers (CHCs)
- Four Kadaknath Farming Cum Hatchery Units
- Two Quail Farming Cum Hatchery Units
- One Goat Farming Unit (GFUs)
- One Model Agro-Processing Centers (APCs)
- One Village Soil Testing Unit
- Six Low-cost Azolla Production Units
- Two Model Mushroom Production Unit
- Four Low-Cost Shade Net and Poly House
- Two Modern Nutritional Terrace Gardening Units

### Income generation in the major FFP intervention



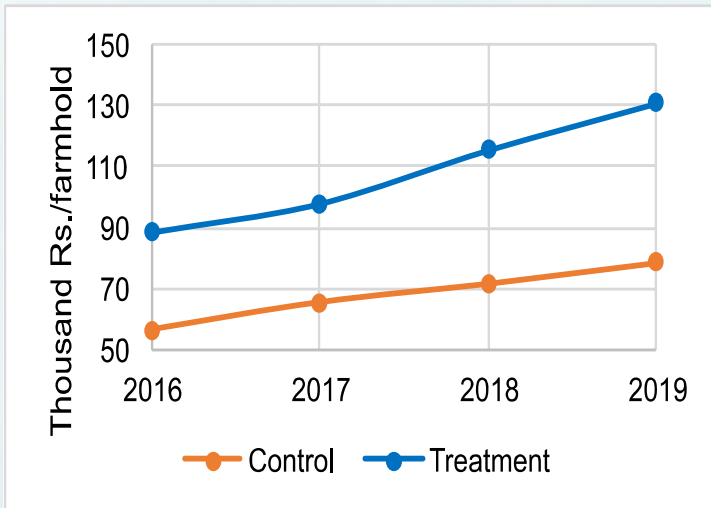
### Impact of FFP Interventions: B:C ratio of farmer's practice and scientific interventions

Technology/ Interventions	B:C ratio	
	Farmer's Practice	Interventions
Kadaknath	2.38	3.94
Goat	2.51	3.60
SRI	2.02	3.49
Chickpea	2.54	4.05
Lathyrus	1.53	3.39
Vegetable	1.80	2.61
Turmeric	3.16	5.33
Mushroom	3.61	4.28
Azolla	4.20	6.22

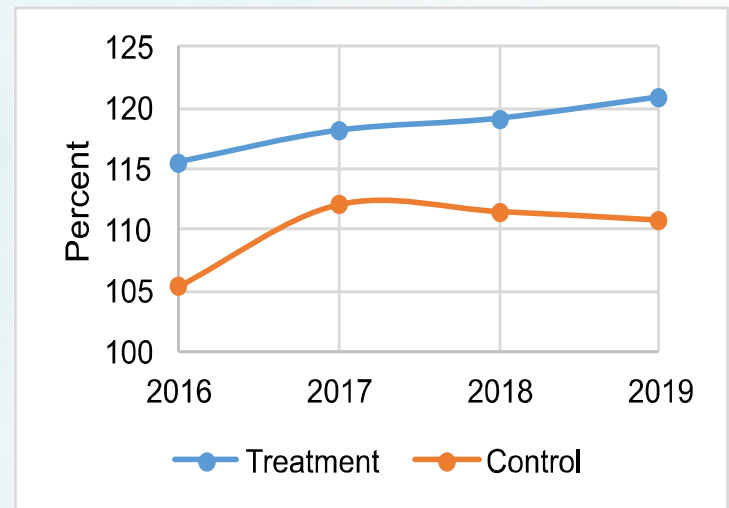


# Key outcome based assessment of Farmer FIRST Programme

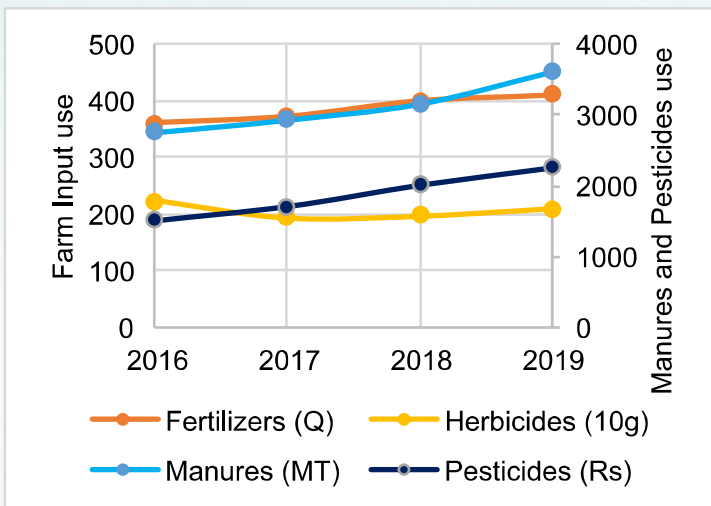
## Changes in Farm income



## Changes in Cropping Intensity

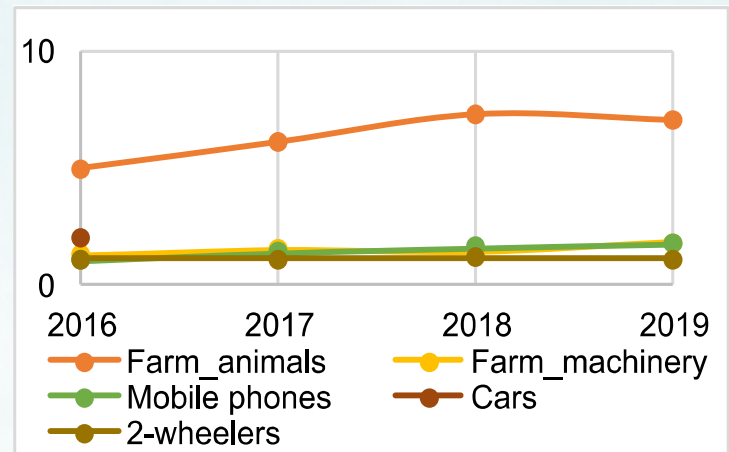


## Changes in farm input use



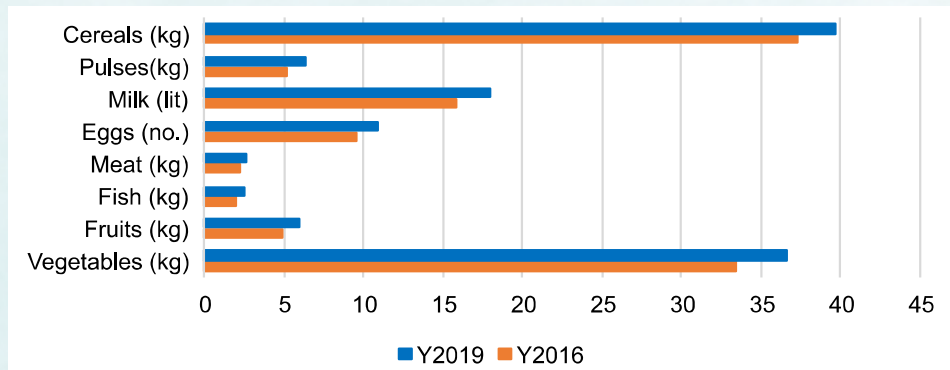
## Asset holdings

### Changes in asset possessed by FFP farmers

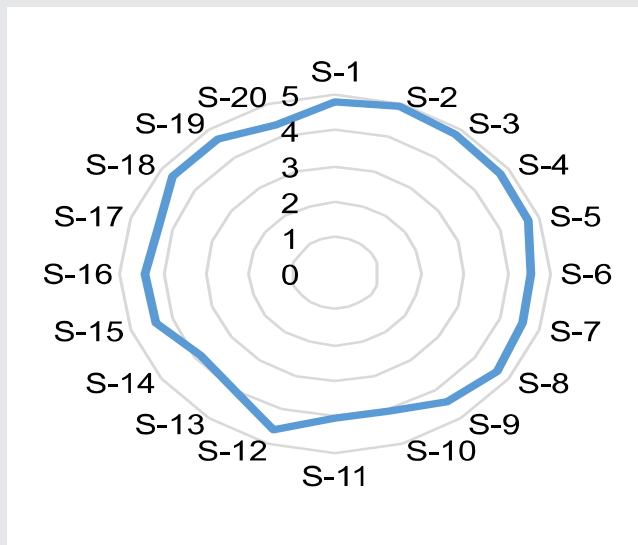


## Nutritional security

### (Monthly Household Consumption of Food Items)



### Perceived effectiveness of FFP on farmer partners



- S-1. Increase in the income substantially
- S-2. Improvement in nutrition
- S-3. Reduced health hazards
- S-4. Helped you to network with other farmers
- S-5. Helped you to network with extension workers
- S-6. Helped you to gain self-esteem/ social status
- S-7. Helped in shifting to commercial crops
- S-8. Helped in getting quality food
- S-9. Enhanced livelihood security
- S-10. Improved the education level in household
- S-11. Increased spending on comforts
- S-12. Increased investment on agriculture
- S-13. Increased investment on other items
- S-14. Increased expenditure on clothing
- S-15. Drudgery reduction for rural women
- S-16. Increasing employment for rural women
- S-17. Income enhancement for rural women
- S-18. Access to market
- S-19. Diversification of farming system
- S-20. Agri-preneurial ability of farmers

### Impact of technological intervention through FFP

S.No	Indicators	D-i-D*	P> z
1.	Cropping intensity (%)	2.56	0.342
2.	Manures (tonnes/ha)	0.3	0.166
3.	Fertilisers (Kg/ha)	9.58	0.496
4.	Nutritional security (CEQ Kg/Capita/month#)	3.54***	0.002

# Impact / Outcome



Additional  
Income  
Generated  
**118.75** Lakh

Income  
Generated  
**₹ 12054**  
(Family/year)

Cropping  
Intensity  
Increased by  
**120%**

Migration  
Reduced by  
**36%**

Women  
Farmers  
Empowered  
**34%**

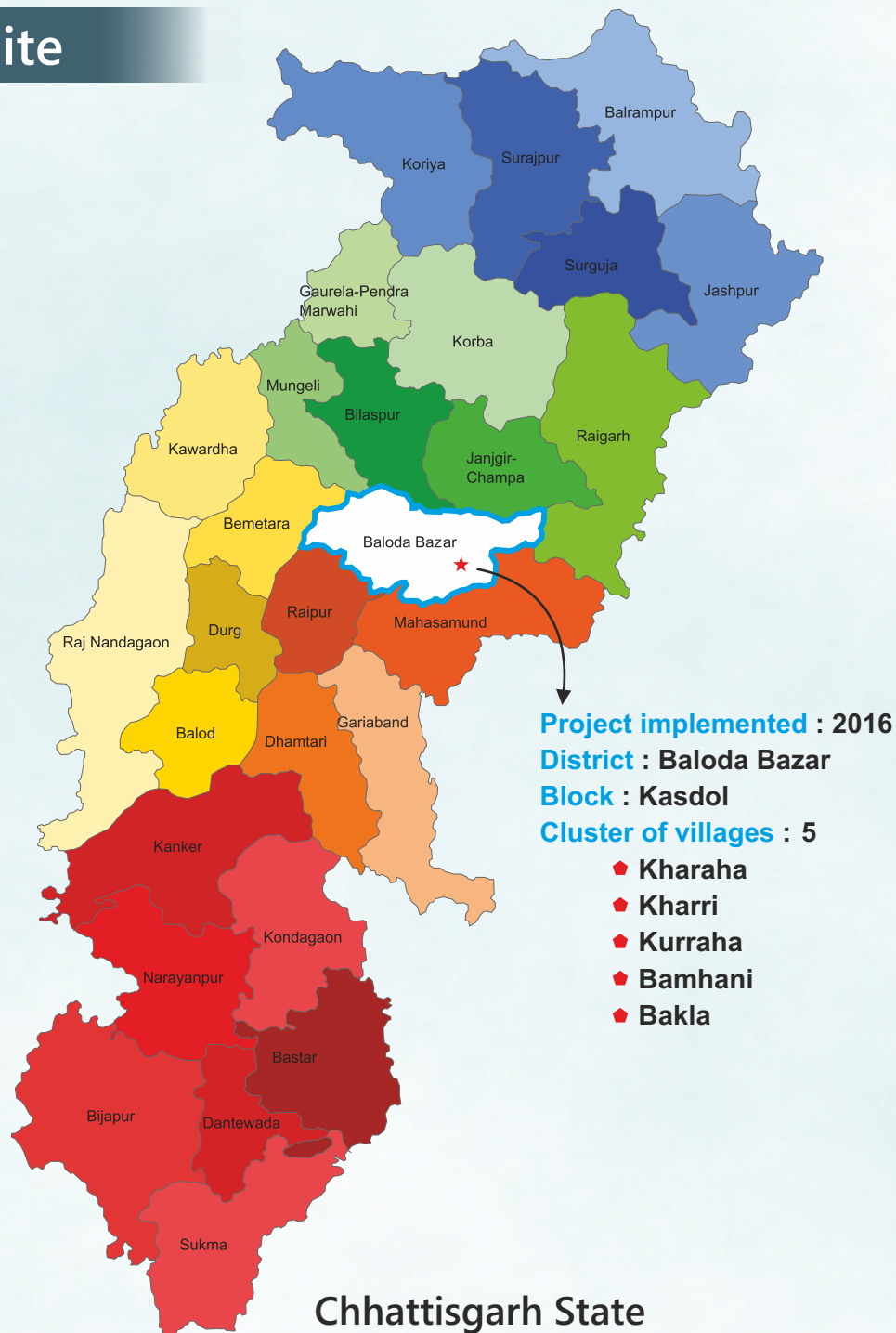
Youth  
Attracted in  
Agriculture  
**20%**

ICT Agro  
Advisory  
Delivered  
**1830**

Farmers  
Benefitted  
**8417**



# Project Site



# I. Crop Based Module (CBM)



## Aqua Ferti Seed Drill



Demonstration of line sowing of *lathyrus* and mustard during *Rabi* season at cluster of villages, Kasdol



## Happy Seeder



Field operation in rice fallow during *Rabi* season at Kharri village

## Scientific Rice Cultivation



Farmers practicing line transplanting of rice crop in *kharif* season at Kurraha village

## SRI Technology



Demonstration of SRI Technology at Kurraha village

## Improved Crop Varieties in Rice Fallow



Introduced improved crop varieties such as Prateek, Mahateoda, Vaibhav, GJ-12 and Chhattisgarh Sarson

## *Lathyrus* Cultivation with Low ODAP Varieties



Farmers involved in inter-cultural operation of *Lathyrus* production at Kharri village

## Line Sowing of Pulses and Oilseeds



Demonstration of Aqua Ferti Seed Drill and Happy Seeder at cluster of villages

## Eco-friendly Pest Management



Installation of Pheromone Trap for the management of pod borer in chickpea and Yellow Stem Borer in rice

## Rat Management



Demonstration of rat management practices at Kharri village



## Seed Treatment with Fungicide



Seed treatment of chickpea with 2gm Thiram + 1gm Carbendazim per kg seed

## Seed Treatment with Bio-fertilizer



Seed treatment of *Lathyrus* with Rhizobium culture 250gm per 10kg seeds

## Pest Management through Bio-control Agent



Using *Trichogramma japonicum* in paddy to control Yellow Stem Borer (YSB) at Kurraha village

## Seed Storage Bin



IGKV seed storage bin provided for safe storage of *lathyrus*, chickpea and paddy seeds

## II. NRM Based Module



## Low-cost Azolla Production



Low-cost *azolla* (*Anabaena azollae*) production units established at cluster of villages to meet out the feed requirements of Kadaknath and cattle. Per day production is 1.5kg per unit.

## Application of Waste Decomposer



ICAR-NIBSM demonstrated waste decomposer from NCOF, Ghaziabad for quick composting of organic waste and soil health improvement at cluster of villages

## Low-cost Drip System



Farmers practicing low-cost drip system for efficient use of irrigation water for scientific vegetable cultivation at cluster of villages

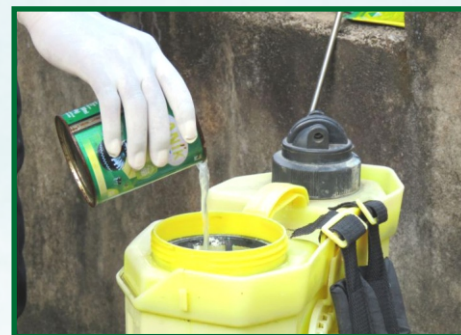


## Poly Mulching



**ICAR-NIBSM provided low-cost poly house structures with poly mulch and trained the farmers to grow tomato, strawberry, cauliflower, chilli and capsicum**

## Safe Use of Pesticides and PPE Kit



Demonstration of safe use of pesticides and PPE kit at Kharaha village

### III. Horticulture Based Module (HBM)



## Protected Cultivation



ICAR-NIBSM demonstrated protected cultivation at cluster of villages and covered 480sqm with poly house and shade net structures. Rs. 25,300 income generated per farm family/year



**ICAR-NIBSM demonstrated poly house and shade net structures to produce high value horticultural crops such as tomato, yard long bean, cauliflower, chilli and capsicum**

## Scientific Vegetable Cultivation



**Demonstration of scientific vegetable cultivation using improved vegetable varieties from IIHR, TNAU and NSC**



Improved vegetable varieties such as Arka Rakshak, Arka Meghana, Arka Anant, Arka Anamika, PKM-1 and PKM-2 were demonstrated at cluster of villages

## Flower Cultivation



Demonstration of flower crops such as gerbera, marigold, rose and tuberose under poly house and open condition at Kharaha village



## Low-cost Hydroponics



ICAR-NIBSM provided training to the women farmers in the establishment of low-cost hydroponics units to produce leafy greens at Bamhani village

## Annual Moringa Production



**ICAR-NIBSM introduced and demonstrated annual moringa (PKM-1 and PKM-2) from TNAU at cluster of villages**

## Modern Terrace Gardening



Farmers practicing modern terrace gardening with low-cost drip system, grow bags, improved varieties from IIHR for home nutritional security

## Nursery Raising Technology



**ICAR-NIBSM trained the group of farmers for scientific nursery raising technology to produce healthy vegetable seedlings at cluster of villages**

## Nutritional Home Gardening



Nutritional home gardening established using improved varieties from IHR, TNAU and NSC. Farm families' nutritional requirement fulfilled and excess vegetables sold at local markets

## Plant Propagation



**Training organised on the plant propagation technologies such as air layering, grafting and budding in fruit crops such as guava, ber, lemon and mango**

## Strawberry Cultivation



Pilot demonstration organised to cultivate strawberry under poly house at Kharaha village

## Turmeric Cultivation



**Demonstration of scientific turmeric cultivation with improved variety (Roma) from IGKV.  
SMS from KVK, Bhatapara trained the farmers**



## Application of *Trichoderma*



Farmers practicing root and seed treatment with *Trichoderma viride* to control seed and soil borne diseases in chilli, tomato and brinjal crops

## Eco-friendly Pest Trap



**ICAR-NIBSM trained the farmers to adopt pheromone traps, blue and yellow sticky traps to control the pests in vegetable cultivation at cluster of villages**

# IV. Livestock Based Module (LBM)



## Kadaknath Farming



**Kadaknath farming established by individual and group of farmers at cluster of villages.  
Rs. 1,53,166 additional income generated per farm family/year**



ICAR-NIBSM provided chicks, low-cost shed, vaccine, feed and advisory support

## Goat Farming



Goat farming established by individual family and women Self Help Group (SHG) at Kharaha village.  
Rs. 27,087 income generated per family/year

## Kadaknath Hatchery Unit



Village level hatchery unit established at cluster of villages (05). The hatchery units maintained by Farmers Interest Groups (FIGs) and the production cycle successfully completed at village level.

## Vaccination



Vaccination of Kadaknath chicks done by state department of animal husbandry to control *Ranikhet* and *Gambro* diseases to reduce the chick mortality



## V. Enterprise Based Module (EBM)



## Agro Processing Centres (APCs)



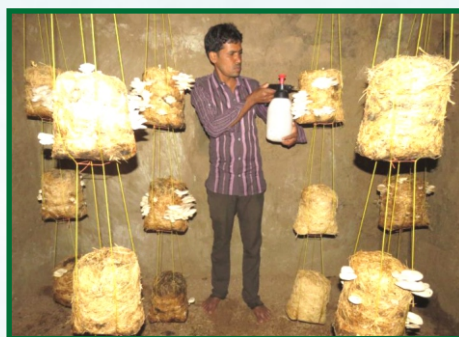
Experimental APC unit established at Bamhani village with PKV dal mill, mini flour mill, mini rice mill, pulveriser, spice grinder and mini oil expeller machines which is maintained by FIGs (Rs. 6,400 income per month)

## Custom Hiring Centres (CHCs)



Village level Custom Hiring Centres established to reduce drudgery of farmers

## Oyster Mushroom Production



ICAR-NIBSM introduced oyster mushroom (*Pleurotus sajor-caju*) production technology and provided training to rural youth and farm women. Rs. 12,500 income generated per unit/season

## Paddy Straw Mushroom Production



ICAR-NIBSM introduced paddy straw mushroom (*Volvariella volvacea*) production technology and provided training to rural youth and farm women. Rs. 6,700 income generated per unit/season

## Village Soil Testing Unit



Village level soil testing unit established at Kurraha village to provide soil health cards.  
*Mridaparikshak* mini soil testing lab procured from ICAR-IISS, Bhopal

# ICT Initiative



## Farmer Communication Centres (FCCs)



ICAR-NIBSM established two FCCs with computer, internet connectivity and agricultural literatures in Hindi and English languages at Kurraha and Kharri village to provide need based information and agro advisory on time



## Agricultural Film Shows (AFSs)



Periodical agricultural film shows during night hours organised at cluster of villages during pre crop season regularly to provide latest agricultural information

## Popularization of Agricultural Mobile App



Agro based mobile applications demonstrated and installed in representative farmers' phones for farmer to farmer information sharing

# Women Empowerment Initiatives





**Women empowerment through crop, livestock, horticulture, enterprise and NRM based modules.  
Total 215 women farmers benefitted under these initiatives**



**Participation of tribal women farmers in various agricultural activities under crop, livestock, horticulture, enterprise and NRM based modules**

# Glimpses of Capacity Building Programmes



**Total 347 capacity building programmes such as training, demonstration, exposure visit and farmer-scientists interface organised and 8417 farmers benefitted under this initiative**



Capacity building programmes organised in collaboration with IGKV, KVK and SAMETI, Raipur

## Dignitaries Visited



Dr. P. K. Ghosh, Director and Vice-Chancellor, ICAR-NIBSM and FFP monitoring team from NAARM, Hyderabad and ATARI, Jabalpur visited project implementation site at cluster of villages, Kasdol



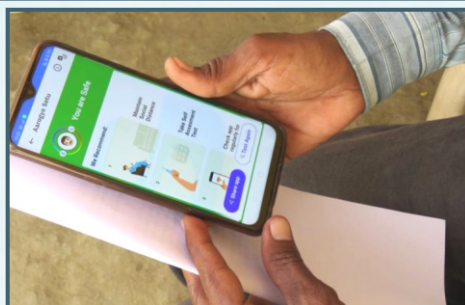
## Awards Received



**Mr. Chhabhu Lal Paikara received "Innovative Farmer Award 2019" from Dr. Trilochan Mohapatra, DG, ICAR.  
Mr. Bharat Paikara and Mrs. Rajkumari Patel received "Innovative Farmer Award 2019-20" from Dr. P. K. Ghosh**



## SOP Followed during COVID-19 Pandemic



Agro-advisory provided to the tribal farm families during COVID-19 pandemic for sustainable production

## Agro-advisory during COVID-19 at Project Site

- ★ Restricted the movement of visitors to the livestock and poultry shed & practice biosecurity measures.
- ★ Animal farm equipments and accessories cleaned and sanitized regularly before and after using.
- ★ Farmers were suggested to keep sufficient feed, fodder and medicine in hand to manage the lockdown period.
- ★ Farmers asked to wear the face mask, sanitizer and maintain social distance while cleaning animal shed, chaffing and distributing fodder and milking dairy animals.
- ★ Followed good management practices related to feeding, housing (clean, dry and well ventilated), water and general hygiene to keep animal healthy and productive.
- ★ Assisting the farmers through five Custom Hiring Centers (CHCs) at village level to cater their farm implements needs during harvest.
- ★ Village level Farmer Communication Centers (FCCs) and other ICT tools used to cater the information need of the farmers during *Rabi* harvest.
- ★ Storage pest monitoring gadgets provided to farmers to keep them vigil on storage pest management. Since, farmers harvested the crop and waiting for disposal.
- ★ As per ICAR guidelines, farmers are requested to maintain safe social distance of 3-4 feet during rest, taking of meals, produce collection points, loading and unloading at procurement centers.
- ★ Distributed the handouts of MoAFW guidelines/ICAR advisories for farmers during the lockdown.
- ★ More than 24 agricultural videos, 165 pictorial information and 433 text messages/files circulated through online platforms.
- ★ Farmers queries addressed through video conferencing, voice call and WhatsApp group.

# Seed to seed support under Farmer FIRST



**Crops:** *Lathyrus*, Chickpea, Mustard, Lentil, Linseed, Vegetables and Rice

**Contributors :** Bhisham Kumar Sahu (FA) and Satish Xaxa (FA)



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