

PRAYAS

Participatory Research Application for Year-Round
Income and Agricultural Sustainability: A Pathway to
Bridge Science and Farmers towards Prosperity

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Foreword

India is predominantly an agrarian economy, with over 50% of its workforce engaged in agriculture. However, this dependence does not always ensure financial stability, particularly in the eastern region, where farmers' monthly incomes in states like Jharkhand (₹4,895), Odisha (₹5,112), and Bihar (₹7,542) remain significantly below the national average of ₹10,218. Many farming communities, especially ethnic tribes and marginalized sections, still rely on traditional practices, yielding low economic returns and perpetuating rural poverty, malnutrition, and livelihood insecurity. To address these challenges, the Government of India has introduced targeted interventions and enhanced financial support through schemes such as the Scheduled Caste Sub-Plan (SCSP) and Tribal Sub-Plan (TSP), aiming to strengthen the agricultural sector and uplift these communities.

Achieving *Viksit Bharat-2047* requires the economic upliftment of scheduled caste, tribal, and other marginalized farming communities through location-specific, integrated, and sustainable interventions for inclusive growth. To support this vision, ICAR-RCER, Patna, launched the flagship program *PRAYAS* (Participatory Research Application for Year-Round Income and Agricultural Sustainability) using a multi-disciplinary, single-window approach. It combines scientific and indigenous knowledge exchange through exposure visits, tribal farmers' conclaves, and stakeholder collaboration to develop tailored farming system modules. With a market-driven, women-centric focus, it aims to generate year-round income and strengthen rural economies, promoting sustainable agricultural development. The institute is successfully implementing *PRAYAS* across 18 villages in 12 districts of 7 eastern states, benefiting over 12,000 farmers. By addressing location-specific needs—such as horticulture-based interventions in Assam, women empowerment and nutri-gardens in Bihar, goat-based models in Chhattisgarh, and pig farming in Jharkhand—it ensures effective technology dissemination and fosters long-term agricultural sustainability.

The book *"Participatory Research Application for Year-Round Income and Agricultural Sustainability: A Pathway to Bridge Science and Farmers towards Prosperity"* serves as a comprehensive guide to *PRAYAS*, documenting its intervention methodologies (process model), collaborative execution model, and impact across Eastern India, with a focus on ethnic tribes and Scheduled Caste farmers. I commend the institute's dedication to promoting sustainable farming practices that enhance the socioeconomic development of marginalized communities. *PRAYAS* aims to empower disadvantaged farmers (SCs and STs) by addressing their socio-economic and technological needs, transforming their livelihoods. Such participatory technology dissemination efforts will significantly contribute to inclusive agricultural growth. I sincerely appreciate the institute and its dedicated team of scientists for their valuable work and confident that the *PRAYAS* model will gain recognition and adoption by other organizations engaged in livelihood improvement programs nationwide.


(Rajbir Singh)

Preface

Agriculture in Eastern India plays a crucial role in the socio-economic development of the eastern region (Bihar, Jharkhand, West Bengal, Assam, Odisha, Chhattisgarh, and Eastern UP), yet it faces multiple challenges, including high population density, fragmented landholdings, climate variability, low productivity, income, and limited market access. **The Participatory Research Application for Year-Round Income and Agricultural Sustainability (PRAYAS)** initiative has been designed to address these challenges by integrating scientific advancements with traditional farming practices to enhance sustainability and productivity. The special focus of the initiative is to connect farmers belonging to marginalized section (SC, ST) and design location-specific pathways for effective technology transfer in a holistic manner to address diverse issues related to agriculture and transform the livelihood of farmers with innovative location-specific interventions.

This book presents a detailed account of the PRAYAS process model, documenting its implementation across different states, the key interventions, and the impact on farmers' livelihoods. Through participatory research and knowledge-sharing, the initiative aims to bridge the gap between scientific innovation and practical agricultural solutions. The document provides valuable insights into the process of making traditional farming, like tribal farming or farming practiced by Scheduled caste farmers, more sustainable, creating income diversification, and making market integration strategies tailored to the unique conditions of Eastern India. The further aim of the PRAYAS is to empower farmers, especially women belonging to weaker sections, through capacity building, training, exposure, interactions, cross learning, and demonstrations.

We believe this publication will serve as a useful resource for researchers, policymakers, agricultural extension officers, and farmers interested in adopting participatory and sustainable agricultural models. We extend our gratitude to all contributors, institutions, stakeholders, and participating farmers involved in this initiative.

Editors

Acknowledgements

We gratefully acknowledge the financial and institutional support extended by the TSP/SCSP Funds of ICAR Research Complex for Eastern Region (ICAR-RCER), Patna; ICAR-Indian Institute of Agricultural Biotechnology (IIAB), Ranchi; and ICAR-National Institute of Biotic Stress Management (NIBSM), Raipur. Their generous support has been instrumental in the successful conceptualization and execution of the PRAYAS initiative.

We sincerely thank our collaborators, including ICAR-ATARI, Guwahati, Assam, for their valuable coordination. The cooperation of Krishi Vigyan Kendras (KVKs), particularly KVK Kamrup and KVK Malda-II, has been pivotal in the on-ground implementation of location-specific interventions under PRAYAS. Our heartfelt thanks extended to the partner NGOs—Brajina Foundation, Bettiah; Vivekananda Vikas Kendra, Kalimati, Purulia; and DREAMS, Guwahati—for their proactive community engagement, capacity building, and support in mobilizing the farmers at the grassroots level. We also extend our appreciation to several grass root FPCs, SHGs for facilitating farmer mobilization, value chain development, and market linkage activities in the region.

We extend our heartfelt gratitude to the dedicated farmers from the seven eastern states—Bihar, Jharkhand, West Bengal, Assam, Odisha, Chhattisgarh, and Eastern Uttar Pradesh—whose active participation, traditional wisdom, and openness to innovation have been the cornerstone of the PRAYAS initiative. Their collaboration and trust have greatly enriched our research and outreach efforts.

We also sincerely acknowledge the unwavering support and commitment of all scientific, technical, and administrative staff of ICAR-RCER, Patna. Their collective efforts, coordination, and hard work have been vital in planning, executing, and monitoring the various components of this initiative across diverse agro-climatic regions.

Editors

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PRAYAS – A conceptual model for empowering farmers of marginalised sections through technology intervention

Eastern India, comprising 7 states viz. Bihar, Odisha, Jharkhand, West Bengal, Assam, Chhattisgarh, and parts of eastern U.P., is a region rich in natural resources and cultural heritage. However, it is also home to some of the most marginalized and vulnerable farming communities in the country. Globally, India is recognized as the country with large share of tribal population, hosts half of the worlds tribal community i.e., approximately 10.45 crore representing 11.58% of the total population of India (Indian Census, 2011). Also, Scheduled Caste (SC), and Scheduled Tribe (ST) farmers form a significant portion of the agricultural workforce in this region. Despite their critical role in food production, these communities face systemic challenges that hinder their progress and perpetuate cycles of poverty. This chapter delves into the socio-economic and agricultural context of eastern India, highlighting the challenges faced by SC, and ST farmers underscoring the importance of sustainable agriculture for their upliftment.

Challenges faced by SC, and ST Farmers

1. Land ownership and fragmentation

Marginalized farmers often lack secure land tenure, with many being small or marginal landowners. In states like Jharkhand and Odisha, over 60% of tribal farmers own less than 1 hectare of land. This land fragmentation limits their ability to adopt modern farming techniques and achieve economies of scale. Additionally, land alienation due to illegal encroachments and lack of proper documentation further exacerbates their vulnerability.

2. Limited access to credit and resources

Access to formal credit remains a significant challenge for tribal and SC/ST farmers. According to the National Bank for Agriculture and Rural Development (NABARD), only 30% of tribal farmers in eastern India have access to institutional credit. The rest rely on informal moneylenders who charge exorbitant interest rates, trapping them in cycles of debt. Moreover, limited access to quality seeds, fertilizers, and irrigation facilities further hampers agricultural productivity.

3. Dependence on rainfed agriculture

Eastern India is heavily dependent on monsoon rains, with over 70% of the agricultural area being rainfed. Erratic rainfall patterns due to climate change have made farming increasingly unpredictable for instance, in Odisha, frequent droughts and floods have led to crop failures, pushing tribal farmers deeper into poverty. The lack of irrigation infrastructure and water management systems compounds this issue.

4. Low adoption of modern technologies

Tribal farmers often rely on traditional farming practices, which, while ecologically sound, are not always productive. The adoption of modern technologies like high-yielding seed varieties, precision farming, and mechanization remains low due to lack of awareness, training, and

financial resources. This technological gap limits their ability to compete in the market and improve their livelihoods.

5. Poor market linkages

Tribal and marginalized farmers often lack access to fair markets and are exploited by middlemen. In states like Chhattisgarh, tribal farmers sell their produce at prices significantly lower than the market rate due to poor transportation infrastructure and lack of market information. This exploitation reduces their income and discourages them from investing in agriculture.

6. Social exclusion and discrimination

SC and ST farmers face social discrimination, which limits their access to government schemes and programs. Despite affirmative action policies, the implementation of welfare schemes remains uneven, with many tribal farmers unaware of their entitlements. This exclusion perpetuates their marginalization and limits their growth opportunities.

Importance of sustainable agriculture for the weaker sections

Sustainable agriculture is not just an environmental imperative but also a socio-economic necessity for marginalized farmers in eastern India. Here's why:

- 1. Climate resilience:** Sustainable practices like agroforestry, organic farming, and water conservation can help tribal farmers adapt to climate change. For example, in Odisha, the adoption of the System of Rice Intensification (SRI) has increased yields while reducing water usage.
- 2. Economic stability:** Diversification into allied activities like poultry, dairy, and fisheries can provide year-round income. Integrated farming systems have helped tribal farmers increase their income and empower the weak.
- 3. Preservation of traditional knowledge:** Tribal farmers possess rich traditional knowledge of biodiversity and natural resource management. Integrating this knowledge with modern science can lead to innovative solutions for sustainable agriculture.
- 4. Empowerment and inclusion:** Sustainable agriculture initiatives can empower marginalized farmers by providing them with skills, resources, and market access. Self-help groups (SHGs) in Jharkhand have enabled several tribal women to become entrepreneurs in organic farming.
- 5. Enhancing livelihood security:** Sustainable farming practices help ensure that farmers can maintain their livelihoods over time. By focusing on crop diversification, organic farming, agroforestry, and conservation practices, marginalized farmers can improve their income stability and reduce their vulnerability to climate-related shocks.
- 6. Promoting environmental sustainability :** Eastern India is rich in biodiversity and natural resources. However, traditional farming practices often lead to soil degradation, deforestation, and the depletion of water resources. Sustainable agriculture emphasizes the use of eco-friendly farming techniques such as soil conservation, rainwater harvesting, organic fertilizers, and agroecology. These practices not only increase agricultural productivity but also preserve the environment for future generations.

The plight of marginalized farmers in Eastern India is a complex issue that requires multi-dimensional

solutions. The socio-economic and agricultural context of the region reveals significant challenges, including limited access to resources, poor infrastructure, climate vulnerability, and social exclusion. However, sustainable agriculture offers several pathways. By adopting sustainable agricultural practices, empowering farmers with knowledge, and improving access to markets, these marginalized communities can transform their agricultural practices, increase their income, and achieve long-term sustainability. The PRAYAS model offers a promising pathway to address these challenges and promote inclusive agricultural growth in the region.

Participatory Research Application for Year-Round Income and Agricultural Sustainability (PRAYAS)

PRAYAS is a flagship outreach program of ICAR-RCER Patna, dedicated for demonstrating advanced agricultural technologies across seven states in Eastern India: Bihar, West Bengal, Jharkhand, Odisha, Assam, Eastern Uttar Pradesh, and Chhattisgarh. This initiative integrates the Tribes Sub Plan, Scheduled Sub Caste Sub Plan and other institutional programs under one umbrella. The primary objective is to enhance agricultural productivity and sustainability through improved practices. PRAYAS also focuses on creating awareness and providing skill development opportunities for resource-poor farmers, enabling them to adopt profitable farming techniques. By establishing linkages with grassroots stakeholders, the project ensures the widespread adoption of these practices. Additionally, PRAYAS examines the impact of institutional interventions on sustainable livelihoods. Through participatory research and community engagement, PRAYAS empowers farmers, promotes agricultural sustainability, and contributes to improved livelihoods and economic resilience in the region.



Fig. 1.1 Study areas of PRAYAS in eastern India

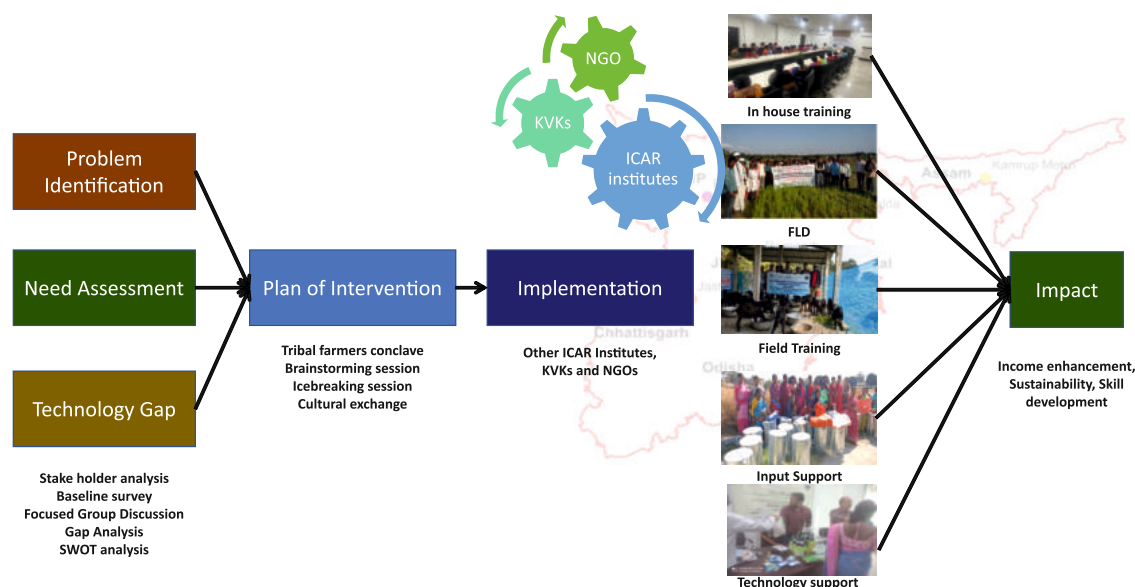
Table 1.1: Villages adopted under the PRAYAS in eastern India

SC Villages adopted (8)	ST Villages adopted (8)	Districts (12)	States (7)
Dhipuji Jan pam, Chandrapur block	Rewa-Mahaswar, Demoria block	Kamrup District	Assam
-	Naurangia, Ramnagar block Bettiah	West Champaran	Bihar
Selhauri, Dulhin Bazar Block	-	Patna	
Guleriyachak, Tekari Block	-	Gaya	
Kumekela, Pathalgaon Block	Kandora Kunkuri block	Jashpur	Chhattisgarh
Basantpur, Sohaon Block	-	Ballia	Eastern UP
-	Palandu and Kharsidag, Namkum Block	Ranchi	Jharkhand
Udlu Mandu block	Lodma Ramgarh	Ramgarh	
Mangratoli village Nuagaon block	-	Sundargarh	Odisha
	Hatinada, Baghmundi block, Ajodhya Hill,	Purulia	West Bengal
Begunbari Habibpur Block	Chandandighi, Gazole block	Malda	
-	Chakkathalia, Bagda block	24 Parganas	

The PRAYAS project has concentrated its efforts on villages classified as (SC) and (ST) in 12 districts across 7 states within Eastern India. This initiative aims to implement targeted technological interventions to foster development and address the unique needs of these communities (Table 1.1). A comprehensive need assessment survey was conducted, followed by a problem prioritization process employing multi-criteria decision-making techniques. This methodological approach allowed for a systematic evaluation of the identified needs and gaps, assessing them based on their significance and potential impact. Each identified issue was subsequently assigned a score to denote its priority in enhancing agricultural sustainability and promoting income generation within the targeted regions (Table 1.2).

Table: 1.2 State-wise major issues and interventions under PRAYAS

Major issues	Interventions	State
Lack of quality planting materials, water scarcity, low income	Plantation crops and horticultural-based IFS	Assam
Lack of livelihood opportunities, poor nutrition, quality seeds, and agricultural technologies	Promotion of Backyard Poultry, Skilling of Women, and promotions of Nutri-garden	Bihar
Rice fallow, Water scarcity, technology gap, low income	Goat Based IFS, Pulses/oilseeds in rice fallow areas	Chhattisgarh
Poor irrigation facilities, lack of improved varieties of vegetables, poor nutrition and low income	Vegetable-based interventions	Eastern UP
Water scarcity, Unemployment, Wide skill and technology gaps, low income and employment	Pig based and horticulture-based IFS	Jharkhand
Water scarcity, poor nutrition and income	Promotion of Backyard Poultry	Odisha
Lack of market, Unemployment and Marginalization, Lack of improved varieties of crops, chick and fisheries, poor nutrition	Mushroom, Poultry, Goat, and Fish based interventions, nutri-garden	West Bengal

**Fig. 1.2 Process model of PRAYAS**

The PRAYAS process model is a systematic, participatory approach that progresses through distinct phases, each informed by scientific principles and tailored to the local context. The framework is illustrated in Figure 1.2 and described below:

Phase 1: Problem identification, needs, and technological gap assessment

- o Conducted baseline surveys, participatory rural appraisals (PRAs), focus group discussions (FGDs), stakeholder analysis, and SWOT analysis to understand local issues.
- o Assess technological gaps, resource constraints, and socio-economic barriers.
- o Use data-driven insights to prioritize interventions.

Phase 2: Strategic intervention design

- o Conducted tribal farmer's conclave, ice-breaking sessions, and brainstorming sessions with tribal farmers to understand their situation and make them familiar with the new research environment. Through these, a platform for cultural exchange was facilitated. The tribal farmers of Jharkhand (*Santhal and Munda*) were exposed to the traditional practices of tribal farmers (*Bodo and Rabha*) of Assam.
- o Collaborated with ICAR institutes, Krishi Vigyan Kendras (KVKs), and NGOs to design evidence-based interventions.
- o Integrated traditional knowledge with modern scientific practices.
- o Focused on three core goals:
 1. **Income enhancement:** Promoted cost-minimizing technologies, secondary agriculture, and market linkages.
 2. **Sustainability:** Introduced climate-resilient practices, water conservation, and organic farming.
 3. **Human resource development:** Build farmer capacity through training and skill development.

Phase 3: Collaborative implementation

- o Engage ICAR institutes, KVKs, and NGOs to provide technical expertise and resources.
- o Implement location-specific programs
- o Conduct frontline demonstrations and field training to ensure the practical adoption of technologies.

Phase 4: Capacity building and skill development

- o Organize in-house training sessions, workshops, and exposure visits.
- o Train farmers on improved technologies, such as modern varieties, breeds, and integrated farming systems.
- o Promote gender inclusivity by empowering women farmers through skill development and access to resources.

Phase 5: Monitoring, evaluation, and impact assessment

- o Use quantitative and qualitative indicators to assess outcomes, such as income levels, adoption rates, and environmental impact.
- o Conduct periodic reviews with stakeholders to identify gaps and refine strategies.
- o Document success stories and lessons learned for scalability and replication.

3. Key outcomes of PRAYAS

The PRAYAS model has demonstrated measurable impact across multiple dimensions (Fig. 1.3):

1. **Income enhancement:** Increased farmer incomes through diversified livelihoods and market linkages.
2. **Environmental sustainability:** Adoption of climate-resilient practices, reduced drudgery, and conservation of natural resources.
3. **Skill enhancement:** Strengthened capacity, community networks, gender inclusivity, and enhanced human capital.

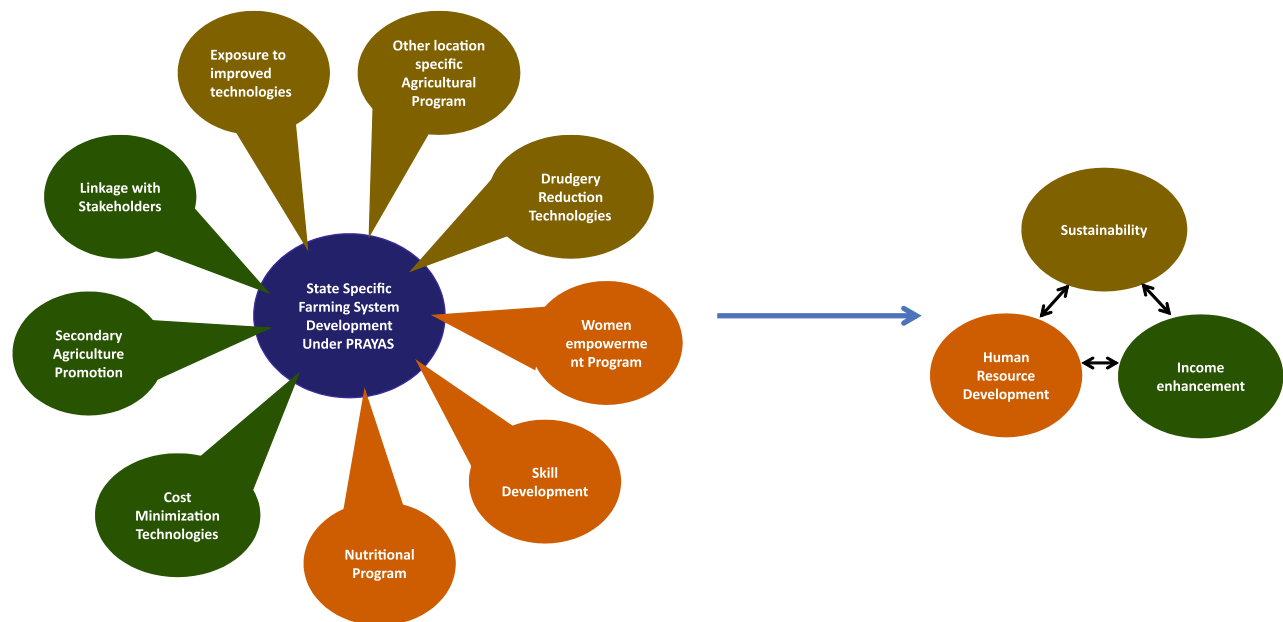


Fig. 1.3 Components of PRAYAS intervention for attaining sustainability, income enhancement, and human resource development



Fig. 1.4 Baseline survey at Malda



Fig. 1.5 Need identification at North 24 Pargana



Fig. 1.6 Farm resource survey at Assam



Fig. 1.7 Village resource survey at North 24 Pargana



Fig. 1.8 Goat-based intervention at North 24 Pargana



Fig. 1.9 Backyard poultry-based interventions at West Champaran



Fig. 1.12 Folk dance by the Gond tribes of Bihar during the Tribal Farmers Conclave



Fig. 1.13 Folk dance by Santhal Tribes of Jharkhand during Tribal Farmers Conclave



Fig. 1.14 Products of tribal FPOs displayed during Tribal Farmers Conclave (Dr KD Kokate, Former DDG, Agril Extn)



Fig.1.15 Recognition of tribal farmers for conservation practices

Tribal Farmers Conclave: A celebration of culture and conservation

The Tribal Farmers Conclave (TFC) was successfully organized at ICAR Research Complex for Eastern Region, Patna, in February 2024, creating a dynamic platform for cultural exchange and technological advancement. The event brought together 500 tribal farmers from seven states, fostering dialogue between indigenous farming communities, agricultural scientists, and development organizations.

A key highlight of the conclave was the vibrant display of tribal heritage. Enthralling performances, such as the Gond dance from Bihar and the Santhal dance from West Bengal and Jharkhand, captivated the audience, reinforcing the need to preserve these rich traditions. Tribal Farmer Producer Organizations (FPOs) set up interactive exhibitions showcasing traditional agricultural products, demonstrating sustainable farming techniques that have been passed down through generations.

Beyond cultural appreciation, the conclave played a crucial role in integrating traditional wisdom with modern agricultural innovations. Tribal farmers actively engaged in discussions with experts, sharing their indigenous technical knowledge while expressing the need for scientific interventions to improve productivity and income. Live demonstrations of climate-resilient crop varieties, low-cost mechanization, and agroforestry techniques offered practical insights into sustainable farming solutions.

A special felicitation ceremony recognized tribal farmers for their exceptional contributions to conservation practices, emphasizing the invaluable role of indigenous knowledge in environmental sustainability. The conclave not only celebrated tribal traditions but also underscored the importance of technological empowerment in strengthening rural livelihoods.

Well-structured sessions, seamless coordination, and enthusiastic participation made the conclave a resounding success, leaving a lasting impact on both the farming community and the scientific fraternity. By bridging cultural heritage with modern agricultural advancements, the TFC set a new benchmark for collaborative growth and sustainable development.

Assam: Strengthening Livelihoods through Integrated Horticulture-based Interventions

Assam, a state in northeastern India, spans a total area of 78,438 square kilometers and has a population of 3.12 crore, according to the 2011 census. The population density is notable, standing at 397 individuals per square kilometer, which indicates the significance of the population, pointing to the presence of historically marginalized communities. The state has a sex ratio of 958 females for every 1,000 males, which suggests a relatively balanced gender distribution, albeit with a slight male predominance. The state has around 85.9% rural population. The Scheduled Tribe population in Assam is around 12.45%, whereas the Scheduled caste population is around 7.15%. Demographic-wise, the Indigenous Bodo tribe constitutes half of the region's ST population, and the region also has a significantly large number of other ethnic minorities which include: Assamese, Karbi, Koch Rajbongshi, Garo, Rabha tribe, Adivasis etc. In this state 2 villages, Dhipuji Jan Pam village (SC-dominated village) and Rewa-Mahaswar, Demoria (ST communities) were selected for the interventions.

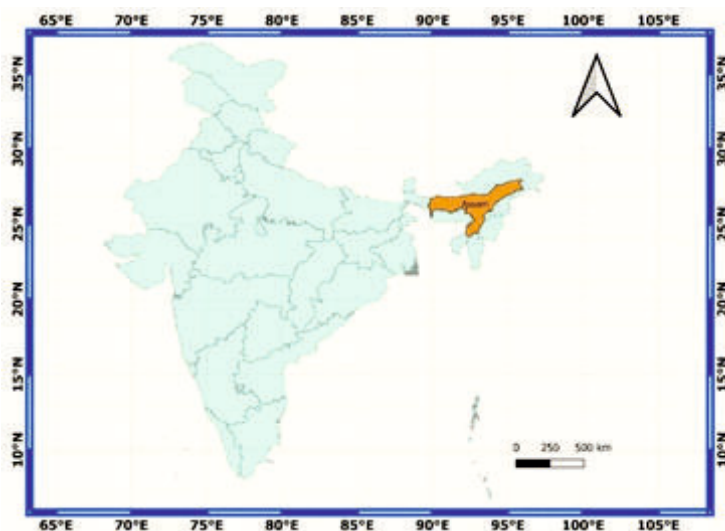


Fig. 2.0 State boundary of Assam state

Dhipuji Jan Pam, a large village in Chandrapur Circle of Kamrup Metropolitan district, Assam, is home to 416 families with a total population of 2,607, including 1,350 males and 1,257 females (Census, 2011). Children aged 0-6 constitute 16.92% of the population, with a child sex ratio of 986, higher than Assam's average of 962. However, the overall sex ratio (931) is lower than the state average (958). The village has a literacy rate of 66.30%, lagging behind Assam's 72.19%, with male literacy at 71.54% and female literacy at 60.60%. Predominantly inhabited by Scheduled Caste (97.39%), the village has no Scheduled Tribe population. Governance follows the Panchayati Raj system, led by an elected Sarpanch.

In Dhipuji Jan Pam village out of the total population, 801 were engaged in work activities, 79.28 % of workers described their work as main work (employment or earning more than 6 months), while 20.72 % were involved in marginal activity providing livelihood for less than 6 months. Out of 801 workers engaged in Main Work, 469 were cultivators (owner or co-owner) while 56 were Agricultural labourers.

Table 2.1 Details of Dhipuji Jan Pam village

1	Name of Village	Dhipuji Jan Pam
2	Total no. of Households	416 families
	Partner Institute	KVK Kamrup Kahikuchi, Distt. Kamrup, Guwahati
3	Major Interventions	Plantation crops and horticultural-based IFS

The Dhipuji Jan Pam village selected was around 40 km from Guwahati. The village's population consists of people belonging to the SC community (> 80%). The people are mainly marginal farmers with limited land holdings and are poor. Agriculture is the major livelihood activity going on in that area, The area is surrounded by the river Brahmaputra from the Northern side and its tributary Kopilee from the eastern side and is a flood-prone area. The whole area is known as Chandrapur. During the visit to those villages and understanding the topographical and livelihood issues of that area, ICAR RCER has decided to initiate a few activities in pilot project mode.

Table 2.1 Details of Dhipuji Jan Pam village

Particulars	Total	Male	Female
Total No. of Houses	416	-	-
Population	2,607	1,350	1,257
Child (0-6)	441	222	219
Schedule Caste	2,539	1,313	1,226
Schedule Tribe	0	0	0
Literacy	66.30 %	71.54 %	60.60 %
Total Workers	801	645	156
Main Worker	635	-	-
Marginal Worker	166	90	76

Problems & needs identified: As per the baseline survey and focused group discussions, the key agricultural challenges identified include the unavailability of quality planting material, water scarcity, inadequate irrigation infrastructure, low soil fertility, and limited access to extension services. These constraints significantly impact crop productivity and farm sustainability, necessitating targeted interventions for improved resource management and technology adoption.

Initiatives undertaken: The initiatives undertaken focus on the implementation of plantation crops and horticulture-based Integrated Farming Systems (IFS) to enhance agricultural productivity and sustainability. This includes the establishment of diversified cropping systems integrating high-value horticultural crops, agroforestry models, and intercropping practices to optimize land use efficiency. Additionally, the promotion of climate-resilient varieties, improved irrigation techniques, and soil fertility management strategies aim to address key challenges such as water scarcity and degraded soil health. Capacity-building programs and farmer training sessions are also being conducted to facilitate knowledge transfer and ensure the successful adoption of these improved agricultural practices.

Training conducted:

The implementation of Integrated Farming Systems (IFS) has been recognized as a sustainable approach to address key challenges faced by farmers in Dhipuji Jan Pam village, Chandrapur, Kamrup (M), Assam. As identified through baseline surveys and focused group discussions, the primary constraints include limited access to quality planting materials, inefficient resource utilization, and the need for diversified income sources. To mitigate these challenges, a training-cum-awareness program on “Integrated Farming Systems for Livelihood Improvement” was conducted on June 17, 2023, under the Scheduled Caste Sub-

Plan (SCSP). This initiative, in collaboration with Krishi Vigyan Kendra (KVK) Kamrup, Luitporiya Farmer Producer Company Limited, and DREAMS, Guwahati, provided farmers with technical knowledge on sustainable crop diversification, particularly focusing on the scientific management of Arecanut planting materials.

Further, on February 27, 2024, a one-day training session was organized to promote wetland-based livelihoods through the integration of agriculture, livestock, and fisheries. To ensure the practical application of knowledge gained, critical inputs such as improved planting materials (arecanut, Assam lemon, rice varieties, vegetable seeds), suction and delivery pipes, and knapsack sprayers were distributed to Scheduled Caste (SC) farmers. These interventions have led to improved adoption of climate-resilient farming practices, enhanced crop productivity, efficient pest management, and increased farm income diversification. The impact assessment revealed better resource utilization, reduced dependency on single-crop systems, and strengthened economic resilience among beneficiary farmers



Fig. 2.1 Distribution of planting material to SC Farmers at Dhipuji Jan Pam village, Guwahati



Fig. 2.2 Awareness cum interaction with SC farmers and input support at Dhipuji Jan Pam, Kamrup, Assam

Impact of the activities:

The implementation of integrated farming interventions has demonstrated significant positive outcomes in enhancing agricultural productivity and livelihood sustainability among Scheduled Caste (SC) farmers in the selected region. A total of 4,000 Arecanut and 2,000 Assam lemon planting materials were distributed to approximately 100 SC farmers, with an observed survival rate of 60-65% in the targeted area, indicating successful establishment and adaptation to local agro-climatic conditions.

To address water scarcity and improve irrigation efficiency, 15 delivery plastic pipes were allocated among 30 farmers (organized into groups of two), facilitating groundwater extraction and efficient water transportation across fields. This intervention enabled the irrigation of approximately 50 acres of agricultural land, thereby improving soil moisture availability and overall crop health.

Additionally, five knapsack sprayers were provided to enhance pest and disease management, contributing to an estimated 5% increase in income from field crops due to improved crop protection measures. Furthermore, the provision of high-quality vegetable seeds for kitchen gardening resulted in a 10-15% increase in vegetable yield, enhancing both household nutritional security and supplementary farm income. These integrated interventions collectively improved resource-use efficiency, farm resilience, and livelihood diversification among SC farmers in the region.

Rewa Maheswar village (TSP)

The site selected is around 50 km from Guwahati. The population of that village consists of people belonging to the ST community (> 90%). The people are mainly marginal farmers having limited land holdings and are poor. Agriculture and livestock (especially piggery and poultry) are the major livelihood activities going on in that area. During the visit to those villages and understanding the topographical and livelihood issues of that area, ICAR RCER has decided to initiate a few activities in the pilot project mode

Table 2.3 Details of Rewa Maheswari village

1.	Name of Village	Rewa Maheswar
2.	Total no. of Households	170
3.	Partner Institute	KVK Kamrup Kahikuchi, Dist. Kamrup, Guwahati, Assam
4.	Major Interventions	Plantation crops and horticultural-based IFS

Problems & Needs Identified in Rewa Maheswar Village

A comprehensive baseline survey and focused group discussions conducted in Rewa Maheswar village revealed critical challenges affecting agricultural productivity and farmers' livelihoods. The primary constraints include the unavailability of high-quality planting materials, limiting farmers' ability to adopt improved crop varieties with better yield potential and resistance to biotic and abiotic stresses. Additionally, water scarcity emerged as a major concern, particularly during the dry season, affecting both crop cultivation and livestock management. Inefficient irrigation practices, coupled with limited access to water conservation technologies, further exacerbated the problem, leading to suboptimal productivity and increased vulnerability to climatic fluctuations. The lack of integrated farming approaches and diversified income sources made the farming community more susceptible to economic instability. Hence, a need-based intervention was designed to enhance resource-use efficiency, ensure sustainable water management, and introduce improved crop varieties suited to local agro-climatic conditions.

Initiatives Undertaken in Rewa Maheswar Village

To address the identified challenges, an Integrated Farming System (IFS) model with a focus on plantation crops and horticulture was introduced in Rewa Maheswar village. This approach aimed to optimize land use, improve farm income diversification, and enhance water-use efficiency. High-yielding and climate-resilient planting materials, including fruit-bearing and plantation crops, were provided to farmers to promote long-term sustainability. Additionally, water management interventions, such as the

installation of delivery pipes and improved irrigation techniques, were implemented to ensure efficient water utilization for crop production. Training programs were conducted to educate farmers on sustainable agricultural practices, efficient irrigation management, and organic methods of pest and disease control. By integrating horticulture with traditional farming practices, farmers were able to enhance productivity, improve soil health, and create alternative revenue streams. The intervention not only improved agricultural resilience but also contributed to nutritional security and economic stability in the village.

Training conducted:

Organized a one-day training cum farmers' awareness programme under the TSP component on 12th March 2024 in Rewa Maheswar village of Kamrup (M) district, Assam, and critical inputs like planting materials of Arecanut, Assam lemon and black pepper, suction pipes, delivery pipes, and Knap sac sprayers were also supplied to the ST farmers for spraying insecticides in the agricultural field



Fig. 2.3 Training cum farmers' awareness programme under TSP component in Rewa Maheswar village of Kamrup (M) district, Assam

Impact of the activities in Rewa Maheswar village

The implementation of the plantation-based Integrated Farming System (IFS) model in Rewa Maheswar village resulted in significant improvements in agricultural productivity, resource utilization, and income generation among the tribal farming community. A total of 1,500 planting materials, including Arecanut, Black Pepper, and Assam Lemon, were distributed to 30 Scheduled Tribe (ST) farmers, with each beneficiary receiving 50 plants. Field assessments revealed a high survival rate of 70-75%, indicating successful adaptation to the local agro-climatic conditions and effective post-plantation management by the farmers. To address the issue of water scarcity, 10 delivery plastic pipes and three suction pipes were provided to 10 farmers, facilitating groundwater extraction and efficient water transportation across fields. These interventions enabled the irrigation of approximately 20 acres of agricultural land, mitigating water stress and enhancing crop yields. Additionally, four knapsack sprayers were distributed to support integrated pest and disease management, contributing to improved crop health and yield stability. The adoption of these practices led to an estimated 5-6% increase in income from field crops. Overall, the interventions played a crucial role in enhancing agricultural resilience, promoting sustainable livelihoods, and ensuring long-term farm productivity for the tribal farmers of Rewa Maheswar village.

Capacity Building Workshop for empowering tribal farmers under PRAYAS program in Guwahati

A capacity-building workshop aimed at empowering farmers under the Tribal Sub Plan (TSP) and

Scheduled Caste Sub Plan (SCSP), as part of the PRAYAS program, was successfully organized on March 12, 2025, in Guwahati by ICAR RCER, Patna, in collaboration with ATARI Guwahati and KVK Kamrup, Assam Agricultural University, Kahikuchi. The workshop witnessed enthusiastic participation from 150 farmers and 10 experts and officials, focusing on equipping them with essential resources and knowledge for improved agricultural productivity.

As part of the initiative, critical agricultural inputs such as high-yielding paddy seeds, fruit and plantation crop planting materials, drying nets, delivery pipes, and steel buckets with mugs, were distributed among all participants, ensuring tangible support for their farming activities.

Dr. K.M. Bujarbaruah, former DDG Animal Sciences and Vice Chancellor of AAU Jorhat graced the event as the Chief Guest. He emphasized the need for integrated efforts and resource mobilization to make a meaningful impact on the livelihoods of marginalized communities. Highlighting the significance of organic and natural farming, he underscored their role in ensuring sustainable development in the region. Dr. V.K. Mishra, Director, ICAR Research Complex for NEH, Umiam, stressed the importance of conserving and promoting indigenous cattle breeds, while Shri K.K. Bora, a social worker, encouraged farmers to adopt entrepreneurship and effective marketing strategies for financial empowerment. Dr. Anup Das, Director of this Institute, elaborated on the institute's outreach programs, urging farmers to embrace modern technologies for enhanced productivity and livelihoods. The program was smoothly coordinated by Dr. Kamal Sarma and Dr. N. Bhakta from ICAR RCER Patna, along with Dr. Bagish Kumar from ICAR ATARI Guwahati. The event concluded with a vote of thanks by Dr. D.C. Kalita, Head, KVK Kahikuchi, marking a significant step toward strengthening the agricultural ecosystem of the region.





Fig. 2.4 Capacity building workshop under the PRAYAS program in Guwahati



Fig. 2.5 Happy and empowered farmers after training and intervention support with their crop in Assam



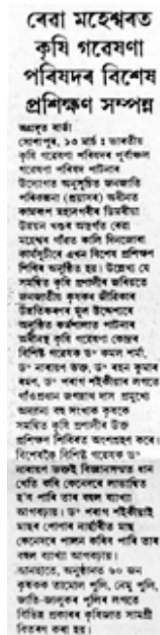
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Fig. 2.6 Press and media coverage of the programmes taken up at Assam under PRAYAS



Bihar: Backyard farming and nutri-garden innovations for year-round income and rural prosperity

Bihar, encompassing an area of 94,163 square kilometers, had a population of 104,099,452 according to the 2011 Census, resulting in a population density of 1,106 individuals per square kilometer. A substantial majority, 88.7%, reside in rural areas, while 11.3% live in urban regions. The literacy rate stands at 61.8%, with male literacy at 71.2% and female literacy at 51.5%. Scheduled Castes (SC) constitute 16.6% of the population, and Scheduled Tribes (ST) account for 1.3%, with a sex ratio of 918 females per 1,000 males. The 2022 Bihar Caste-Based Survey, conducted between January and August 2023, provides updated demographic insights. The survey indicates that Bihar's total population has risen to 130,725,310. Scheduled Tribes now represent 1.68% of the population, totaling approximately 2,199,361 individuals. This reflects a slight increase from the 1.3% reported in the 2011 Census. Several tribal communities contribute to Bihar's diverse cultural fabric. Notable among them are the Oraon, Munda, Khond, and Kol tribes. The Oraon community, with a national population of 3,682,992, is present in Bihar among other states. Similarly, the Munda tribe, totaling 2,203,006 individuals nationally, and the Khond community, with 1,628,501 members, have significant representations in Bihar. The Kol tribe, comprising 1,263,818 individuals across India, also resides in the state.

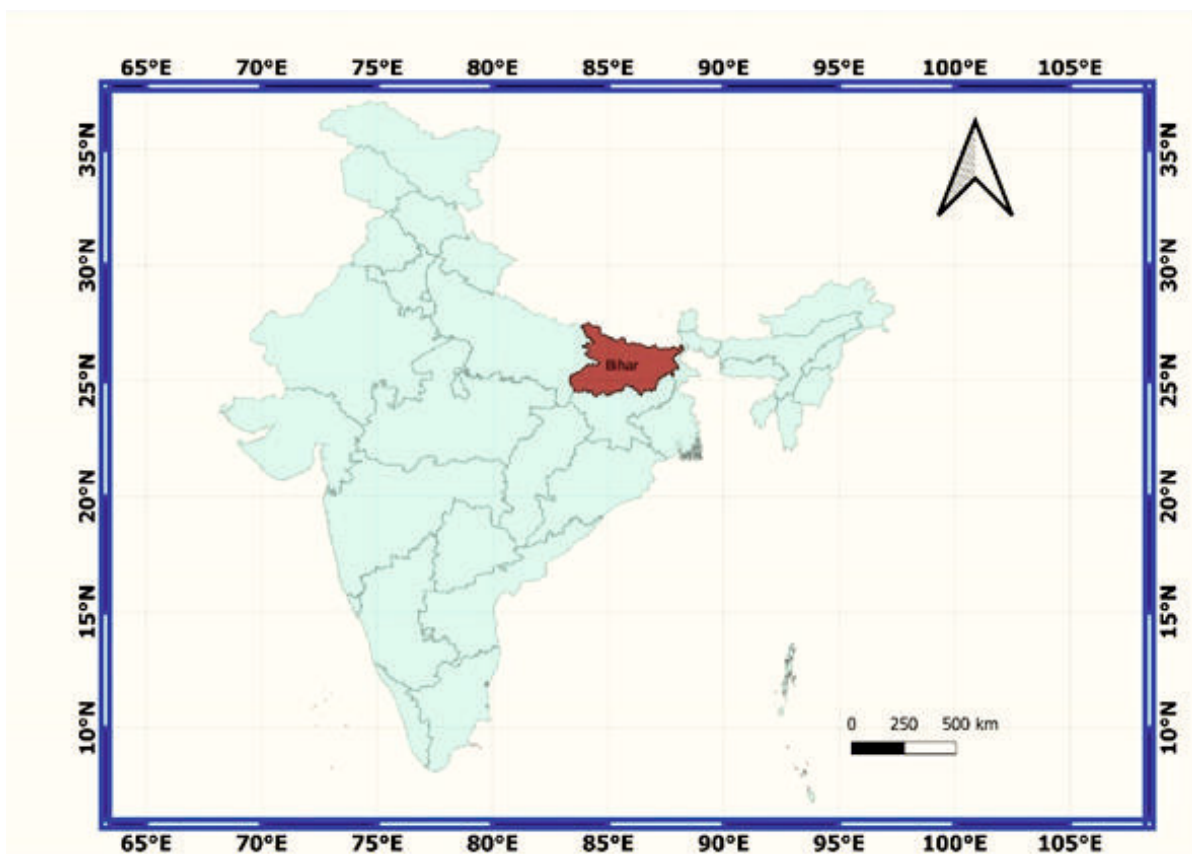


Fig. 3.0 State boundary map of Bihar State

Selhauri village, Block: Dulhin Bazar, Patna

Selhauri is a vibrant village located in the Dulhin Bazar Block of Patna district, Bihar (25.3978 °N, 84.8586 °E). Covering a total geographical area of 247 hectares (net sown area 140 ha), the village is home to approximately 640 families. This close-knit community thrives amidst a rural setting, with agriculture and related activities serving as the primary livelihood for many residents. The village primarily relies on rainfall for irrigation; however, the presence of an ahar enables farmers to irrigate their fields for most of the year. During the dry period from March to May, farmers use tubewells for irrigation.

Positioned 41 kilometers west of Patna, the district headquarters, Selhauri enjoys proximity to several other administrative blocks that contribute to its accessibility and connectivity. It is bordered by Bikram Block to the north, Paliganj Block to the south, Masaurhi Block to the east, and Sandesh Block to the west, creating a network of neighboring areas that influence the socio-economic dynamics of the village.

The population of Selhauri stands at about 4,051 individuals, reflecting the diversity of its residents. A significant portion of the population, approximately 27%, belongs to the Scheduled Caste (SC) community. This demographic includes over 200 households, highlighting the substantial representation of SC families in the village. Efforts to empower these communities through government schemes and social initiatives are evident, fostering a sense of inclusion and progress.

Selhauri's location and demographic structure make it a key part of the Dulhin Bazar Block. The village, like many others in the region, faces challenges related to rural infrastructure, education, and healthcare, but it also holds immense potential for development. With its rich cultural heritage and hardworking residents, Selhauri is a microcosm of Bihar's rural heartland, showcasing both its challenges and opportunities for growth. The village also has a significant population of livestock, including goats, buffaloes, crossbred cattle, indigenous cattle, and poultry.

Table 3.1 Details of major interventions in Selhauri village

1	Name of the Village	Selhauri, Block: Dulhin Bazar, Patna
2	Total Households	640
3	Total SC households	200
4	Major Interventions	High-yielding seed varieties, Nutri Garden for vegetable crops, conservation agriculture, and training, year -round income and employment of farmers, sewing m/c for alternate income.

Problems and needs identified

The survey conducted among farmers revealed the following needs, reflecting their priorities for improving livelihoods and agricultural productivity:

1. High-yielding seed varieties for better yield

Farmers expressed the need for high-yielding seed varieties to enhance crop productivity. Such seeds are critical for achieving higher yields, improving food security, and increasing income. Providing these seeds would also help farmers combat the challenges posed by pests, diseases, and adverse climatic conditions.

2. Vegetable seeds for nutri-garden establishment

The demand for vegetable seeds underscores the farmers' focus on nutrition and diversification of crops. Nutri gardens would allow them to cultivate a variety of vegetables for household consumption,

improving family health and reducing expenses on market-bought produce. Surplus vegetables could also generate additional income.

3. **Small farm tools/implements for reducing drudgery and increasing efficiency**

Farmers identified a need for small-scale tools and implements to reduce the physical effort involved in farming activities and improve operational efficiency. Tools like seeders, sprayers, and hand implements would enable faster and more precise work, leading to better productivity and lower labor costs.

4. **Sewing machines for an alternate source of income**

The request for sewing machines highlights the farmers' interest in diversifying income sources. Access to sewing machines can empower families, particularly women, by providing opportunities for tailoring and handicrafts, creating a steady alternative income stream.

5. **Grain/seed storage for seed conservation**

The need for grain and seed storage solutions emphasizes the importance of preserving seeds for future use. Proper storage facilities would prevent spoilage and pest infestation, ensuring that high-quality seeds are available for subsequent planting seasons. This would reduce reliance on external seed purchases and enhance seed sovereignty.

6. **Training for skill development and knowledge enhancement**

Farmers emphasized the importance of training programs to build capacity in modern agricultural practices, efficient tool use, and crop management techniques. Training in areas such as pest control, water conservation, crop rotation, and alternative income generation activities like tailoring can empower farmers to make informed decisions, enhance productivity, and improve their overall livelihoods.

Table 3.2 Needs of the farming communities as per the need assessment survey

	Particulars	Weighted Mean Score	Rank
1	High-yielding seed varieties for better yield	89.43	1
2	Vegetable seeds for nutri-garden establishment	79.24	2
3	Small farm tools/implement for reducing drudgery and increased working efficiency	54.27	5
4	Sewing machine for an alternate source of income	58.24	4
5	Grain/seed storage for seed conservation	72.54	3

Interventions for addressing farmers' needs

- **Provision of inputs:** Farmers were supplied high-yielding vegetable seeds, wheat, chickpea, lentil, paddy, red amaranth, sponge gourd, bottle gourd, bitter guard, okra, boro, green amaranth, etc. to support better yields and nutritional security.
- **Equipment distribution:** Small-scale farming tools and implements like knapsack sprayers, foot sprayers, water pumps, etc were offered to enhance efficiency and reduce physical labor.
- **Livelihood diversification:** The initiative to distribute sewing machines among women farmers was a significant step toward empowering rural women and fostering economic independence. This intervention addresses multiple aspects of livelihood enhancement and social development, benefiting both individual households and the community as a whole.
- **Infrastructure support:** Provided durable and pest-resistant seed/grain storage (5 q) bins to ensure seed conservation and reduce post-harvest losses.
- **Capacity building:** Organized training sessions, awareness program as on modern farming techniques, drone demonstration, tool usage, and alternate livelihood skills to empower farmers and their families.

Capacity building

1) Training program on improved farming technologies for augmenting livelihood at KVK, Buxar

ICAR Research Complex for Eastern Region, Patna in collaboration with KVK, Buxar organized two days training programme on improved farming technologies during 29th February to 1st March 2024 at KVK, Buxar. The aim of the training programme was to acquaint farmers with the available latest technologies using farming practices like zero seed drill, combined harvester, baler, natural farming techniques, mushroom farming, drone technology, bee keeping, solar technology, conservation agriculture, climate resilient practices, vermi composting, organic farming, sprinkler and drip irrigation etc.

2) Farmers awareness programme on empowering rural women under SCSP at selhauri village

The program aimed to empower women from marginalized sections by exploring diverse livelihood options through agriculture. Women farmers were educated about various opportunities they could adopt to enhance their skills and improve their income. As part of the initiative, seeds and pods of improved vegetable varieties were distributed to enable year-round vegetable production, thereby enhancing the nutritional security of their families. Additionally, as part of a new initiative for the development of anganwadi children, educational kits were provided to 60 children.



Fig. 3.1 Glimpses of training and demonstration on diverse livelihood options through agriculture

3) Farmers' awareness program on women empowerment through skill development and nutrition security under SCSP at ICAR RCER, Patna

The training programme on “Women Empowerment through Skill Development and Nutrition Security” was organized under the “Scheduled Caste Sub-Project” on 16th March 2024 at the Eastern Research Complex of the Indian Council of Agricultural Research, Patna. A total of 33 women and 20 farmers from Danapur, Masodhi, Raghurampur, and Selhori participated in this program, where on a group basis, sewing machines were provided to 28 women, and water pumps to 16 farmers including 05 women.



Fig. 3.2 Sewing machine as input support for skill development and nutrition security among women

4. One day training program on efficient soil and water management techniques for crop production

On December 4th, 2024, a one-day training program was conducted focusing on "Efficient Soil and Water Management Techniques for Crop Production." The primary objective of the program was to promote sustainable farming practices among farmers by providing them with knowledge and practical insights into advanced methods of managing soil and water resources effectively. Participants were taken to demonstration fields managed using advanced irrigation systems such as sprinklers and drip irrigation. These fields served as live examples of how efficient water management practices can improve crop health, reduce water wastage, and lower labor costs. Farmers were given an opportunity to observe and understand the operation of these systems, including their installation, maintenance, and benefits. Experts shared techniques for improving soil fertility, such as crop rotation, cover cropping, and the use of organic matter. Emphasis was placed on preventing soil erosion and maintaining its nutrient balance. Training focused on efficient irrigation methods, including the advantages of sprinkler and drip systems in conserving water while ensuring adequate moisture levels for crops. Farmers were provided with informative materials and practical advice on adopting these technologies on their farms. The program also included discussions on government schemes and subsidies available for procuring modern irrigation equipment.

Exposure visits of farmers to Bihar Agriculture University, Sabour, Bhagalpur

An exposure visit on 25.03.2025 was organized for farmers under the Scheduled Caste Sub-Plan by the institute to Bihar Agricultural University, Sabour, and was attended by 34 farmers, including 19 female participants. The visit was properly organized by Dr. R.K. Sohane, Director of Extension, Bihar Agricultural University, Sabour. During the visit, the farmers had the opportunity to explore the university's key agricultural innovations and facilities, including the Agricultural Technology Information Center (ATIC), University Museum, Media Center, High-Tech Nursery, and Krishi Vigyan Kendra (KVK) Sabour. They were introduced to various training programs and technologies designed to improve agricultural production and promote sustainability. The purpose of this exposure visit was to provide farmers with direct information on modern agricultural practices and to encourage the adoption of innovations aimed at improving agricultural productivity and sustainability. This initiative highlights the efforts of knowledge dissemination and technology transfer aimed at empowering SC farmers and bridging the gap in agricultural development. 120 number of various mango plant sampling of different varieties viz Jardalu, Maldah and Amrapali as well as 40 sapling of lemon were provided to farmers during the exposure visit. They were also provided with 90 seed kits of different seasonal vegetables.



Combine Fig. 3.2 & 3.2



Fig. 3.2 Exposure visit of farmers from Selhauri village

Guleriyachak, Village Block: Tekari, Gaya

Guleriyachak is situated at 24.963395°N & 84.833415°E and is a small village in Tekari Block of Gaya district. It comes under Simuara Panchayat, situated 40 km away from the district headquarter Gaya and 109 km from the state capital Patna. Guleriyachak is surrounded by Guraru Block towards West, Bodhgaya Block towards South, Gaya Block towards East and Konch Block towards north. Guleriyachak is a medium size village where a total of 510 households are residing, about 80 households are of SC farmers. Total population of village is 3500, out of which about 350 are Scheduled caste.

The geographical area of the village is 450 acres. Net sown area of village is 275 acres, while total cultivated area is 400 acres. About 50 acres area comes under grazing/pasture land, 350 acres area under rain fed cultivation, 50 acres area under irrigated cultivation. Area sown more than once is 200 acres, while land under non-agricultural use is around 10 acres. The main source of livelihood of the sampled villages is agriculture. Agriculture in this region is practiced in almost rain fed conditions due to seasonal variations in rainfall, whereas, few areas also come under irrigation through canal, wells/tanks/water ponds. Most of cultivated area is mono-cropped with rice as main crop of village in monsoon season. Other important crops of village are wheat, lentil, mustard and potato in winter season; and moong in summer season. Pigeon pea is the dominant pulse crop in kharif season which is grown on the bunds of rice field. Rice is cultivated in most of net cultivated area, whereas, about 40% area remained fallow during winter season after rice production. Farmers prefer to keep large as well as small animals viz. cow (local & crossbred), buffaloes, goat and poultry having very low production capacity. Most of the households come under marginal category (50.80%), whereas, 20.86% households come under small, 12.99% households come under medium and 10.23% households come under large farmers.

The major challenge is to maintain soil moisture in the fallow during winter season caused by the early monsoon withdrawal. Other challenges include unavailability of reliable irrigation facilities, cultivation of long duration rice varieties soil cracking in vertisol, lack mechanization and technical know how and damages to crop by stray animal.

Table 3.3 Details of Guleriyachak village

1	Name of Village	Guleriyachak, Block: Tikari, Gaya
2	Total Households	510
3	Total SC households	80
3	Partner Institute	KVK, Gaya
4	Major Interventions	High-yielding seed varieties, water conservation techniques, conservation agriculture, farm machines, poultry, veterinary medicines, and training for year-round income and employment of farmers

Table 3.4 Need of the farming communities as per the need assessment survey

	Particulars	Weighted Mean Score	Rank
1	Irrigation facilities	92.42	1
2	High-quality seeds	74.14	3
3	Small farm tools/implement for reducing drudgery and increased working efficiency	65.87	4
4	Poultry/goatery	45.54	5
5	Training needs	77.96	2

The survey conducted among farmers revealed the following needs, reflecting their priorities for improving livelihoods and agricultural productivity:

1. Irrigation facilities/Infrastructure

Problem: Farmers in general are facing severe challenges due to inadequate irrigation facilities. In the absence of a reliable irrigation system, farmers depend solely on rainfall, which is erratic and insufficient for consistent crop growth.

Needs and interventions:

Farmers were provided with drought-resistant seed varieties to enhance crop resilience during periods of water scarcity. In addition, they received comprehensive capacity-building training focused on effective water management practices, which equipped them with the skills to optimize water usage in their farming activities. To further promote sustainable agricultural practices, conservation agriculture techniques were also implemented, aimed at improving soil health, reducing water wastage, and conserving moisture. These efforts were designed to help farmers adapt to changing climate conditions, improve water use efficiency, and ensure better crop yields despite water limitations.

2. Lack of availability of quality seeds/inputs

Problem:

Farmers often struggle to access high-quality seeds, fertilizers, pesticides, and other essential agricultural inputs. Low-quality seeds or the unavailability of improved varieties can result in poor crop yields and increased susceptibility to pests and diseases. Furthermore, the irregular supply of fertilizers and agrochemicals can delay planting schedules and crop care routines.

Needs and Interventions:

Support in terms of affordable access to certified seeds and fertilizers, as well as training on their appropriate use were given to the farmers.

3. Non-availability of farm machines and custom hiring centres.

Problem :

Many farmers, especially smallholder farmers, do not have access to modern farm machinery such as tractors, seed drills, harvesters, or ploughing equipment. Without mechanization, farmers rely on manual labour, which is costly, time-consuming, and inefficient.

Needs and interventions:

The farmers were introduced to the concept of custom hiring and encouraged to rent farm machinery from nearby villages. A group of SC farmers were selected to represent the others and negotiate favorable, cost-effective rates for the use of these machines on behalf of the entire farming community. Additionally, their fields were used for the demonstration of zero-seed-cum-fertilizer drill for sowing crops such as wheat, mustard, lentils, and others, showcasing efficient and modern sowing techniques.

4. Small land holding/fragmentation/undulating terrain**Problem:**

Many farmers operate on small, fragmented pieces of land, which makes it difficult to achieve economies of scale. Fragmentation of land, often passed down through generations, led to inefficient land use. Additionally, undulating or hilly terrain can pose challenges to irrigation, mechanization, and crop production, resulting in lower yields.

Needs and interventions:

Farmers were actively encouraged to adopt group farming practices, which promote collective efforts for better resource utilization, cost-sharing, and enhanced productivity. Despite the initial enthusiasm, there has been little progress in implementing this approach so far. Several factors, such as limited collaboration, lack of trust, and challenges in organizing and coordinating among farmers, have hindered the development of group farming initiatives. However, with the right support, training, and encouragement, there remains potential for these collective farming efforts to gain traction and significantly improve farming outcomes in the future.

5. Poor socio-economic conditions/backgrounds**Problem:**

Many farmers come from economically disadvantaged backgrounds, which limit their access to resources like credit, education, and technology. These socio-economic challenges often result in a cycle of poverty, where farmers cannot afford to invest in modern farming techniques, machinery, or inputs that could improve their productivity.

Needs and interventions:

The farmers were informed about the various state government subsidies, schemes, and programs designed to benefit Scheduled Caste (SC) farmers. These initiatives aim to support their agricultural activities and improve their overall socio-economic condition. The information shared included details about financial assistance, technical support, training programs, and other facilities available to SC farmers, ensuring they could take full advantage of the resources and opportunities provided by the government.

6. Lack of awareness about recent technologies**Problem:**

Many farmers are unaware of modern farming techniques, technologies, and best practices that could significantly improve their productivity. The rapid advancements in agricultural technology, such as precision farming, organic practices, drone usage, and climate-resilient crops, are often inaccessible or incomprehensible to farmers who lack proper training or information.

Needs and interventions:

A series of comprehensive capacity-building programs were organized for farmers to enhance their knowledge and skills in key areas of sustainable agriculture. These programs focused on topics such as conservation agriculture, nutrient management, and water management. The training sessions aimed to

educate farmers about adopting eco-friendly farming practices, optimizing the use of natural resources, and improving soil health. Farmers were also introduced to advanced techniques and tools for efficient nutrient application and water conservation. The initiatives were designed to empower farmers to increase productivity while preserving environmental sustainability and ensuring long-term agricultural resilience.

Capacity Building:

1. Capacity-building on rice fallow management for livelihood improvement for SC farmers at Guleriyachak, Tikari Block, Gaya (Bihar).

The ICAR Research Complex for Eastern Region, Patna organized a capacity-building event on rice fallow management for livelihood improvement for SC farmers on September 3rd, 2024, at Gulariya Chak, Tikari block, Gaya (Bihar). A team of scientists interacted with the farmers about rice fallow management, the benefits of conservation agriculture, farm machines, and water management.

Also a live demonstration of a drone was conducted in a paddy field. Additionally, 50 numbers centrifugal water pumps (1 hp) were provided to 50 SC rice growers. Around 60 SC farmers attended including farm women and youths, from the village in at the end of the event, the farmers expressed their interest in more frequent scientific activities to support the adoption of rice fallow management.



Fig. 3.3 Training cum input support on Rice-fallow Management

2. Training - cum- Exposure visit at KVK, Ramgarh, CRUSS, Hazaribagh & FSRCHPR, Ranchi.

The institute organized a 3-day Training Programme-cum-Exposure Visit from 17th-19th March 2025 under the Consortia Research Platform on Conservation Agriculture (CRP on CA). The program aimed to educate SC farmers from Guleriyachak village in Bihar on sustainable management of rice-fallow areas through integrated crop management and conservation practices. Over 35 farmers, including 10 women, participated in the sessions covering crop management, soil moisture, livestock integration, pest management, and the economic benefits of rice-fallow systems. The event also included field visits to Central Rainfed Upland Rice Research Station (CRURRS) Hazaribagh and the Krishi Samridhhi Mela at Farming System Research Centre for Hill and Plateau Region (FSRCHPR) Ranchi, where farmers learned about modern agricultural technologies. The program was designed to empower SC farmers with innovative techniques to promote sustainable farming practices in the region. They were also provided with the high quality seed produced from FSRCHPR, Ranchi which included seed of French bean, HAFB-4 (34 kg), Pea, Swarna Sobhagya (68 kg) and brinjal, Swarna Shyamal (0.68 kg).



Fig. 3.4 Exposure visit of farmers from Guleriyachak, Gaya at KVK, Ramgarh



Fig. 3.5 Exposure visit at Central Rainfed Upland Rice Research Station (CRURRS), Hazaribagh



Fig. 3.6 Exposure visit and parnci.... Kisan Samridhhi Mela at FSRCHPR, Plandu, Ranchi

Telhada, Village Block: Ekangarsarai, Nalanda

Telhara is a large village located in Ekangarsarai Block of Nalanda district, Bihar with a total of 1075 families residing. The Telhara village has a population of 6236 of which 3161 are males while 3075 are females as per Population Census 2011.

1. Capacity building program on recent advances in the management of kharif season crops at Telhara village, Ekangarsarai block, Nalanda district

On September 11th, 2024, a capacity building programme on recent advances in the management of kharif season crops was held at Telhara Village, Ekangarsarai Block, Nalanda District, aimed at benefiting SC farmers. The event featured a team of scientists who engaged in discussions with local farmers about their current crop production practices. The Agronomist from the institute provided recommendations for enhancing agricultural production through the use of improved seeds and conservation agriculture techniques. During the program, various agricultural tools and equipment were distributed to selected farmers for demonstration purposes. Approximately 200 farmers participated.

2. Awareness-cum-demonstration programme on "Application of agro-chemical in kharif crops through drone technology" in Nalanda district of Bihar

An awareness-cum-demonstration programme on "Application of agro-chemical in kharif crops through drone technology" was organised at Telhara village in Nalanda district of Bihar on 11th September 2024. Live demonstrations of spraying agro-chemicals through drones were conducted on kharif crops mainly paddy. Experts educated the farmers on the potential uses of drones in agricultural spraying, including the operation and maintenance of drones. The programme also highlighted various ongoing government schemes and subsidy offers related to drone technology in agriculture. Additionally, the management practices of crops through drone technology were discussed. During this programme, the spraying of nano urea was demonstrated over approximately 10 acres of paddy crop using drone. More than 100 farmers were present at the demonstration site during the awareness programme.

Table 3.5 Input distribution among SCSP beneficiaries during 2024-25 in Bihar

Sl. No.	Name of the Input	Qty	No of beneficiaries
1	Vegetable seed (red amaranth, sponge guard, bottle gourd, bitter guard, okra, boro, green amaranth)	5 kg	60
2	Wheat	600 kg	68
3	Lentil	120 kg	68
4	Chick pea	80 kg	68
5	Children bag	60	60
6	sewing machines	29	29
7	Water pump	102	=102
8	Seed storage bin (5 Q)	20	20
9	Battery operated sprayers,	34	34
10	Seed storage bins (50 kg cap)	25	25
11	Foot sprayers	27	27
12	Hand push seeders	25	25
13	Jute bags	200	200
14	Veterinary medicine	-	80
15	Vanraja poultry birds	360	50
16	Kadaknath poultry birds	68	15
17	Poultry feeder and drinker	50	50

Ramnagar Block, West Champaran

West Champaran district, carved out from the old Champaran district in the year 1972, lies in the Northwest part of Bihar, shares its open border with Nepal, and its district headquarters is Bettiah. The district of West Champaran lies between 26° 25' 07" and 27° 31' 50" N and 83° 49' and 84° 45' 55" E covering an area of 4843.51 Sq. Km. The district shares its border with Nepal through five of its blocks in the North, Gopalganj and part of East Champaran in the South, East Champaran in the East and Padrauna and Deoria districts of Uttar Pradesh in the West. According to the Census 2011, the population of West Champaran district is 39.35 lakh with population growth over the decade of 2001-2011 was 28.89%. Literacy rate was 39.63%. The district possesses 2,50,046 Schedules Tribe population (18.71% total ST population in the State) and it stands first in terms of ST population in the State.

Problems and need identified:

- Lack of livelihood opportunities, quality seed and agricultural technologies
- Quality seed of crop and vegetable and Livelihood for farmers

Intervention undertaken:

The activities were imparted in two parts, one being implemented in Naurangia and nearby villages which are located far inside the forest coverage. The Institute TSP funds were utilized to implement the activities in those areas. The other part was implemented in the villages near Ramnagar block.

To support the tribal farmers in Ramnagar region, a three-day training program was organized at KVK, Narkatiaganj on "Diversified farming for enhanced food and income security" during March 06-08, 2024. The program was organized in collaboration with KVK, Narkatiaganj, and Brajna Foundation, Ramnagar. A total of 30 farmers participated in the training programme, in which method demonstration and on-farm trials were given priority in addition to teaching. The farmers were taken to the field of fodder crops and were given firsthand knowledge of the cultivation of Napier Hybrid grass. In addition, they were also introduced to Azolla cultivation by providing a method demonstration. Besides, the farmers were exposed to different treatments of sugarcane roots for necessary cultivation and different cultivation methods. Experts from KVK, Madhavpur were also called to give lectures to the invited farmers. At the end of the training programme, the farmers were given superior seeds and other training input items, and given a necessary advisory on suitable cultivation practices.



Fig. 3.8 Field visit of farmers at KVK Narkatiaganj

Table 3.3 Details of Guleriyachak village

1	Name of Village	Naurangia
2	Total Households	900
3	Total SC households	900
3	Partner Institute	KVK Narkatiaganj and Brajna Foundation, Ramnagar
4	Major Interventions	Improved poultry chicks, balanced feed, improved seed, animal health camps

To support the tribal farmers in Ramnagar region, a three-day training programme was organized at KVK, Narkatiaganj on “Diversified farming for enhanced food and income security” during March 06-08, 2024. The programme was organized in collaboration with KVK, Narkatiaganj and Brajna Foundation, Ramnagar. A total of 30 farmers participated in the training programme, in which method demonstration and on-farm trials were given priority in addition to teaching. The farmers were taken to the field of fodder crops and were given firsthand knowledge of the cultivation of Napier Hybrid grass. In addition, they were also introduced to Azolla cultivation by providing a method demonstration. Besides, the farmers were exposed to different treatments of sugarcane roots for necessary cultivation and different cultivation methods. Experts from KVK, Madhavpur were also called to give a lecture to the invited farmers. At the end of the training programme, the farmers were given superior seeds and other training input items, and given necessary advice on suitable cultivation practices.

Other input services aiming to enhance productivity

A total of 1500 Sonali chicks were distributed among the farmers to improve meat productivity. Around 50 chicks were given to 20 farmers, and the remaining farmers were given 20 chicks each. Variation in the number of chicks was based on the resources available to the farmers to maintain and rear the chicks. Those farmers who received 50 chicks were also provided raw materials for strengthening their poultry houses. The farmers who own chicken and cattle/ buffalo were also provided with poultry feed and cattle feed, respectively. A total of 1700 kg of balanced cattle feed was given to 34 farmers with 50 kg of cattle feed each. Farmers were given advice on the usage of input materials



Fig. 3.9 Training cum input support for enhancing meat productivity

Besides, a total of 130 farmers were given a quantity of 15.6 kg of genetically superior seeds, 210 tree plants were given to 105 farmers, 21 kg of micronutrients were given to 95 farmers and 8.5 kg plant protection chemicals were given to 50 farmers. 17 irrigation pipes, 11 sprayer machines and 90 milk cans were given to different farmers. It was instructed to them that irrigation pipes and sprayer machines should be used as common resource materials.

TSP activities in Ramnagar region

A day training programme was conducted for the tribal farmers from the villages near Ramnagar block on “Enhancing the prosperity of tribal farmers through animal and fisheries based farming system” in collaboration with Brajna Foundation, an NGO based in Ramnagar. The training programme was organized at the training hall in Valmiki Tiger Reserve, in which a total of 50 farmers participated.



हिन्दू

पशुपालकों को दिया गया प्रशिक्षण

निर्मली। प्रखंड क्षेत्र के लगुनिया गांव में मंगलवार को कृषि क्षेत्र की उत्पादकता बढ़ाने में देसी नस्ल के पशुओं की भूमिका विषय पर एक दिवसीय प्रशिक्षण कार्यक्रम आयोजित किया गया। प्रखंड पशु चिकित्सा पदाधिकारी डॉ. अर्जुन मंडल ने किसानों को अद्वितीय पशुधन और कुक्कुट की पहचान के महत्व और उसके निबंधन की जानकारी दी। संस्थान के प्रधान वैज्ञानिक डॉ. पीसी चंद्रन ने पशुपालकों को देसी दुधारू

Fig. 3.14 Press and Media coverage of the programmes carried out under PRAYAS in Bihar

Chhattisgarh: Sustainable goat-based farming solutions for tribal and smallholder farmers

Chhattisgarh, spanning 135,192 square kilometers, had a population of 29,436,231 according to the 2011 Census, resulting in a population density of 220 individuals per square kilometer. Approximately 76.76% of the population resides in rural areas, with the remaining 23.24% in urban regions. The literacy rate is 70.28%, with male literacy at 80.27% and female literacy at 60.24%. Scheduled Castes (SC) constitute 12.82% of the population, while Scheduled Tribes (ST) represent a significant 30.62%. The sex ratio is notably balanced, with 991 females per 1,000 males. Chhattisgarh is home to a diverse array of tribal communities, officially recognized as Scheduled Tribes. Notable among them are the Gond, Baiga, Bhil, Munda, Oraon, and Halba tribes. The Gond tribe is one of the largest, with sub-groups such as the Maria and Muria. The Baiga, known for their traditional practices, primarily inhabit the forested regions. The Bhil, Munda, and Oraon tribes also contribute significantly to the state's cultural mosaic. These tribal communities predominantly reside in the dense forests of Bastar and other southern districts, contributing richly to Chhattisgarh's cultural heritage. Their traditional knowledge, art forms, and customs play a vital role in the state's identity.

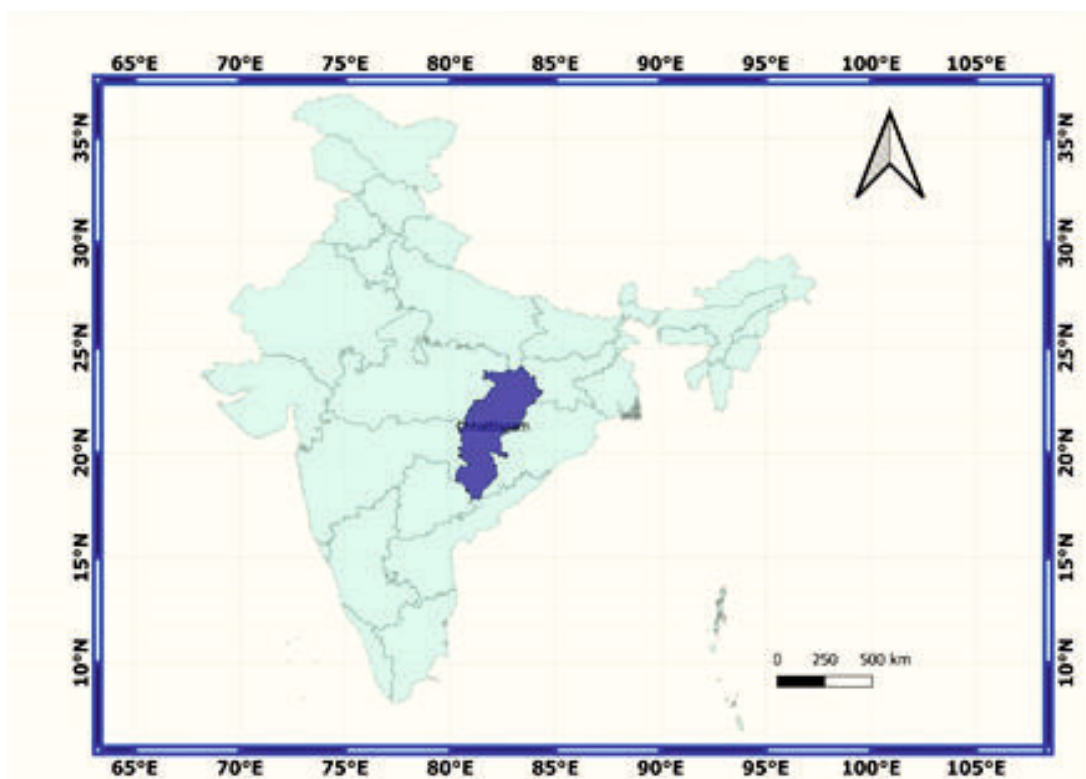


Fig. 4.0: State boundary of Chhattisgarh state

Kandora Village

Kandora is a village situated in the Kunkuri block of Jashpur district, Chhattisgarh State, India. It is located at 21 km towards west from district headquarters, Jashpur and 8 km from Kunkuri. The total geographical area of Kandora village is 1069.52 ha with total population of 1,925 peoples, having male population of 966 while female population 959. The literacy rate of kandora village is 61.56% out of which 68.43% males and

54.64% females are literate. There are about 387 households in Kandora. The total population is 1925 and number of houses are 387.

Table 4.1 Details of population of Kandora Village

Kandora population details		Kandora village Profile			
Census parameter	Census data	Particulars	Total	Male	Female
Female Population %	49.8 % (959)	Total Houses	387	-	-
Total Literacy rate %	61.6 % (1185)	Population	1,925	966	959
Female Literacy rate	27.2 % (524)	Schedule caste	78	37	41
Scheduled Tribes Population %	3.9 % (76)	Schedule tribe	76	28	48
Scheduled Caste Population %	4.1 % (78)	Literacy (%)	69.30	78.32	60.51
Working Population %	69.8 %	Total workers	1,343	670	673
		Main worker	765	-	-
		Marginal	578	155	423

Table 4.2 Details of major interventions of Kandora village

1	Name of Village	Kandora, Kunkuri block, Jashpur district, Chhattisgarh
2	Total Households	387
3	Partner Institute	Jashpur Agriculture College & Research Centre (IGKV) & KVK, Jashpur (IGKV).
4	Major Interventions	Rice fallow management by oil seed and legume crops, animal husbandry, an integrated farming system for improving livelihood, year-round income by alternate income generation activities, and employment generation for farmers.

Problems and needs identified:

The comprehensive need assessment survey was conducted within the tribal communities of Kandora. The survey was aimed to identify and prioritize the requirements of the local people, with rankings. The leading list of identified needs is the imperative for rice fallow management, highlighting the significance of additional livelihood opportunities within the community followed by the necessity for water conservation techniques for increasing cropping intensity purposes. Additionally, the survey identified the importance of alternate income generation activities under an integrated farming system and finally followed by techniques of water conservation through mulching emerged as a crucial need. The village of Kandora is pivotal in the PRAYAS project, an initiative geared towards empowering and uplifting the local community through targeted developmental activities. As the project unfolds in this scenic locale, it endeavors to leverage the inherent potential of both the land and its tribal people, fostering sustainable growth and prosperity for future generations.

In response to the findings of the need assessment survey, the PRAYAS project has devised interventions tailored to address the identified needs. These interventions include initiatives such as rice fallow management by crop rotation and crop diversification, animal husbandry, alternate income generation activities. These efforts are aimed at enhancing livelihoods, ensuring year-round income, and generating employment opportunities for the farmers of different villages of Kunkuri block, Jashpur, Chhattisgarh.

Interventions undertaken:

Training conducted:

Awareness-cum-demonstration of drone application in agriculture cum integrated farming system for livelihood security under Tribal Sub-Plan (TSP)

ICAR Research Complex for Eastern Region, Farming System Research Centre for Hill & Plateau Region, Ranchi organized a one-day awareness-cum-demonstration of drone application cum integrated farming system for livelihood security under Tribal Sub-Plan (TSP) of the flagship program of PRAYAS on 5th March 2024 at Kandora village, Kunkuri Block, Jashpur district, Chhattisgarh. The main objective of awareness cum Drone application in Agriculture and IFS for livelihood security at Kandora village was to create awareness among Tribal farmers, especially of modern tools and new agriculture technologies to improve their livelihood. They were trained on alternate income generation activities under an integrated farming system for enhancing their livelihood the experts and shown the ongoing trial of crops grown under conservation agriculture. The farmers were allowed to perform the practices of conservation agriculture which may give them interests and ideas on the cultivation of rabi and summer crops by adopting CA practices. The farmers were aware of the different uses of drones in the agriculture sector and were also given a demonstration of drones and their application in agriculture. The spray of nano urea was also demonstrated by drone on standing crops of linseed, mustard, and lentils of CA ongoing trials. The farmers were aware of the integrated farming system to utilize effectively the natural resources in agriculture to reduce the input cost & maximize the productivity & income for their livelihood security. The farmers were also aware of rice fallow management by adopting conservation agricultural technology at the demonstration site of CRP on the CA Project. There were 52 participants present during training and at the demonstration site during the program from the different villages of Kunkuri block of Jashpur district.



Fig. 4.1 Training on drone application cum IFS for livelihood improvement



Fig. 4.2 Field visit to CA plots under PRAYAS

Capacity building of farmers for the doubling of farmers' income by the integrated farming system under the Tribal Sub-Plan (TSP):

ICAR Research Complex for Eastern Region, Farming System Research Centre for Hill & Plateau Region, Ranchi, organized a three-day training program of farmers for "Doubling of farmers' Income by Integrated Farming System" w.e.f. 12th to 14th March, 2024 as part of the Institute's flagship extension programme 'PRAYAS' under the Tribal Sub-Plan (TSP) at village Kandora of farmers from villages Kandora, Bhursa, Raikera, Giraldih, Bhumra, Sarnatoli Block of Kunkuri, District Jashpur, Chhattisgarh. A total of 50 farmers of Kunkuri block participated in this training program. The 3 days training program on "Doubling of

Farmers Income by Integrated Farming System" under PRAYAS was to train the farmers of new agriculture technologies and practical demonstration of improved methods of nursery production, vermicompost production, etc. The alternate income generation activities like bee keeping, mushroom farming, improved techniques of animal rearing, health and disease management, timely vaccination, methods of integrated farming system, improved package and practices of agricultural crops, improved methods of irrigation management, water conservation techniques, conservation agricultural technology and plant protection measures by the resource persons of Jashpur Agriculture College & Research Centre, (IGKV, Raipur) and KVK, Jashpur (IGKV, Raipur, Chhattisgarh). The attempt was also made to acquaint the farmers with ongoing schemes of State government of Horticulture, Agriculture and Animal husbandry departments, Jashpur. In this training program, Assistant Director of Horticulture, Jashpur, Government of Chhattisgarh Sri G.S.Tomar addressed the farmers and acquainted them the different ongoing schemes of horticulture. Similarly, state officials of Agriculture Department, Veterinary Department also delivered their lecture. The chief guest during the valedictory session Deputy Director of Animal Husbandry, Jashpur, Government of Chhattisgarh Dr. Marakam addressed the farmers and acquainted them the different ongoing schemes of Animal Husbandry and told farmers to get all possible benefits of different schemes of Central and State governments. He distributed the minikits and given certificates to the farmers.



Fig. 4.3 Glimpses of training on “doubling of farmers' income through IFS” under PRAYAS



Fig. 4.4 Critical input support of battery-operated knapsack sprayer and GI chain link fencing among the 50 beneficiaries under PRAYAS

Sl. No.	Name of the Input	Qty	No. of beneficiaries
1	Sprayer Battery operated	01	50 (50 numbers)
2	GI Chain link fence	02 (Bundle)	50 (2200 Kg)
3	Moong seed	320 g	50 (16.0 Kg)
4	Urad seed	400 g	50 (20.0 Kg)
5	Ridge gourd	20 g	50 (1.0 Kg)
6	Sponge gourd	20 g	50 (1.0 Kg)
7	Tomato	60 g	50 (3.0 Kg)
8	Cowpea seed	130g	50 (6.50 Kg)

Table 4.3 Details of input distribution Total beneficiaries (50)

Awareness cum Animal Health Camp under PRAYAS of Institute General TSP Fund

One day "Animal Health Camp" under PRAYAS of Institute General TSP Fund at village Kandora, Block Kunkuri, District Jashpur, Chhattisgarh was conducted on 15th March, 2024. The treatment of animals, PR vaccination to goat and the lifesaving medicines and nutritional tonic and mineral mixtures were distributed among beneficiaries.



Fig. 4.5 Glimpses of animal health camp under PRAYAS

Kumekela village

The village Kumekela is located at latitude 22.5787949 and longitude 83.4709879 at Pathalgaon Tahsil of Jashpur District in the State of Chhattisgarh (India). It is governed by Kumekela Gram Panchayat and comes under Pathalgaon Community Development Block. The nearest town is Pathalgaon, which is about 3 km away from Kumekela. The location code or village code of Kumekela village is 434272. Kumekela village is located in Pathalgaon tehsil of Jashpur district in Chhattisgarh, India. It is situated 3km away from the sub-district headquarter Pathalgaon (tehsildar office) and 103 km away from the district headquarters Jashpur Nagar. As per 2009 stats, Kumekela village is also a gram panchayat. The total geographical area of the village is 319.49 hectares. Kumekela has a total population of 1,786 people, out of which the male population is 874, while the female population is 912. The literacy rate of Kumekela village is 55.49%, out of which 61.67% of males and 49.56% of females are literate. There are about 437 houses in Kumekela village. Pincode of kumekela village locality is 496118. The Kumekela village is administrated by a sarpanch who is elected representative of the village by the local elections. As per 2019 stats, Kumekela village comes under Pathalgaon assembly constituency and Raigarh parliamentary constituency. Pathalgaon is the nearest town to Kumekela for all major economic activities.

Table 4.4. Details of Kumekela village

1	Name of the Village:	Kumekela village, Pathalgaon block, Jashpur
2	Total Households:	170
3	Partner Institute:	KVK, Jashpur (IGKV, Raipur)
4	Major Interventions:	Training of farmers, distribution of goats, water pump, foot sprayer, dry land weeders, the intervention of mushroom farming, the intervention of improved varieties of our Institute, Scientific methods of rearing of livestock for enhanced income, improved methods for vegetable nursery production, introduction of integrated farming system for enhancing livelihood, Rice fallow management by conservation agriculture

As per the available data of 2009, 1786 persons live in 437 households in the village Kumekela. There are 912 female individuals and 874 male individuals in the village. Females constitute 51.06% and males constitute 48.94% of the total population. There are 1120 scheduled castes persons of which 570 are females and 550 are males. Females constitute 50.89% and males constitute 49.11% of the scheduled castes population. Scheduled castes constitute 62.71% of the total population. There are 424 scheduled tribes' persons of which 211 are females and 213 are males. Females constitute 49.76% and males constitute 50.24% of the scheduled tribe's population. Scheduled tribes constitute 23.74% of the total population. The population density of Kumekela is 559.02 persons per square kilometer.

Table 4.5 Details of the population of Kumekela village

Particulars	Total	Male	Female
Total No. of Houses	437		
Population	1,786	874	912
Child (0-6)	269	136	133
Schedule Caste	1,120	550	570
Schedule Tribe	424	213	211
Literacy	65.33 %	73.04 %	58.02 %
Total Workers	1,043	516	527
Main Worker	699	-	-
Marginal Worker	344	89	255

The total area of Kumekela is 319.49 ha with total sown/agricultural area is 273.02 ha and about 317.01 ha is un-irrigated area. About 6.11 ha is irrigated area. About 2 ha is irrigated by wells/tube wells. About 0.81 ha is irrigated by tanks/lakes. About 3.3 ha is irrigated by other sources of water. Nearly, about 15.76 ha is in non-agricultural use and around 8 ha is used as permanent pastures and grazing lands. Approximately about 10.01 ha is lying as current fallow area. About 4.54 ha is culturable waste land. About 5.8 ha is lying as fallow land other than current fallows. About 1.87 ha is covered by barren and un-cultivable land.

Kumekela is a medium size village located in Pathalgaon Tehsil of Jashpur district, Chhattisgarh with total 437 families residing. The total population of Kumekela is about 1786 out of which 874 are male and 912 are female. The total literate population is 991 comprised of 539 male and 452 as female whereas illiterate are 335 as male and 460 as female among 795 of total population. The Kumekela village has population of 1786 of which 874 are males while 912 are females as per Population Census 2011. In Kumekela village population of children with age 0-6 is 269 which make up 15.06 % of total population of village. Average Sex Ratio of Kumekela village is 1043 which is higher than Chhattisgarh state average of 991. The child Sex Ratio for the Kumekela as per census is 978, higher than Chhattisgarh average of 969.

Kumekela village has a lower literacy rate compared to Chhattisgarh. In 2011, the literacy rate of Kumekela village was 65.33 % compared to 70.28 % of Chhattisgarh. In Kumekela Male literacy stands at 73.04 % while female literacy rate was 58.02 %. As per the constitution of India and Panchyati Raaj Act, Kumekela village is administrated by a Sarpanch (Head of Village) who is elected representative of the village.

In Kumekela village, most of the villagers are from Schedule Caste (SC). Schedule Caste (SC) constitutes 62.71 % while Schedule Tribe (ST) where 23.74 % of the total population in Kumekela village. The village is well connected by district HQ and surroundings by public and private bus services. It is located at 4 km from Pathalgaon.

Problems and needs identified : Rice fallow, Water scarcity, and the technology gap are major problems of the villagers.

Interventions undertaken : Keeping in mind the above problems of the farmers, ICAR-RCER Research Centre Ranchi with the collaboration of the state agriculture department and KVK Jashpur has taken certain initiatives like training and input distribution for goat-based IFS interventions to solve the problems of the villagers.

Training Conducted

Training cum awareness program of Improved Agricultural Technology and Livestock Farming under SCSP of ICAR-NIBSM, Raipur

One day awareness cum training program was conducted on 6th March, 2024 at adopted SCSP village Kumekela, block Pathalgaon, district Jashpur, Chhattisgarh on “Drone Demonstration and Integrated Farming System for Livelihood Security” under ICAR- NIBSM, Raipur, Chhattisgarh. The main objective of awareness cum Drone application in Agriculture and IFS for livelihood Security at Kumekela village was to create awareness among SC farmers especially of modern (Fig...4.7) tools and new agriculture technologies to improve their livelihood. They were trained on alternate income generation activities under the integrated



Fig. 4.6 Glimpses of the input distribution

farming system for enhancing their livelihood by the experts. The farmers were given an opportunity to perform the practices of conservation agriculture which may give them interests and ideas on the cultivation of rabi and summer crops by adopting CA practices. The farmers were aware of different uses of drone in agriculture sector and also given the demonstration of drone and its application in agriculture. The spray of nano urea was also demonstrated by drone on standing crop of tomato at farmer's field. The farmers were aware on integrated farming system to utilize effectively the natural resources in agriculture to reduce the input cost & maximize the productivity & income for their livelihood security. The farmers were also aware for rice fallow management by adopting conservation agricultural technology. The farmers were aware on integrated farming system to utilize effectively the natural resources and recycling the waste material to maximize the productivity & income for their livelihood security. Under this program of ICAR-NIBSM Capital Fund, 12 number of 1HP Motor pump was distributed among needy farmers to get assured irrigation facilities. A total of 52 farmers were present in the program.



Fig. 4.7 Glimpses of training under SCSP funded by drone project & ICAR-NIBSM, Raipur

Awareness cum animal health camp under SCSP fund of ICAR-NIBSM, Raipur, Chhattisgarh

One day "Animal Health Camp" under PRAYAS of Institute General TSP Fund at village Kandora, Block Kunkuri, District Jashpur, Chhattisgarh conducted on 15th March, 2024. The treatment of animals, PR vaccination to goats, and the lifesaving medicines and nutritional tonic, and mineral mixtures were distributed among beneficiaries.



Fig. 4.8 Glimpses of animal health camp under ICAR-NIBSM, Raipur-funded Project

One day animal health camp cum Minikit distribution program was conducted in the presence of officials of the state government veterinary department, Patthalgaon, Jashpur on 16th March 2024 at adopted SCSP village Kumekela, block Pathalgaon, district Jashpur, Chhattisgarh funded under capital fund of ICAR-NIBSM, Raipur, Chhattisgarh. In the animal health camp, treatment of animals and medicines, mineral mixture, and health tonic were given and awareness was created for better upkeep of animals and timely vaccination of their animals. The head of the village distributed 98 goats (80 female and 18 male goats) to 25 SC beneficiaries and foot sprayers to 5 SC beneficiaries to maximize their productivity & income for their livelihood security.

Table 4.6 Details of the input distribution

Sl. No.	Name of Inputs	Quantity	No of beneficiaries
1	1 HP diesel water pump	01	12 (12 numbers)
2	Foot sprayer	01	05 (5 numbers)
3	Goat	04	25 (98 numbers)
4	Dry land weeder	01	20 (20 numbers)
5	Mineral Mixer	01 kg	15 (15 Kg)

Conducted One day awareness training program on Kharif Awareness workshop under PRAYAS on 6th July, 2024

Conducted one day awareness training program on kharif awareness workshop under PRAYAS on 6th July, 2024 under SCSP at village Kumekela, Block Pathalgaon, District Jashpur, Chhattisgarh. In this one day training program, a total of 80 farmers of Kumekela Village participated. Sarpanch of Kumekela Smt Foolmati Sidar expressed her gratitude for conducting one day training program for farmers for upscaling their livelihood of SC community under SCSP program by ICAR -RCER, FSRC for HPR, Ranchi. The farmers were trained with the scientific way of kharif crop production technology and how to increase the cropping intensity and acquainted with good agricultural practices for cultivating cereal, pulses, cucurbitaceous crops, leguminous vegetables, etc. The farmers were also given seeds of improved variety of paddy developed by our Institute Swarna Shreya and Swarna Shakti 400 kg each (800 kg), cow pea seeds 20 kg among 80 farmers for demonstration purpose for rice fallow management program.

Also conducted 3 days training program on "Rice fallow management by conservation agriculture technology" under SCSP of Institute General Fund at village Kumekela, Block Pathalgaon, District Jashpur, Chhattisgarh w.e.f.17th to 19th October,2024. In this 3 days training program, a total of 50 farmers of Kumekela Village participated. Sarpanch of Kumekela Smt Foolmati Sidar expressed her gratitude for conducting training program for farmers for upscaling their livelihood of SC community under SCSP program by ICAR -RCER, FSRC for HPR, Ranchi.

The farmers were trained with the conservation agriculture technology for rice fallow management and how to increase the cropping intensity and acquainted with good agricultural practices for cereal, pulses, oilseed crops, cucurbitaceous crops, leguminous vegetables. The certificate was given to the farmers by village sarpanch Smt Foolmati Sidar. The farmers were also given seeds of chickpea 90kg, lentil 80kg, linseed 80kg, mustard 80kg and bitter gourd seeds 1kg among 50 farmers for demonstration purpose for rice fallow management.



Fig. 4.9: Three days training program on "Rice fallow management by conservation agriculture technology" under SCSP at village Kumekele, Block Pathalgaon, District Jashpur, Chhattisgarh



Fig. 4.10: Press & media coverage under the ICAR-NIBSM funded Project





Fig. 4.11 Press and media coverage of the training program under PRAYAS

Eastern Uttar Pradesh: Vegetable-based farming for enhancing farm productivity and livelihood security

Uttar Pradesh (UP), the most populous state in India, had a population of 19.98 Crore as per the 2011 Census, making up 16.2% of the nation's total population. With a population density of 828 individuals per square kilometer, UP is one of the most densely populated states in the country. The demographic distribution highlights a significant rural presence, with 77.73% of the population residing in rural areas, while only 22.27% live in urban regions. The literacy rate in Uttar Pradesh stands at 67.68%, reflecting educational progress, though it still lags behind the national average. A notable gender disparity exists, with male literacy at 77.28% and female literacy at 57.18%, indicating the need for further educational improvements, particularly for women. Scheduled Castes (SC) forms a substantial portion of the population, while the presence of Scheduled Tribes (ST) is relatively minimal, accounting for less than 1%. The sex ratio in Uttar Pradesh is 912 females per 1,000 males, which is lower than the national average of 943 females per 1,000 males. This imbalance reflects ongoing socio-cultural challenges, including gender preference issues. Despite these demographic challenges, Uttar Pradesh continues to be a significant contributor to India's economy and culture, with its vast agricultural base and industrial hubs.

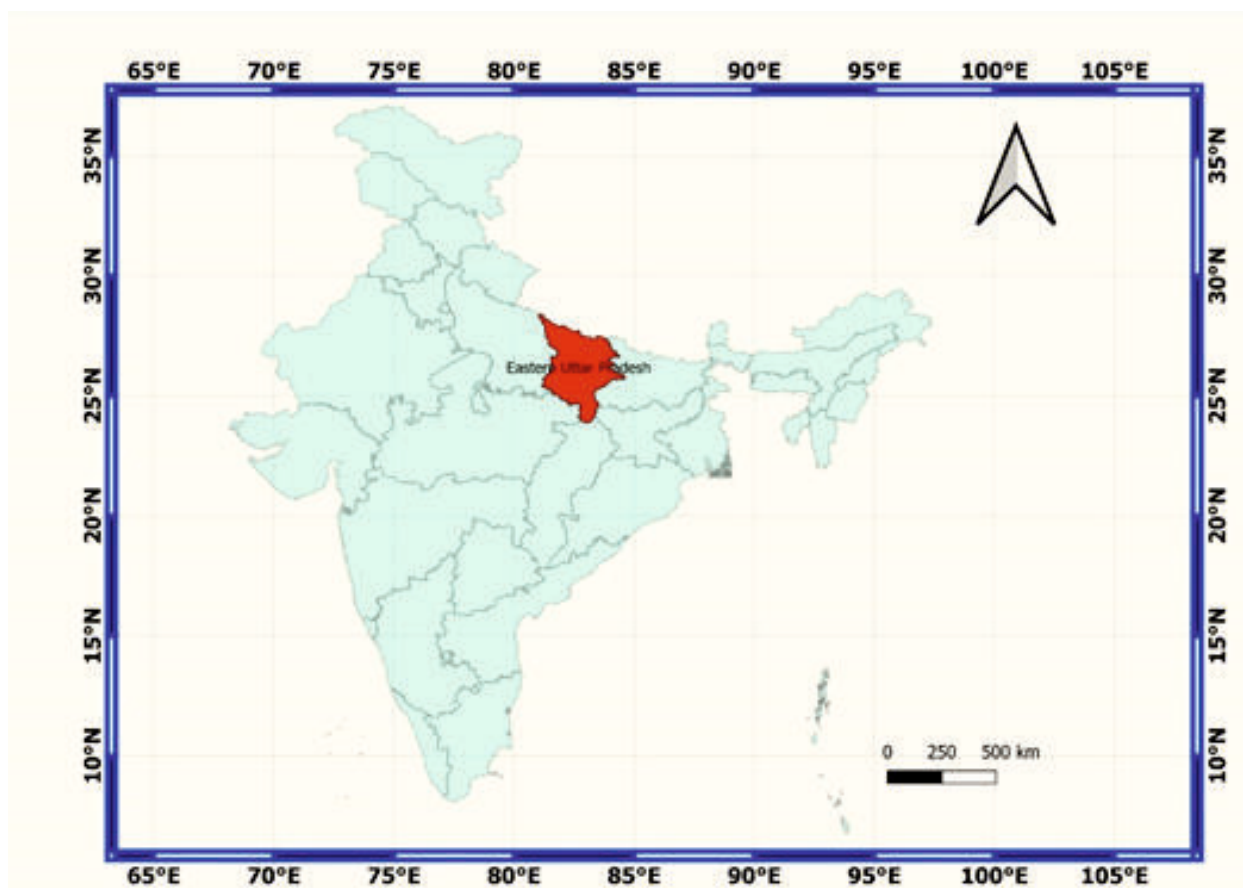


Fig. 5.0: State boundary map of Eastern Uttar Pradesh

Basantpur village

Located in the Ballia district of Eastern Uttar Pradesh, India, Basantpur is a medium-sized village panchayat located near the banks of Ganga River. Situated in the Sohaon block, this panchayat is at the border area of Bihar and Uttar Pradesh with the nearest city Buxar, Bihar around 15 km from the village. It belongs to the Azamgarh Division. It is located 21 km to the west of the district headquarters Ballia, 3 km from Sohaon block and 389 km from the state capital Lucknow. Out of seven villages of Basantpur panchayat, Basantpur (Uttari & Dakshini) and Narsingpatti have been selected under the PRAYAS Programme of SCSP scheme of ICAR- RCER, Patna.

Basantpur and Narsingpatti villages are in a cluster with the majority of the population almost 65-70 percent falling under the Scheduled Caste population. These villages are not developed and most of the population is engaged in either agriculture or animal husbandry or they work as laborers for their livelihood. The National Highway 31 (NH-31) passes through Basantpur. This village is surrounded by Buxar Block towards the south, Bhanwarkol Block towards the west, Simri block towards the east and Hanumanganj Block towards the north.

Table 5. 1 Profile of selected villages under SCSP interventions

1	Name of Village	Basantpur and Narsingpatti
2	Partner Institute	KVK, Buxar, Bihar and Krishi Vigyan Kendra, Sohaon, Ballia, Uttar Pradesh
3	Total no. of Households	205 families
4	Total Population	1500
5	Cultivated area	140 ha
6	No. of cows and buffalo	150
7	No. of goats	60
8	The major source of irrigation	Tube well
9	Crops grown	Rice, wheat, maize, lentils, fodders, vegetables
10	Major Interventions	Introduction of high yielding variety of major cereals and pulses, vegetable production, animal health management, year-round income, and employment of farmers

Problems and need identified

For the development of identified SC communities, it is necessary to find out their current issues and problems. Under, the PRAYAS project, all the technology interventions have to be designed as per the needs of SC farmers. To find out the major problems of SC farmers in Basantpur and Narsingpatti villages, group discussions and village surveys were done by a team of scientists consisting of various disciplines. The survey aimed to identify and prioritize the requirements of the farmers, with rankings based on percentage responses. Many observations were recorded during discussions with farmers. Accordingly, an assessment of agricultural needs was done, the result of which is presented in Table 5.2

Table 5. 2 Agricultural need assessments of the farming communities as per the need assessment survey

	Particular	% Response	Rank
1	Lack of quality seed of cereals and pulses	80.0	1
2	Lack of knowledge and technology for vegetable cultivation	66.0	2
3	Loss of crops due to diseases and pests attack	50.0	4
4	Lack of irrigation facility	56.0	3

The findings presented in this table show that the availability of quality seeds for improved varieties of crops was the most important need identified by farmers of Basantpur. It was found that farmers still grow traditional old varieties of rice, wheat, pulses, and maize resulting in lower yields.

The village has a good potential for vegetable cultivation due to its proximity to the Ganga River. However, results showed that two-thirds of farmers need high-yielding varieties of vegetables such as tomato, brinjal, chilli, cauliflower, ridge gourd, french bean, etc, and knowledge about the scientific package of practices. Loss of crops due to diseases and pest attacks on crops was also a major issue along with lack of irrigation facilities. In addition to that flooding during the rainy season for 15-20 days in Narsingpatti village near Ganga river and the attack of wild animals like blue bulls were also important problems faced by farmers of adopted villages.

Interventions undertaken

Awareness Program on “Livelihood improvement through innovative agricultural technologies

The program was organized in February, 2023 after the initial selection of villages. For this purpose, a team of scientists from ICAR RCER, Patna visited Sohaon block of Ballia district, Uttar Pradesh, and met KVK, Sohaon officials who advised to select a few villages. However, after a detailed survey of the SC population, Basantpur village was selected due to more than 60% population belonged to the SC community. The village had a good livestock population as well as a scope for vegetable farming that could fetch more income. Since their annual income was less than 50,000 per year. An awareness program on “Livelihood improvement through innovative agricultural technologies” was organized (Fig. 5.1).



Fig. 5.1 Awareness program on livelihood improvement

Demonstration of high-yielding varieties of cereals and pulses

In response to the results of the needs of farmers, the interventions have been devised and implemented in both the selected villages. To address the issue of lack of quality seeds of cereals and pulses, field demonstrations were laid out at farmers' fields using high-yielding varieties of major crops. For this, certified seeds of improved varieties were provided to almost 50 farm families belonging to the SC community. Along with seed, technical support was also provided regarding the package of practices by the team of scientists. In order to enhance the knowledge of farmers, training, awareness programs and exposure visits to ICAR RCER were also organized. When they saw better result of these technologies and practices in the field, they learned a lot. The following table shows the account of varietal demonstration of cereals and pulses among farmers in Basantpur.

Table: 5. 3 Details of on-farm demonstration of high-yielding varieties of major crops in Basantpur

Season	Crop	Varieties
Summer Kharif	Moong	MH 1142
	Paddy	Swarna Samriddhi & Swarna Unnat
	Hybrid Maize	DMRH-1308
	Fodder Sorghum	Pant Chari-6
Rabi	Wheat	HD 2967
	Lentil	IPL 220
	Vegetable pea	PB 89

High-yielding varieties of paddy developed at ICAR RCER; Patna were introduced in the village namely Swarna Samriddhi & Swarna Unnat Dhan. Both these varieties have more than 50 q/ha potential yield. Instead of local maize, the quality seed of hybrid maize DMRH-1308 was also demonstrated during Kharif season. Livestock is an integral part of the farming system in Basantpur and therefore quality seeds

of multi-cut jowar fodder Pant Chari-6 were provided to livestock owners for better availability of green fodder during the season. This variety can be harvested 3-4 times for green fodder. All these interventions during Kharif gave farmers several benefits including higher productivity of crops and increased knowledge about production and protection technologies. These efforts helped in enhancing their livelihoods and ensured better income for the farmers of Basantpur panchayat.

Training and demonstration of improved vegetable cultivation

Since vegetable cultivation has a lot of scope in Basantpur panchayat, farmers were provided training on improved methods of vegetable cultivation at KVK, Buxar. They also visited the farm of KVK and learned about planting material for different vegetables. After the training, vegetable kits from IIVR, Varanasi containing quality seeds of different vegetables were given to farmers for demonstration at their field. These vegetables gave 20-30% higher yield than local cultivars (Fig. 5.2).



Fig. 5.2 Capacity building programmes organized for plant protection and water management

Farmers training conducted on Integrated Farming System: A three-day Farmers' training on “Integrated Farming System for Livelihood Improvement and Nutritional security” was organized from 6-8 March, 2024 at KVK Buxar. This training was attended by 40 farmers of Basantpur Panchayat. They were trained in IFS models and cultivation of summer crops as well as vegetables. Visits to KVK farms were also organized for farmers. They learned the scientific method of crop cultivation as well as marketing.



Fig. 5.3 Training programme on IFS for livelihood improvement and nutritional security

Awareness program-cum-exposure visit

A one-day Awareness Program-cum-Exposure visit on “Scientific methods of agriculture and animal husbandry” was organized at ICAR-RCER, Patna on March 23, 2024. A total of 22 farmers from Basantpur village, Ballia district, Uttar Pradesh participated in the program. They visited various farms of the institute, such as natural and organic farming, Nutri-gardens, Integrated Farming Systems (IFS)

model, animal husbandry, fisheries, the museum, and the farm machinery center. Additionally, they had the opportunity to interact with the scientists. The primary objective of this visit was to educate farmers about advanced agricultural techniques and encourage their adoption in the fields to enhance agricultural income.



Fig. 5.4 Awareness program cum exposure visit to ICAR RCER, Patna

Awareness Program and Demonstration of innovative technologies for livelihood Improvement

In order to educate farmers about livelihood options and practices, Farmers awareness Program cum Demonstration of innovative technologies for livelihood improvement was organized at Panchayat Bhawan, Basantpur on February 24, 2024, at Basantpur (Narsingh patti-1 & 2), Ballia, Uttar Pradesh under Schedules Caste Sub-Plan (SCSP). Farmers' awareness was created regarding scientific method of kharif crop production such as rice, maize and fodder crops. Farmers were also learned about better water management and irrigation practices.



Fig. 5.5 Awareness programme on innovative technologies for livelihood Improvement at ICAR- RCER, Patna

Input distribution among SC beneficiaries

Many critical inputs such as quality seeds of paddy, maize, wheat, moong bean, fodder seeds and planting material for vegetables were distributed among farmers for improving their productivity and income level. Additionally, farm implements and other material like sprayer, tarpaulin, spade, pick axe etc were also distributed to farmers for their benefit. More than 500 farmers benefitted from this.

Table 5.4 Input distribution among SC beneficiaries of Basantpur panchayat

Sl. No.	Name of Inputs	Quantity	No of beneficiaries
1	Sprayer	90 Nos.	90
2	Tarpaulin	90 Nos.	90
3	Spade	41Nos.	41
4	Pick Axe	41Nos.	41
5	Vegetable seed kit	190 No.	100
6	Maize seed	64 kg	22
7	Fodder sorghum seed	210 kg	22
8	Moong	160 kg	25
9	Paddy	560 kg	50
10	Wheat	1000 kg	45
11	Lentil	80 kg	8
12	Vegetable pea	40 kg	12
	Total Beneficiaries		546

**Fig. 5.6 Input support for the livelihood improvement of SC farmer**

Impact of interventions:

The interventions under PRAYAS significantly enhanced the productivity of major crops in the selected village. The improved varieties of vegetables from IIVR, Varanasi like tomato, chilli, ridge gourd, pea, leafy vegetables etc. increased the yield by 20-30%. The rice varieties like Swarn Samriddhi and Swarn Unnat gave an average yield of 43.5 q/ha which was almost 8.5 q/ha higher than the local cultivar. Similarly, hybrid maize DMRH-1308 also provided a significantly higher yield than local maize. Thus, significant increase in yield of main crops enhanced the income level of farmers to the extent of 20-25% over existing level. Livestock is an important component of the farming system, and multi-cut Fodder Sorghum Pant Chari-6 provided extra feed to animals. Farmers took three cuts from this crop. Small implements like pick axes, spades, and sprayers help farmers in day-to-day operations and reduce the drudgery of women. The tarpaulin provided to almost 100 farmers helped in the proper harvesting and threshing of grains.



Fig. 5.7 Media coverage of the activities of PRAYAS undertaken at Basantpur, Ballia Eastern UP

Jharkhand: Bridging traditional wisdom and modern agricultural practices for farmers' prosperity

Jharkhand, spanning 79,716 square kilometers, is home to 32,988,134 people, as per the 2011 Census. With a population density of 414 individuals per square kilometer, the state predominantly remains rural, with 75.95% of its population residing in villages, while 24.05% live in urban areas. The literacy rate stands at 66.41%, reflecting a gender disparity—76.84% among males and 55.42% among females. The state's sex ratio is 948 females for every 1,000 males.

A defining feature of Jharkhand is its rich tribal heritage, with Scheduled Tribes (ST) constituting 26.21% of the population. The state is home to 32 recognized tribes, including the Santhal, Munda, Oraon, Ho, Kharia, Bhumij, and Birhor communities, each contributing to the region's vibrant cultural and agricultural traditions. Scheduled Castes (SC) account for 12.08% of the population.

Jharkhand's tribal communities have preserved unique traditional practices, from indigenous farming techniques to rich folklore and art. Despite their deep connection to nature and sustainability, many tribal groups face socio-economic challenges, highlighting the need for inclusive development initiatives.

With its diverse population and strong cultural identity, Jharkhand remains a land of resilience, tradition, and evolving progress, where modernization and heritage continue to shape its future

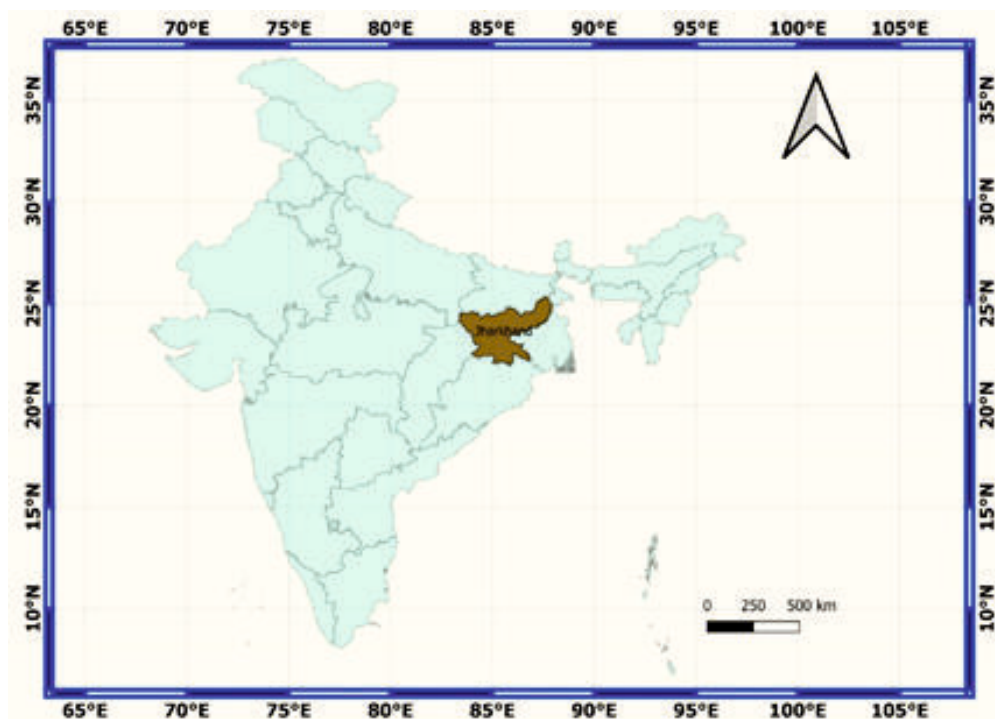


Fig. 6.0: State boundary map of Jharkhand

Plandu village

Palandu village is located in Namkum subdivision of Ranchi district in Jharkhand, India. It is situated 5 km away from Namkum (tehsildar office) and 15 km away from the district headquarters, Ranchi. Namkum is the nearest town to Palandu village for all major economic activities. Sidroll is the gram panchayat of Palandu village. This village is administrated by a sarpanch who is elected representative of the village. The total geographical area of the village is 187.23 hectares. Palandu has about 600 tribal households. The literacy rate of Palandu village is 65.15%, out of which 72.15% of males and 58.78% of females are literate. This is a 100 percent tribal village and is located near ICAR-RCER, FSRCHPR, Palandu, Ranchi

Table 6.1 Details of Palandu village

1	Name of Village	Palandu
2	Total Households	600
3	Partner Institute	State Agriculture Department
4	Major Interventions	Horticulture-based IFS and enterprise based module

Need assessment in Palandu village: A focused group discussion was organized in the village (Fig... 6.1) in which fifteen farmers participated. They discussed at length the problems faced in farming and expressed the need for the livelihood improvement of farmers. Their need and its ranking as per priority are mentioned below:

Table 6.2 Problem and need identification of the village

S. No.	Need	Rank
1	Rice fallow management i. Chain-linked fencing in irrigated land ii. Cultivation of vegetables in irrigated upland	I
2	Establishment of enterprises, namely- mushroom cultivation, lac cultivation, vermicomposting, nursery raising, fishery, poultry, duckery, goatery, piggery, etc.	II
3	Establishment of market linkage	III
4	Improvement in the knowledge and skills of scientific farming	IV



Fig. 6.1 Focused Group Discussion with farmers

Interventions under taken:

On campus training programme at ICAR, RCER, FSRCHPR, Palandu

Three days (29th February - 02 March, 2024) on-campus training programme was organized at ICAR-RCER, FSRCHPR, Palandu, Ranchi, in which 15 progressive farmers (10 male and 5 female) from Palandu village and 10 progressive farmers (2 male and 8 female) from Kharsidag village participated. Hands-on training on mushroom cultivation, nursery raising, vermicomposting, livestock (poultry, goatery, piggery, etc.) rice fallow management, Integrated farming system, etc. were imparted in the training. Role model agri-entrepreneur Sri Baijnath Mahto motivated trainees by sharing his experiences

and success story (Fig... 6.2). Change in knowledge, skill, and attitude of participants was observed



Fig. 6.2 Sh. Baijnath Mahto sharing experiences

Off-campus training programme at Plandu village :

One day training programme was organized at Plandu village on 28.02.2024 in which 50 beneficiary farmers (20 male and 30 female) participated (Fig... 6.3). Project implementation team also participated in the program and received first-hand information on the socio-economic condition of farmers, demographic profile, problems and need of the farming community.



Fig. 6.3 Off-campus training at Plandu village

Formation of farmers group: ICAR-RCER, FSRCHPR, Plandu, Ranchi provided chain link fencing to the farmers group to protect crops from animal grazing (Fig...6.4). In Plandu village, 67 beneficiary farmers joined hands to cultivate crops throughout the year on 30 acres of land in which fencing was done, transitioning from a single annual paddy crop to a diversified farming system. This area, equipped with 4 perennial ponds and 6 wells, was effectively utilized for irrigation, fisheries, and duck farming, diversifying income sources and enhancing sustainability. Another group of 80 farmers received 180 bundles of chain-link fencing to protect their crops from animal grazing in 50 acres of land.



Fig. 6.4 Providing chain-linked fencing to the farmers for growing rabi and zaid crops

The group successfully grew multiple crops, including vegetables, pulses, and oilseeds, improving food security and income. Additionally, several members of this group are part of the Namkum Block 4S4R Producer Company Limited (FPO), strengthening their access to markets and resources.

Cultivation of drought-tolerant paddy: In Plandu village, a successful initiative was undertaken to promote drought-tolerant paddy varieties. The varieties introduced included Swarn Shreya, S. Unnat Dhan, and S. Poorvi Dhan 1 & 2. A total of 85 acres of farmland was dedicated to planting these resilient paddy varieties, benefiting 80 farmers in the region. Collectively, the farmers cultivated a substantial 7 quintals of seeds, showcasing a collaborative effort to improve agricultural sustainability and productivity in the area. Swarn Unnat Dhan recorded an impressive average production of 4.5 tons per hectare.

Cultivation of vegetables in irrigated upland: Farmers' groups have successfully initiated the cultivation of various vegetables, including grafted tomato, grafted brinjal, amaranthus, and cowpea, in irrigated upland areas. This reflects the continued efforts to enhance agricultural productivity and promote sustainable farming practices

Establishment of enterprises:

a. Mushroom production: For the financial year 2024-2025, significant achievements were made in mushroom production. Hands-on training on mushroom cultivation and value-added products was organized for beneficiary farmers at ICAR-RCER, FSRCHPR, Plandu, Ranchi from 29th February 2024 to 1st March 2024. During the training, essential materials such as 72.5 kg of mushroom spawn, polypropylene bags, formalin, and Bavistin were distributed to the 18 participants. Following the training, the farmers successfully initiated mushroom cultivation and began selling their produce in local markets and weekly bazaars (Hats), contributing to their income generation. A total of 18 farmers utilized 72.5 kg of spawn for cultivation. A separate Oyster Mushroom Unit was set up to enhance production capacity (Fig. 6.5). These initiatives have played a pivotal role in promoting sustainable livelihoods and empowering farmers in the region.



Fig. 6.5 Happy women farmer with bumper production of mushrooms

b. Vermi composting: A group of seven college-going girls started vermicomposting after being trained at ICAR-RCER, FSRCHPR, Plandu, and Ranchi. A vermicomposting unit was established (Fig.. 6.6). Vermibeds, earthworms, chaff cutter machines, weighing balances, hand sealer machines, etc. were provided to the group. The quality of vermicompost prepared by this group is superior to the available vermicompost in the market.

c. Feeding mineral mixture to the animals: The soil in Jharkhand is deficient in several essential minerals, which in turn results in a lack of these minerals in the green fodder available for livestock. As a consequence, it becomes crucial to provide animals with area-specific mineral mixtures to ensure their proper nutrition. To address this issue, mineral mixtures have been supplied to beneficiary farmers for feeding various animals such as poultry, goats, pigs, cattle, and buffaloes. The distribution of the mineral mixture includes 25 no cows, 184 no goats, 58 no pigs, 11 no buffaloes, 24 no poultry, and 23 no ducks, totaling 82 kg of mineral mixture is distributed. This distribution was made to 21 farmers to help improve the health and productivity of their livestock. 82 kg. of mineral mixture was distributed to the farmers.

d. Poultry: Training was provided to beneficiary farmers in poultry, goat farming, and piggery. Poultry birds were distributed to farmers in need. Thirteen (13) farmers received poultry birds, while 14 farmers were given Khaki Campbell ducks. A poultry house was constructed for one farmer, and two farmers received duckery houses. These initiatives aim to enhance the livelihoods of the local farming community.

e. Pond Ecosystem IFS Model: In Plandu village, an Integrated Farming System (IFS) model has been established with the support of ICAR-RCER, Ranchi, under the Tribal Sub Plan. This model combines duckery, poultry, fishery, and fruit plants in a pond ecosystem. It demonstrates how multiple farming activities can be integrated to maximize resource use and improve livelihoods. The system allows farmers to use the pond not only for fish farming but also for rearing ducks and chickens, while fruit plants grow around the pond, creating a sustainable and efficient farming method.

The IFS model has brought significant benefits to the tribal community. It provides a steady income by producing fish, eggs, meat, and fruits throughout the year. The integration of these activities reduces farming risks and ensures better use of land and water resources. Additionally, the model promotes self-reliance and improves nutrition for the farmers' families. By adopting this system, the farmers in Plandu village are experiencing better economic and social well-being, showcasing the positive impact of sustainable farming practices.



Fig. 6.6 Fishery + Duckery + Poultry + Fruit Plant in Pond Ecosystem

Kharsidag village

Kharsidag village is located in Namkum sub-division of Ranchi district in Jharkhand, India. It is situated 8 km away from Namkum (tehsildar office) and 18 km away from district headquarter Ranchi. Namkum is the nearest town to kharsidag village for all major economic activities. Lalkhatanga is the gram panchayat of Kharsidag village. Kharsidag village is administrated by a sarpanch who is elected representative of the village by the local elections. The total geographical area of village is 480 hectares. Kharsidag has about 150 tribal households. Literacy rate of Kharsidag village is 67.78% out of which 72.70% males and 62.71% females are literate.

Table 6.3 Details of Kharsidag village

1	Name of Village	Kharsidag
2	Total Household	150
3	Partner Institute	State Agriculture Department
4	Major Interventions	Horticulture based IFS

Table 6.4 Need assessment in Kharsidag village:

No.	Need	Rank
1	Rice fallow management i. Chain-linked fencing ii. Provision of Dova/ well and drip irrigation iii. Cultivation of vegetables in irrigated upland	I
2	Availability of quality planting material at the right time	III
3	Promotion of enterprises, namely-mushroom, fishery, nursery raising, value addition, poultry, goatery, piggery, etc.	II
4	Knowledge and skills of scientific farming	IV

Interventions undertaken:

Off-campus training programme at Kharsidag village

One day training programme was organized at Kharsidag village on 04.03.2024 in which 50 beneficiary farmers (7 male and 43 female) participated (Fig... 6.7). Resource persons motivated the beneficiary farmers and imparted knowledge and skill about Integrated farming system, rice fallow management, livestock management, seed production, water management, nutrient management, pest management, etc.



Fig. 6.7 Off-campus training at Kharsidag

In Kharsidag village, the Self-Help Group expanded its efforts in safe food cultivation, utilizing 10 acres of land for year-round safe and chemical-free farming practices, ensuring the production of healthy food for the community. The group also plans to diversify into horticulture and floriculture, maximizing land use and profitability. These initiatives highlight the farmers' commitment to sustainable agriculture, resource optimization, and year-round cultivation, contributing significantly to their livelihoods and the local economy.

Cultivation of drought-tolerant paddy: A successful initiative was undertaken to promote drought-tolerant paddy varieties. The varieties introduced included Swarn Shreya, S. Unnat Dhan, and S. Poorvi Dhan 1 & 2.

Cultivation of vegetables in irrigated upland: Farmers group have initiated cultivation of grafted tomato, grafted brinjal, amaranthus, cowpea, etc. in irrigated upland. Fencing was provided for 10 acres of land.

Poultry: Training on poultry, goatry and piggery was imparted to the beneficiary farmers. A model poultry unit was constructed at Kharsidag village under TSP (Fig...6.8). Poultry birds were provided to the needy farmers.

Table 6.5 Input Distribution at Palandu and Kharsidag village under TSP (PRAYAS) Total beneficiaries (314)

Sl. No.	Interventions	Variety/ Items	Area/ animals covered	No. of farmers benefited	Quantity
1	Vermibed	20 lit manuals		25 Farmer	25
2	Sprayer			22 Farmer	22
3	Poultry Bird Distribution			13 Farmer	
4	Duck Distribution	Khakicampbell	Cow=25, Goat=184, Pig=58, Buffalo=11, Poultry=24, Duck=23	14 Farmer	105
5	G.I Chain link			80 Farmer	180 bundles
6	Tarpauline			30 Farmer	30
7	mushroom cultivation	Oyster		18 Farmer	72. 5 kg spawn
8	Mineral Mixture			21 Farmer	82 kg
9	Poultry House			1 Framer	1
10	Vermi-Composting Unit			6 Farmers	1
11	Duckery House			2 Farmer	1
12	Oyster Mushroom Unit			1Farmer	1

Livelihood improvement: G.I. chain linked fencing in 95 acres of land facilitated growing rabi and Zaid crops in project villages. Consequently, cropping intensity and annual income have increased. Mushroom growers are generating income through the sale of their produce, and this business has also created employment opportunities for family members. The vermicomposting group is earning revenue from selling vermicompost and providing part-time jobs to a group of college-going girls. Over time, local breeds of poultry, goats, and pigs will be replaced by improved breeds. The introduction of mineral mixtures, deworming, and vaccinations enhanced scientific livestock production in the project villages. The cultivation of high-value vegetables, the promotion of scientific livestock farming, and the development of various enterprises will further enhance livelihoods. This will lead to a positive impact, with improved technologies spreading to nearby project villages.

Udlu village selected under Schedule Cast Sub-plan

Udlu village, situated within the Kimo Panchyat of Mandu subdivision in Ramgarh district, Jharkhand, India, is a significant community in the region. Despite being located 40 km away from Krishi Vigyan Kendra, Mandu, Ramgarh, and 54 km from the district headquarters of Ramgarh, Udlu thrives with its own unique characteristics. Covering a geographical area of 190 hectares, Udlu is home to a population of 639 individuals, with 294 males and 345 females. The village boasts a literacy rate of 62.1%, with male literacy at 72.98% and female literacy at 53.14%. There are approximately 111 households in Udlu. Mandu serves as the nearest town for major economic activities, making it a vital hub for commerce and trade for the villagers. A notable demographic aspect of Udlu is its composition of Scheduled Castes (SC), constituting 61.2% of the total population, while Scheduled Tribes (ST) make up 12.8%. In terms of employment, out of the total population, 293 individuals are engaged in various work activities. Among them, 75.4% describe their work as Main Work, involving employment or earning for more than six months, while 24.6% are involved in Marginal activities, providing livelihood for less than six months. Of the 293 workers engaged in Main Work, 107 are cultivators (owner or co-owner), and 98 are agricultural laborers.

Table 6.6 Details of activities conducted in the Udlu village

1	Name of Village	Udlu, Block- Mandu, District- Ramgarh, Jharkhand
2	Total Household	111
3	Partner Institute	IIAB, Ranchi
4.	Problem Identification	Agriculture-Small and fragmented land holdings and lower productivity. Lack of irrigation facilities and over-dependence on monsoons. Poor soil health due to inadequate knowledge of soil fertility management. Lack of awareness about modern farming techniques and sustainable practices. Lack of storage facilities. Horticulture-Limited adoption of high-value horticultural crops due to lack of technical knowledge. Insufficient understanding of crop rotation and integrated farming systems. Inadequate supply of quality planting material. Animal Husbandry-Lack of breed improvement programs for cattle, poultry, and pigs. Poor housing and feeding practices for livestock. High mortality rates due to inadequate vaccination and disease prevention measures.

4	Major Interventions	Demonstration of High-yielding seed varieties for better yield, Small Farm Tools / Implements for Reducing Drudgery and Increasing Efficiency, Sewing Machines for Alternate Income, Grain / Seed Storage for Seed Conservation, Improve breed of Poultry and Pig. Awareness programme, Training programme, Kisan gosthi, Exposure visit, Animal health and vaccination camp
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Three days Skill Development Training program on Integrated Farming System:

Krishi Vigyan Kendra in Ramgarh organized three-day Skill Development Training program on Integrated Farming System (IFS), as part of the Institute's flagship extension program 'PRAYAS', funded under the Schedule Cast Sub Plan by ICAR-IIAB, Ranchi. The training aimed to enhance the livelihoods of Scheduled Caste (SC) farmers, fostering sustainable agricultural practices and income generation opportunities. This intensive training program unfolded from February 28th to March 1st, 2024, at the KVK Campus. Throughout the event, a diverse array of lectures, both online and offline, were delivered by esteemed scientists and officers from institutions including ICAR, SAU, NABARD, and various line departments. The emphasis was on the pivotal role of Integrated Farming Systems in doubling farmer income, particularly amidst the challenges posed by climate change. Scientists underscored the importance of adopting different IFS models tailored to the specific needs of families, especially those residing in rainfed farming areas. They advocated for the implementation of diverse cropping patterns, agro-forestry, agri-horticulture, and livestock farming practices such as pig, poultry, and goat farming. These strategies are crucial for ensuring regular income streams throughout the year. Notably, approximately 35 Scheduled Caste farmers from Udlu village actively participated in the program, with a majority being women farmers. Exposure visits to IFS farmer fields provided trainees with practical insights and real-world examples of successful implementation. During the valedictory session, important inputs such as vegetable seeds, portray, coco pit, and vermicompost were distributed to all trainees, empowering them with essential resources to start their journey towards integrated and sustainable farming practices.



Fig.6.8 Skill development training program on IFS



Fig.6.9 Farmer-Scientist Interaction programme:

Krishi Vigyan Kendra in Ramgarh organized a Farmer-Scientist Interaction Programme on March 12th, 2024, generously funded by ICAR-IIAB, Ranchi. This event served as a dynamic platform for farmers to engage directly with scientists, facilitating knowledge exchange and empowerment within the agricultural community. Approximately 75 farmers actively participated in the program, with a notable majority being women farmers. The esteemed chief guest for the occasion was Shri Jaiprakash Bhai Patel, MLA of Mandu, Ramgarh. In his address, he underscored the importance of enhancing the efficiency and effectiveness of inputs utilized in crop production. By optimizing these factors, he emphasized, farmers could significantly increase crop productivity while simultaneously reducing the labor burden associated with various farm operations. As a tangible gesture of support and empowerment, 25 mono-block pumps were distributed among Scheduled Caste farmers during the program. This initiative aimed to equip farmers with essential tools and resources, further enabling them to enhance their agricultural practices and improve their livelihoods.



Fig. 6.10 Exposure visits of SC farmers to ICAR RCER Patna:



Fig. 6.11 Distribution of Monoblock pump

On March 19th, 2024, a significant exposure visit was organized for 40 Scheduled Caste (SC) farmers to ICAR RCER Patna under the Scheduled Caste Sub Plan (SCSP). This visit aimed to enrich their skills and knowledge in modern agricultural practices, including animal husbandry techniques. The farmers were provided with a comprehensive tour of various facilities at ICAR RCER Patna, including the Integrated Farming System, goat unit, dairy unit, duck unit, poultry unit, fish hatchery unit, nutri garden, and seed production areas. This exposure allowed them to witness firsthand the implementation of modern agricultural activities and gain valuable insights into efficient farming practices. A highlight of the visit was a farmer-scientist interaction session chaired by the Director of ICAR RCER Patna. During this session, the importance of poultry, duckry, and goatry, alongside vegetable and crop production, was emphasized. Farmers had the opportunity to engage with experts, ask questions, and exchange ideas, further enhancing their understanding of these agricultural practices. In a gesture of support and encouragement, milk cans were distributed among the farmers during the valedictory session. The exposure visit to ICAR RCER Patna was a valuable opportunity for SC farmers to expand their knowledge, learn from experts, and gain practical insights into modern agricultural activities, contributing to their growth and prosperity in the agricultural sector.



Fig 6.12 Exposure visits to ICAR RCER Patna



Fig 6.13 Milk can distribution during exposure visits to ICAR RCER Patna



Fig. 6.14 Exposure visits to ICAR RCER Patna



Fig. 6.15 Exposure visits to ICAR RCER Patna

Farmers awareness programme cum Animal health camp:

Under the Scheduled Caste Sub Plan, the Krishi Vigyan Kendra (KVK) in Ramgarh organized Farmers Awareness Programme coupled with an Animal Health Camp, held at the vibrant village of Udlu on March 18, 2024. This dynamic event aimed to empower local farmers with cutting-edge knowledge and practical solutions. Over 200 enthusiastic farmers actively engaged in the program, notably with a significant representation of women farmers, highlighting the inclusive nature of the endeavor. Throughout the day, participants delved into the realm of modern agricultural and animal husbandry practices. Expert sessions elucidated advanced techniques like mulching and drip irrigation, essential for maximizing crop yield while conserving precious resources. Moreover, the session addressed the pressing issue of animal health. Farmers gained invaluable insights into identifying and managing major diseases affecting livestock, alongside the pivotal role of vaccination in disease prevention. To further support their efforts, essential resources such as mineral mixtures, dewormers, and antibiotics were generously distributed among the farmers. This initiative not only fostered knowledge exchange but also fostered a sense of community and solidarity among farmers, empowering them to adopt progressive practices for sustainable livelihoods.



Fig. 6.16 Lecture deliver Farmers awarenessprogramme



Fig. 6.17 Women Farmers actively participated in awareness programme

Pre-Kharif Workshop:

A one-day Pre-Kharif Workshop was organized on May 6, 2024, at KVK, Ramgarh. The event was graced by Dr. K.D. Kokate, Chairman of RAC, ICAR-RCER, Patna and Dr. Anup Das, Director of ICAR, Patna, along with other distinguished members. Dr. Sudhanshu Shekhar, Head of KVK, Ramgarh, Ramgarh, welcomed the guests and highlighted the ongoing work at the center for the benefit of farmers. During the inauguration, two technical bulletins authored by Krishi Vigyan Kendra were released. The guests visited the plantation field, observed research systems, and provided valuable feedback. Interacting with farmers from various villages, Dr. Kokate encouraged them to connect with KVK and adopt scientific farming methods. Dr. Das suggested using the Dobha technique for drip irrigation and water harvesting. The workshop

focused on reducing agricultural costs and increasing farmers' income. Over 60 Schedule farmers from Udalu village participated in the program



Fig. 6. 18 Farmers share own their experience during the programme

Vaccination Camp: A vaccination camp was successfully organized ON 22 July 2024 in Udalu village to safeguard livestock from contagious diseases. The event focused on administering the Peste des Petits Ruminants (PPR) vaccine to 500 goats. This initiative aimed to prevent the spread of the highly infectious viral disease that significantly affects the livelihoods of farmers relying on goat rearing. Veterinary professionals conducted the vaccinations, ensuring the health and well-being of the animals. Awareness



Fig. 6.19 Farmers Scientist Interaction

sessions were also held to educate villagers on proper livestock management and the importance of timely vaccinations. The community welcomed the effort, expressing gratitude for the proactive steps taken to protect their goats.

This camp was a significant stride toward promoting animal health, improving rural livelihoods, and boosting agricultural sustainability in the regio



Fig. 6.20 PPR vaccine camp at Udalu village

Drone Demonstration: A drone demonstration was held on 6 September, 2024 at Udalu village, showcasing advanced agricultural technology in rice cultivation. Farmers and scientist gathered to witness how drones can enhance farming practices, particularly in pest control, and precise pesticide and micronutrient spraying. The demonstration highlighted the efficiency of drones in reducing labor, saving time, and ensuring optimal use of resources. Participants expressed enthusiasm about adopting this technology to boost productivity and sustainability in rice farming. The event concluded with a Q&A session, where experts addressed farmers' queries and emphasized the importance of integrating technology into traditional farming methods

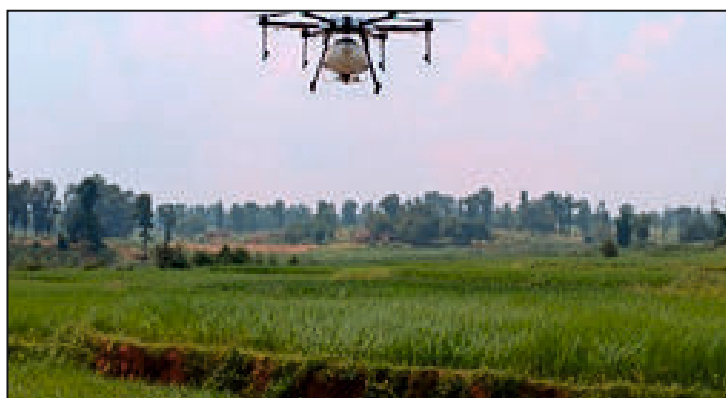


Fig. 6.21 Drone demonstration at Udalu village

Workshop on Water Conservation and Rainwater harvesting:

A one-day workshop on water conservation and rainwater harvesting was held on 21 September, 2024 at Krishi Vigyan Kendra, Mandu Ramgarh, under the Scheduled Caste Sub-Plan. Chief Guest Dr. Anup Das, Director of ICAR-Eastern Zone Research Complex, emphasized the importance of water conservation, describing it as essential for life and agriculture. He advised constructing water ponds for irrigation and promoting integrated farming systems, including crop production, animal husbandry, and poultry. Special guests Umesh Tirkey and Wilson Kujur highlighted government schemes supporting advanced agriculture and suggested techniques like

drip irrigation and mulching. Dr. Sudhanshu Shekhar discussed water-efficient crops and encouraged combining agriculture with animal husbandry. Steel drums for seed storage were distributed to 65 Scheduled Caste and Tribe farmers to promote sustainable farming. The workshop, attended by over 70 farmers from nearby villages, concluded with a cleanliness awareness initiative under the "Swachh Ata Hi Seva" program.



Fig. 6.22 Director ICAR-RCER Interacted with the Participants



Fig. 6.23 Farmers share own their experience during the programme

Rabi Workshop:

On 24 November, a Rabi workshop was held at Krishi Vigyan Kendra, Ramgarh. The workshop emphasized integrated farming, organic fertilizers, soil health management, and income generation through activities such as poultry and goat farming. Sustainable practices like zero tillage, drip irrigation, and rainwater harvesting were highlighted, encouraging farmers to adopt environmentally friendly techniques. Farmers were also advised to grow high-demand crops like broccoli, jackfruit, and pomegranate and utilize barren land for crops like tamarind to boost income. Experts stressed the importance of market management and value chain creation to secure better prices for their produce. The key takeaway for farmers was to adopt modern, sustainable agricultural practices that conserve resources, increase productivity, and enhance profitability, ensuring long-term success in farming.

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कृषि विज्ञान केंद्र मांडू, रामगढ़ ने 50 अनुसूचित जाति के किसानों को लखपति बनाने का लक्ष्य



मांडू (आज़ाद सियाही)। कृषि विज्ञान केंद्र, मांडू, रामगढ़ ने अनुसूचित जाति उप योजना के लिए उदयल गांव को चयनित किया है। जिसमें केंद्र के द्वारा किसानों को खेती, पशुपालन आगवानी एवं स्वरोजगार के प्रति प्रोत्साहित कर उनीं लखपति बनाने का लक्ष्य रखा गया है। इसी लक्ष्य को पूरा करने को लेकर केंद्र में अनुसूचित जाति उप योजना अंतर्गत जल संरक्षण एवं वर्षा जल संयोजन कार्यक्रम आयोजित किया गया। जिसका सुभारंभ भारतीय कृषि अनुसंधान परिषद का पूर्वी अनुसंधान के निदेशक डॉ अनुप दास, जिला कृषि पर्यवेक्षक, रामगढ़ उमेश ठिक्की एवं जिला अभियंता पर्यवेक्षक विमल कुमार ने संयुक्त रूप से दीप प्रज्ज्वलित कर किया। अभियंता कृषि विज्ञान केंद्र के प्रधान डॉ सुधांशु सोहर ने कुसमुख एवं अंग वनज देकर किया। इस कार्यक्रम में मांडू प्रखंड के उदयल, इंदिराबाद एवं सरगली गांव के 70 से अधिक किसानों ने भाग लिया। कार्यक्रमों को सफल बनाने में केंद्र के डॉ इंद्रजीत प्रजापति, डॉ धर्मवीर सोहर, सती कुमार, जसिकांत चौधरी और रीतन कुमार ने महत्वपूर्ण योगदान दिया।

Lodhma village selected under the Tribal Development Sub-Plan

Lodhma village is nestled within the Ramgarh subdivision of Ramgarh district in Jharkhand, India. Positioned a mere 0.8 km away from Ramgarh, which serves as both the district and sub-district headquarters. The gram panchayat overseeing Lodhma village is Kundru Kalan. Spanning across 474 hectares, the village is home to a population of 1,509 individuals. Among them, 808 are male, while 701 are female. The literacy rate in Lodhma stands at 59.38%, with 69.06% of males and 48.22% of females being literate. Lodhma village comprises approximately 310 households. One notable demographic aspect of Lodhma is its predominantly Scheduled Tribe (ST) population, constituting 53.55% of the total inhabitants. The Bediya tribe notably dominates this demographic landscape. For essential economic activities, residents of Lodhma often turn to Ramgarh, the nearest town, making it a vital hub for commerce and trade within the vicinity.

Table 6.7 Details of major interventions of Lodhma village

1	Name of Village	Lodhma, Block- Ramgarh, District- Ramgarh, Jharkhand
2	Total Household	180
3	Major Interventions	Demonstration of improve varieties of crops, planting materials and pigs Training cum awareness program, Exposure visits, Animal health camp

Problems and need identified

Lack of quality planting material, Rice fallow, Water scarcity, technology gap are major problems of the villagers.

Interventions under taken

Keeping in mind the above problems of the farmers, ICAR- RCER KVK, Ramgarh have taken certain initiatives like training and awareness programme, distribution of quality planting material of cereals, pulses, oilseeds and vegetables, nursery raising materials like vermicompost, cocopeat, portray and technical bulletins, Birsa Kisan Diary to the farmers to solve the problems of the villagers.

Demonstration of high yielding varieties of cereals, pulses, oilseeds and vegetables

In response to the results of the need of farmers, the interventions have been devised and implemented in both the selected villages. To address the issue of lack of quality planting materials of cereals, pulses, oilseeds and vegetables field demonstrations were laid out at farmer's field using high yielding varieties of major crops. For this, certified seeds and seedlings of improved varieties were provided to almost 50 farm families belonging to ST community. Following table shows the account of varietal demonstration of cereals, pulses, oilseeds and vegetables among farmers in Lodhma.

Table: 6.8 Details of on farm demonstration of high yielding varieties of major crops in Lodhma

Season	Crop	Varieties
Kharif	Paddy Groundnut Sesame Tomato Chili Brinjal	Swarna Shreya, CR Dhan 320 & IR64 drt-1 Girnar Gujrat til-1 Swarna Sampada Swarna Praphulya Swarna Shyamali
Rabi	Mustard Vegetable pea Faba Bean	PM 30 HAEP 2 Swarna Safal
Summer	Bottle gourd Sponge gourd	Swarna Sneha Swarna Prabha

High yielding varieties of paddy and vegetables developed at ICAR RCER, Patna were introduced in the village namely Swarna Shreya, Swarna Sampada, Swarna Praphulya and Swarna Shyamali during kharif season. HAEP-2 and Swarna Safal varieties of vegetable pea and faba bean respectively developed at ICAR RCER, Patna and Mustard variety PM 30 introduced in the village for cultivation under rice fallow during rabi. High yielding varieties of Bottle gourd and Sponge gourd of ICAR RCER Patna were also demonstrated at farmers field during summer.

All these interventions during kharif, rabi and summer gave farmers several benefits including higher productivity and increased knowledge. These efforts helped in enhancing their livelihoods and ensured better income for the farmers of Lodhma village.

Trainings, awareness program and exposure visit

Along with seed and seedlings, technical support was also provided regarding package of practices by the team of scientists. In order to enhance the knowledge of farmers, trainings, awareness program and exposure visit to ICAR RCER FSRCHPR, Ranchi and Birsa Agriculture University, Ranchi were also organized. When they saw these technologies and practices in the field, they learned a lot.

1. Training programme

Krishi Vigyan Kendra (KVK) Ramgarh organized a three-day training program on Integrated Farming System (IFS) under the Tribal Sub-Plan (TSP) from March 4th to March 6th, 2024, at the KVK. The primary aim of this training was to raise awareness among tribal farmers regarding the significance and advantages of adopting integrated farming systems to enhance their livelihoods. Approximately 30 participants from Lodhma village actively took part in this program. Throughout the event, a series of 12 lectures were delivered, covering various components integral to integrated farming systems. Topics ranged from quality seedling production to goat and pig farming, orchard management, and marketing strategies. Additionally, hands-on training sessions were conducted, focusing on practical aspects such as vegetable nursery management, duck farming, and poultry farming. By providing both theoretical knowledge and practical skills, the training program aimed to empower tribal farmers with the tools and techniques necessary to implement integrated farming systems effectively, thereby promoting sustainable agriculture and improving livelihoods within the community.



Fig. 6.24 Training programme on IFS



Fig. 6.25 Training programme on IFS

1. Awareness Programme

Farmers, farm women and rural youth of the village were participated in various awareness programme on swachhata hi sewa, food and health security through nutritional garden, natural farming, field day organized on campus and off campus through group meeting, goathi, kisan mela and farmers- scientist interaction etc.

2. Exposure visits

On March 13th, 2024, an exposure visits of 50 tribal farmers to two prominent agricultural institutions: FSRCHPR, Ranchi and BAU, Kanke, Ranchi. This endeavor was conducted under the Tribal Sub-Plan (TSP) to enhance the skills and knowledge of tribal farmers regarding modern agricultural technologies. During the visit to BAU, Kanke, Ranchi, farmers had the opportunity to explore the piggery unit and goat unit, gaining insights into the latest practices in animal husbandry. Additionally, they attended a lecture on commercial pig farming, which provided valuable information for improving their livestock management techniques. At FSRCHPR, Ranchi, farmers were exposed to various modern agricultural practices, including drip irrigation, poly mulching, multi-tier orchard setups, and protected vegetable cultivation. These innovative methods aim to optimize resource utilization and increase productivity even in rainfed farming conditions. The program included interactions with esteemed individuals such as the Director of ICAR RCER Patna, the Head of FSRCHPR, Ranchi, and scientists from FSRCHPR, Ranchi. Their guidance and motivation encouraged farmers to consider adopting integrated farming systems as a means to double their income, particularly in rainfed farming areas. Overall, these exposure visits provided tribal farmers with firsthand experiences and knowledge about modern agricultural technologies, empowering them to make informed decisions and improve their agricultural practices for sustainable livelihoods.



Fig. 6.26 Exposure visit to FSRCHPR, Ranchi



Fig. 6.27 Exposure visit to BAU, Ranchi



Fig. 6.28 An Empowered woman farmer thrives in pig farming after training and support



Fig. 6.29 Woman Farmer excelling in paddy cultivation



Fig. 6.30 Tibable farmer rearing pig after training and support





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Odisha: Empowering farmers through alternate livelihood opportunities

Odisha, located on India's eastern coast, is renowned for its rich cultural diversity and traditional agricultural practices. Odisha, with a total area of 155,707 square kilometers, had a population of 41,974,218 according to the 2011 Census. The state has a population density of 269 people per square kilometer. A relatively smaller proportion of the population, 16.69%, lives in urban areas, while the majority, 83.31%, resides in rural regions. The literacy rate in Odisha is 72.9%, with male literacy at 81.59% and female literacy at 64.07%. Scheduled Castes (SC) make up 22.85% of the population, while Scheduled Tribes (ST) represents 17.13%. The sex ratio in the state is 979 females for every 1,000 males. According to the 2011 Census, Odisha's total population was approximately 41.97 million. Scheduled tribes (ST) constitute about 22.85% of this population, totaling around 9.59 million individuals, while Scheduled castes (SC) make up approximately 17.13%, accounting for about 7.19 million people. The state is home to 64 distinct tribal communities, each with unique cultural practices, languages, and traditions. These communities have developed Indigenous Traditional Knowledge (ITK) systems that are intricately linked to their environment and livelihoods. For instance, the Chuktia Bhunjia tribe employs traditional agricultural practices that are closely tied to local ecology, beliefs, and rituals, ensuring sustainable food production and effective responses to climate variability. Livestock rearing is integral to the livelihoods of Odisha's tribal communities. Many tribes practice integrated farming systems, combining crop cultivation with livestock management. This approach not only diversifies income sources but also enhances soil fertility through organic manure.

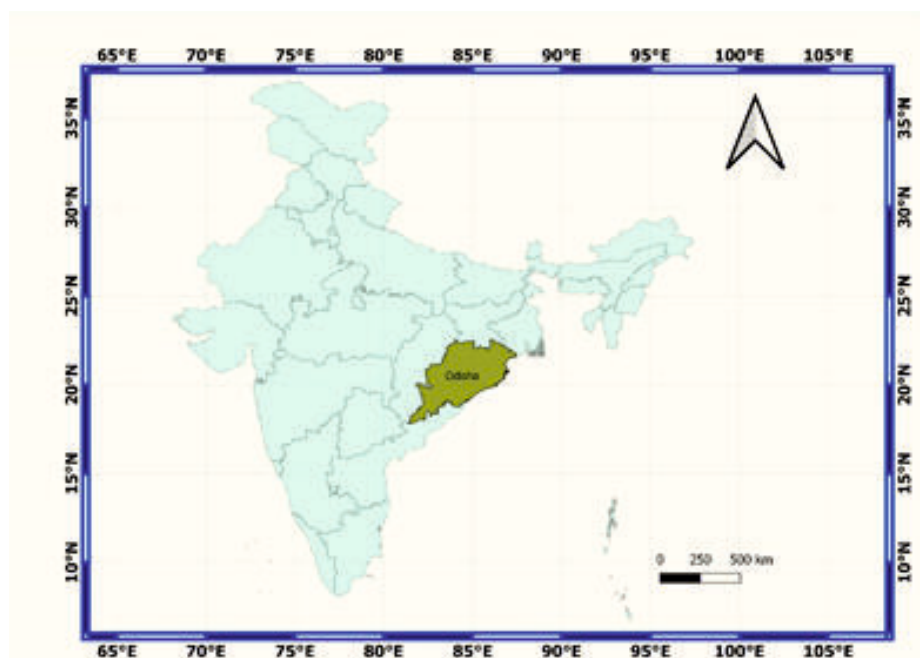


Fig. 7.0 State boundary map of Odisha

Traditional practices, such as using ash and cow urine for seed treatment and pest control, are prevalent among tribal farmers. In addition to staple crops, tribal farmers in Odisha cultivate a variety of vegetables. Traditional methods, including mixed farming techniques, are employed to grow multiple crops simultaneously, promoting biodiversity and reducing pest infestations. For example, the Baiga tribe

practices 'Bewar Kheti,' an indigenous form of shifting cultivation where organic manure in the form of ashes and twigs is used, and crop rotation is practiced with crops like Kodo-Kutki and Ramtilla. A total of eight crops are grown in this mixed farming technique. Paddy farming is generally done in the traditional way, often without the use of chemical fertilizers or pesticides. These farmers rely on organic farming practices and utilize natural resources like cow dung, compost, and locally available materials for soil enrichment. Livestock farming, particularly cattle, goats, and pigs, is also an essential part of tribal farming in Odisha. Animals are used for draught power, milk, meat, and manure, contributing to both the livelihood and sustenance of the tribal communities. Tribal farmers are increasingly facing the impacts of climate change, such as unpredictable rainfall patterns, droughts, and floods, which threaten their traditional agricultural systems.



Fig. 7.1 Mangratoli village and the Co-ordination team from ICAR, the Department of Agriculture, Govt. of Odisha

The Mangratoli village is located in the Sundargarh district, Odisha. The village belongs to Hatibari gram panchayat of Nuagaon block, Sundargarh district. The village is located on the state highway route from Birmitrapur to Nuagon block. The village, has a population of 428 numbers, with 175 persons belonging to the Scheduled caste population and constituting around 41% of the total population. The majority of the houses in the village are made of brick walls with a khaprail top. The total geographical area of the village is 39 hectares (Fig.7.1). Elephant menace, water scarcity, pest and disease, and marketing of vegetables are major problems related to agriculture.

Table 7.1 Details of Mangratoli village

1	Name of Village	Mangratoli Village, Nuagaon Block, Sundargarh, Odisha
2	Total Households	98
3	Partner Institute	Department of Agriculture Govt. of Odisha
4	Major Interventions	Backyard poultry cultivation, Goat cultivation, Low-cost mushroom cultivation, Water harvesting structure, and Solar fencing to check Elephant menace.

Table 7.2 Problems and need identification of village

Sl. No	Details	Ranks
1.	Backyard poultry cultivation	I
2.	Goat cultivation	II
3.	Low cost mushroom cultivation	III
4.	Water harvesting structure	V
5.	Solar fencing to check Elephant menace	VI

Interventions under taken:

After the needs assessment survey in the village, most SC farmers demanded backyard poultry farming and technical know-how for improved vegetable cultivation. Keeping this in view, the significant interventions are mentioned below:

Table 7.3 Details of input distribution

Particulars	Description
Major interventions	1. Distribution of improved chicks of 1-month-old (Sonali variety). 2. Provided training on Integrated farming systems for livelihood security. 3. Distribution of Nano urea 4. Distribution of mineral mixture
Collaborating Organization and office	Agriculture Department, Govt. of Odisha. Agriculture Office, Nuagaon Block, Sundargarh

After the need assessment survey, around 40 SC beneficiaries were selected from the Mangratoli village. As per the beneficiary's priority, one-month-old chicks (Sonali variety) were distributed among themselves. Each beneficiary received 50 chicks, and a total of 2000 numbers were distributed to the SC beneficiaries in the presence of Asst. Agriculture Officer, Nuagaon block.



Fig. 7.2 Distribution of one-month-old improved chicks of Sonali variety at Mangratoli village

On the day of distribution, a one-day awareness cum farmers interaction program for the dissemination of agricultural technology was also organized.



Fig. 7.3 Farmers' interaction programme for dissemination of agricultural technology at Mangratoli

The different farmers kept their chicks in their respective houses and provided feed by themselves. They were trained on improved methods of poultry farming and provided balanced nutrition such as calcium supplements, vitamins, minerals etc. and routinely vaccinated all birds



Fig. 7.4 Farmers feeding their well grown chicks in their respective houses at Mangratoli

Visit to solar-operated fencing by a progressive farmer

In the Mangratoli village, the elephant menace is a significant problem. Most farmers suffer major losses in the agricultural cultivation of all crops due to damage by elephants. One progressive farmer (Fuldeep Tappo) in the village is cultivating watermelon in an area of 1 acre with the adoption of drip fertigation. To safeguard their crops, the farmers installed solar-operated fencing with an investment of Rs 18000/- per acre. With this solar-operated fencing, he is successfully cultivating the watermelon. Such solar fencing is a significant need for farmers.



Fig. 7.5 Watermelon cultivation under drip fertigation with solar fencing all around at Mangratoli

Training Programme at Ranchi

About 25 farmers of Mangratoli village, Nuagaon block, Sundargarh, Odisha attended the training program under SCSP fund and took the training on Integrated farming system for livelihood security during 29.02.2024 to 02.03.2024. The training was formally welcomed by Dr. V. K. Yadav, Course Director. It highlighted the farmers' livelihood security by adopting an integrated farming system approach under the changing climate scenario (Fig. 7.6). Dr. R. S. Pan advised the farmers about Diversification options in vegetable cultivation for livelihood improvement. Further, Dr. S. K. Naik advised the farmers about integrated nutrient management to enhance crop yield and soil health. Dr. Meenu Kumari provided training on Techniques for improved vegetable cultivation. Dr. Reena K. Kamal stressed the importance of backyard poultry and goat farming under an integrated farming system. Other scientists, such as Dr. A. K. Jha, Dr. J. S. Choudhary, and Dr. R. Shinde, advised the farmers about mushroom cultivation, Pest management in crops, and Demonstration of preparation of organic manures, etc. One pragatisheel farmer, Mr. Baijnath Mahato, of Ormanjhi, gave his experience on how to take agriculture as a business to earn three lakhs in a one-acre land area by doing vegetable cultivation.



Fig. 7.6 Training on integrated farming system approach under the changing climate scenario



Fig. 7.7 Training of farmers about the paneer preparation from vegetable soybean

Input support of training kit to the farmers:

At the last day of training programme, various inputs of improved seeds and fertilizer were distributed to the farmers as training kit



Fig. 7.8 Distribution of mineral mixture and nano urea to the farmers of Mangratoli



Fig. 7.9 Training/ Awareness camps/ Exposure visits / Field Day / On farm trials (OFTs)/ Front Line Demonstration (FLDs) and other demonstration

Table 7.4 Details of Training programme

Sl. No.	Title	No. of days	Date and Location	No. of farmers attended
01	Awareness programme cum farmers' meeting for the implimentation of technology dissemination under SCSP-Odisha	01	Date: 02.03.2023 Location: Mangratoli village, Nuagaon block, Sundargarh, Odisha	110
02	Training on Integrated farming system for Rainfed ecosystem	03 (Residential training)	Date: 16.03.2023 to 18.03.2023 Location: ICAR-RCER, FSRCHPR, Plandu, Ranchi	25 SC farmers of Mangratoli village, Nuagaon block, Sundargarh, Odisha
03	Training on Integrated farming system for Rainfed ecosystem	03 (Residential training)	Date: 20.03.2023 to 22.03.2023 Location: ICAR-RCER, FSRCHPR, Plandu, Ranchi	25 SC farmers of Mangratoli village, Nuagaon block, Sundargarh, Odisha

Input support (Seeds / Nursery plants/ Cutting slips, suckers etc./ Mushroom spawns/Bio-fertilizers/ Honey bee colonies/ / Animal- Small (Pig/sheep/goat etc.)/ Poultry chicks/duckling etc./ Fish spawn/fingerlings/ Small equipments/ Medium equipments/machinery/ Large equipments/machinery / Fertilizers (NPK)/Secondary Fertilizers/ FYM/Vermicompost/ Setting up plant nursery/seed farm/hatchery/ Plant protection chemicals/ Animal feed etc.)

Table 7.5 Details of input support to the farmers

Sl. No	Village Name	Name of Item	Qty	No. of beneficiaries
1	Mangratoli village, Nuagaon block, Sundargarh, Odisha	Bitter gourd (Swarna Yamini)	2 kg	40 SC farmers
		Tomato hybrid (Swarna Sampada)	0.8 kg	
		Bottle gourd (Swarna Sneha)	2 kg	
		Satputia (Swarna Sawani)	2 kg	
		French bean (HAPB-4)	4 kg	
		Cow pea (Swarna mukut)	4 kg	50 SC farmers
2.	Mangratoli village, Nuagaon block, Sundargarh, Odisha	Battery operated knapsack sprayer	50 numbers	
3	Mangratoli village, Nuagaon block, Sundargarh, Odisha	Mini-rice mill	08 numbers	34 SC farmers through 8 SHGs

Distribution of literature: Hindi folder of package of practices for 1. Tomato cultivation, 2. Brinjal cultivation, 3. Cow pea cultivation, 4. French bean cultivation, 5. Bottle gourd cultivation

01 day Awareness programme cum farmers' meeting for the implimentation of technology dissemination Mangratoli village, Nuagaon block, Sundargarh, Odisha under SCSP-Odisha on 02.03.2023 (Figs. 7.9-7.12).



Fig. 7.10 Awareness programme cum farmers' meeting at Mangratoli village



Fig. 7.11 Distribution of mini-rice mill to the farmers of Mangratoli village, Nuagaon block, Sundargarh, Odisha at the ICAR-RCER, FSRCHPR, Plandu, Ranchi.



Fig. 7.12 Distribution of battery-operated knapsack sprayer to the farmers of Mangratoli village, Nuagaon block, Sundargarh, Odisha at the ICAR-RCER, FSRCHPR, Plandu, Ranchi.

अनुसंधान केन्द्र प्लाण्डु में अनुसूचित जाति के किसानों के लिए तीन दिवसीय प्रशिक्षण

रांची। 16 से 18 मार्च तक कृषि प्रणाली का पहाड़ी एवं पठारी अनुसंधान केन्द्र में अनुसूचित जाति के किसानों के लिए "समेकित कृषि प्रणाली" विषय पर तीन दिवसीय प्रशिक्षण आयोजित किया गया। इस प्रशिक्षण में ओडिशा के 25 किसान शामिल हुए। केन्द्र के प्रधान डॉ. रवि शंकर पान ने कार्यक्रम का उद्घाटन किया और किसानों को सब्जी उत्पादन में विविधता लाने का सुझाव दिया। पाठ्यक्रम संचालक डॉ. सुशान्ता कुमार नायक, प्रमुख वैज्ञानिक ने बागवानी फसलों में पोषक पदार्थों के प्रबंधन की विस्तृत जानकारी प्रदान की। डा. प्रेरणा नाथ, वैज्ञानिक ने किसानों के समक्ष सब्जी सोयाबीन से सोया दूध एवं सोया घनीर बनाने की तकनीक का व्यवहारिक प्रदर्शन किया एवं इससे होनेवाले लाभ के बारे में जानकारी दी। केन्द्र के वैज्ञानिकगण डॉ. अजित कुमार झा, डॉ. जयपाल सिंह चौधरी, डॉ. रीना कुमारी कमल एवं डॉ. मीनू कुमारी ने मशरूम उत्पादन, कीट एवं रोग का प्रबंधन, कुक्कुटपालन, बकरीपालन आदि विषयों पर जानकारी प्रदान की। तकनीकी विशेषज्ञ सुरेश कुमार एवं धनंजय कुमार ने कृषकों को सब्जी उत्पादन की व्यवहारिक जानकारी दी।



छाया : अखिलेश

प्लाण्डू अनुसंधान केन्द्र में ओडिशा और नामकुम के किसानों को प्रशिक्षण दिया गया



छाया : अखिलेश

रांची। अनुसंधान केन्द्र प्लाण्डु में 29 फरवरी से चल रहे उड़ीसा के अनुसूचित जाति के किसानों तथा झारखंड के अनुसूचित जनजाति के किसानों को "समेकित कृषि प्रणाली" द्वारा जीविका सुरक्षा पर प्रशिक्षण का समापन हुआ। यह प्रशिक्षण अनुसूचित जाति उप योजना तथा अनुसूचित जनजाति उप योजना के अंतर्गत प्रदान किया गया जो भारतीय जैव-प्रौद्योगिकी संस्थान द्वारा वित्तपोषित था। इस प्रशिक्षण में उड़ीसा सुंदरगढ़ के लगभग 25 किसानों ने भाग लिया तथा झारखंड के रांची जिले के नामकुम प्रखंड के प्लाण्डू गांव के 25 किसानों ने भाग लिया। इस प्रशिक्षण के आरंभ में पाठ्यक्रम निदेशक डॉ. वीरेंद्र कुमार यादव ने बदलती जलवायु के परिप्रेक्ष्य में समेकित कृषि अपनाने के द्वारा जीविका सुरक्षा के उपायों पर प्रकाश डाला। प्रमुख वैज्ञानिक डॉ. आर.एस. पान ने किसानों को जीविका में सुधार के लिए सब्जियों की खेती में विविधता लाने की सलाह दी। प्रमुख वैज्ञानिक डॉ. एस.के. नायक ने किसानों को समेकित पोषक प्रबंधन द्वारा फसल का उत्पादन तथा मिट्टी के स्वास्थ्य में सुधार लाने का सुझाव दिया। वैज्ञानिक डा. मीनू कुमारी ने सब्जियों की खेती की उन्नत तकनीक पर प्रकाश डाला तथा डॉ. रीना कुमारी कमल ने समेकित कृषि प्रणाली में कुक्कुट पालन और बकरीपालन को जोड़ने पर बल दिया। डॉ. अजित कुमार झा ने किसानों को मशरूम उत्पादन, वरीय वैज्ञानिक डॉ. जयपाल सिंह चौधरी ने फसलों में कीट प्रबंधन तथा डा. रेशमा शिंदे द्वारा किसानों को जैविक खाद बनाने के गुर सिखाए। इस दौरान केन्द्र के पदाधिकारी, कर्मों एवं किसान शामिल थे।



रांची 06-03-2024

पलांडु में ओडिशा व नामकुम के किसानों ने लिया प्रशिक्षण

नामकुम। कृषि अनुसंधान केन्द्र प्लांडु में सप्ताहभर से चल रहे ओडिशा और झारखंड के अनुसूचित जनजाति के किसानों का समेकित कृषि प्रणाली जीविका सुरक्षा प्रशिक्षण मंगलवार को संपन्न हो गया।

यह प्रशिक्षण भारतीय जैव-प्रौद्योगिकी संस्थान द्वारा वित्तपोषित अनुसूचित जाति उप योजना तथा अनुसूचित जनजाति उप योजना के अंतर्गत दिया गया। इसमें ओडिशा के सुंदरगढ़ के 25 और

नामकुम के प्लांडु गांव के 25 किसान शामिल हुए। प्रशिक्षण के आरंभ में पाठ्यक्रम निदेशक डॉ. वीरेंद्र कुमार यादव ने बदलती जलवायु के परिप्रेक्ष्य में समेकित कृषि अपनाने के उपायों पर प्रकाश डाला। प्रमुख वैज्ञानिक डॉ. आर.एस. पान ने किसानों को जीविका में सुधार के लिए सब्जियों की खेती में विविधता लाने की सलाह दी। प्रमुख वैज्ञानिक डॉ. एस.के. नायक ने किसानों को समेकित पोषक प्रबंधन द्वारा फसल

का उत्पादन बढ़ाने का सुझाव दिया। वैज्ञानिक डॉ. मीनू कुमारी ने सब्जियों की खेती की उन्नत तकनीक बताई। डॉ. रीना कुमारी कमल ने समेकित कृषि प्रणाली में कुक्कुट पालन और बकरी पालन को जोड़ने पर बल दिया। प्रमुख वैज्ञानिक डॉ. अजित कुमार झा ने किसानों को मशरूम उत्पादन, वरीय वैज्ञानिक डॉ. जयपाल सिंह चौधरी ने फसलों में कीट प्रबंधन और डॉ. रेशमा शिंदे ने जैविक खाद बनाने के गुर सिखाए।

West Bengal: Participatory approaches for enhancing income and nutritional security

West Bengal, the fourth most populous state in India, had a population of 91.3 million as per the 2011 Census, with an estimated rise to approximately 99.36 million by 2024. The state is one of the most densely populated, with 1,029 individuals per square kilometer, second only to Bihar. A significant 68.13% of its residents live in rural areas, with many engaged in agriculture and allied activities. The literacy rate stands at 77.08%, with a gender gap-male literacy at 82.67% and female literacy at 71.16%-highlighting the need for further educational improvements, particularly for women. West Bengal has a sex ratio of 950 females per 1,000 males, closely aligning with the national average. The state is home to a large tribal population residing in hilly terrains, forests, and plains, contributing to its diverse cultural heritage. Tribal festivals like Makar Parab (Tusu Parab) and Saharul reflect deep agricultural and nature-worship traditions. Agriculture, livestock rearing, and integrated farming are key livelihood sources in the south-western plateau. Recent initiatives promoting sustainable farming and animal husbandry aim to enhance tribal livelihoods, reinforcing the state's economic resilience and socio-cultural richness in India's development landscape.

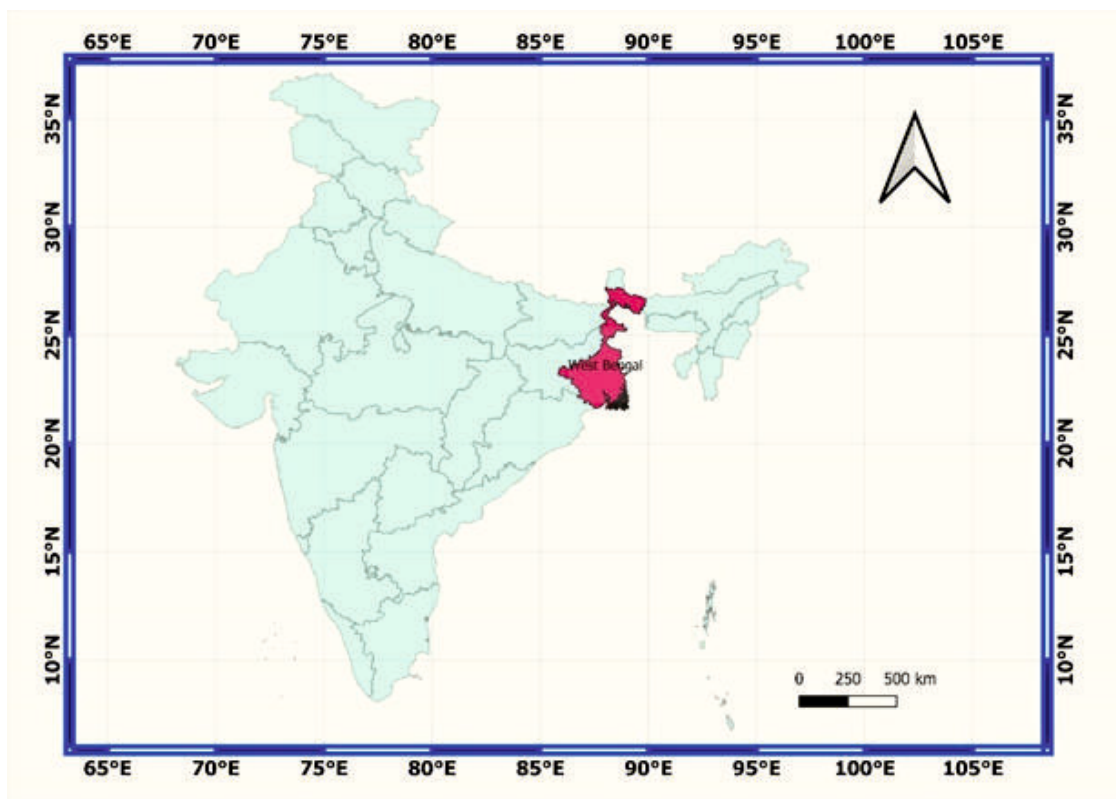


Fig. 8.0 State boundary map of West Bengal

Hatinada Village, Baghmundi Block

Hatinada is a tribal village nestled in the Ayodhya Hills of Purulia district, West Bengal, India. It falls under the Baghmundi block and lies in the easternmost part of the Chhotanagpur Plateau, which extends into the Eastern Ghats range. The region's highest peak, Chamtaburu, rises to an elevation of 719 meters above sea level.

Hatinada is encircled by verdant hills and dense forests, creating a serene and picturesque retreat for those yearning for peace in nature's embrace. The nearby town of Baghmundi acts as a central hub for the local community, which is primarily made up of the Santhal tribe. Their rich cultural traditions and strong bond with the land contribute to the vibrant and dynamic character of the region. The livelihoods of Hatinada's tribal residents are closely tied to the forest and its resources, with agriculture in the surrounding foothills providing additional sustenance. This deep, symbiotic relationship with nature is woven into the fabric of their everyday lives.

Table 8.1 Details of major interventions in Hatinada village

1	Name of Village	Hatinada, Baghmundi block, Ayodhya hills
2	Total Households	61
3	Partner Institute	Vivekananda Vikas Kendra, Kalimati, Purulia
4	Major Interventions	Mushrooms, animal husbandry (especially poultry/duck farming), shednet house fruits and multipurpose trees and mulching year-round income and emplyment of farmers, construction of Hapa (small pond).

A comprehensive need assessment survey was conducted within the tribal communities of Hatinada. The study aimed to identify and prioritize the requirements of the local populace, with rankings based on weighted mean scores.

Table 8.2 Needs of the farming communities as per the need assessment survey

	Particulars	Weighted Mean Score	Rank
1	Low-cost mushroom cultivation for additional livelihood	91.42	1
2	Backyard poultry farming for self-consumption / selling	77.14	3
3	Water conservation through mulching	48.57	4
4	Grain/seed storage for conservation	78.57	2

Leading the list of identified needs is the imperative for low-cost mushroom cultivation, highlighted by a weighted mean score of 91.42. This underscores the significance of additional livelihood opportunities within the community. Following closely behind is the necessity for grain and seed storage for conservation purposes, with a score of 78.57.

Additionally, the survey identified the importance of backyard poultry rearing for self-consumption and selling, ranking third with a score of 77.14. Finally, water conservation through mulching emerged as a crucial need, albeit ranking fourth, with a score of 48.57.

The village of Hatinada is pivotal in the PRAYAS project, an initiative geared towards empowering and uplifting the local community through targeted developmental activities. The project endeavors to leverage the land's and its people's inherent potential, fostering sustainable growth and prosperity for future generations.

In response to the findings of the need assessment survey, the PRAYAS project devised interventions tailored to address the identified needs. These interventions included mushroom cultivation, animal husbandry (particularly poultry farming), cultivation of fruits and multipurpose trees, and promoting mulching. These efforts aim to enhance livelihoods, ensure year-round income, and generate employment opportunities for the farmers of Hatinada.

Problems and need identified: Lack of market, unemployment and marginalization, lack of improved varieties of crops, chick/ducklings.

Training/awareness programme/ demonstration

1) Awareness-cum-demonstration of Mushroom cultivation

ICAR Research Complex for Eastern Region, Patna, organized an awareness-cum-demonstration of mushroom cultivation on 26.02.2024 at Hatinada village, Baghmundi Block, Ajodhya Hills, Purulia, West Bengal. The main objective of Mushroom cultivation for Hatinada village was to create awareness among tribal farmers, especially women, to improve their livelihood. They were trained by experts in mushroom cultivation and were allowed to perform the practices. They were given mushroom seeds and other inputs that may provide them with interests and ideas on cultivation that they could learn by themselves. There were 60 participants present during the demonstration program



Fig. 8.1 Training for mushroom cultivation under PRAYAS at Hatinada



Fig. 8.2 Input distribution under PRAYAS at Hatinada



Fig. 8.3 Training cum input support under PRAYAS at Hatinada

2) Capacity building-cum-farmer-scientist interaction programme

A capacity-building and farmer-scientist interaction program was organized from March 13th to 15th, 2024, at Hatinada village as part of the Institute's flagship extension initiative 'PRAYAS' under the Tribal

Sub-Plan. The event saw active participation from over 250 farmers, with women farmers making up the majority of attendees



Fig. 8.4 Farmers–scientist interaction programme at Hatinada village



Fig. 8.5 Input support of improved poultry chicks among ST farmers at Hatinada village



Fig. 8.6 Demonstration of mushroom production among ST farmers at Hatinada village



Fig. 8.7 Demonstration of water conservation using mulching film at Hatinada village

Table 8.3 Input distributions: Total beneficiaries (60+1 demonstration unit at Kalamati)

Sl. No.	Name of Inputs	Qty	No of beneficiaries
1	Sprayer M/C	02	02
2	Mixi Grinder	01	02
3	Mushroom house (18'×10')	01	07
	including inputs:		
	Mushroom spawn	40 pkts	
	Bavistin:	400 gm	
	Polybag:	02 kg	
	Plastic sealing M/c	01	
	Weighing scale:	01	
4	Back-yard Poultry house	16	16
5	Chicks	1140	61

6	Poultry Feed	350 kg	61
7	Poultry crates	55	55
8	Poultry Drinker	08	08
9	Poultry Feeder	08	08
10	Fibre net (50'×4')	08	08
11	GI Chain Link Fence	54 (1060 kg)	54
12	Grain Storage Bin (100 L)	54	54
13	Tarpaulin	54	54
14	Sprayer (Knapsack)	02	02

After the capacity building-cum-farmer-scientist interaction program, two nos. of sprayers were provided to two farmers for precise application of chemicals and fertilizer in farmers' field, one mushroom house (18'×10') for a group of farmers in the village, 16 nos. of poultry house, 1170 poultry chick, 350 kg poultry feed, 55 poultry crates, 08 nos. poultry drinker, 08 poultry feeder were distributed for enhancement of livelihood of women farmers. Additionally, 1060 kg. GI chain link fence was also distributed to control wild animal attacks on field crops, 54 nos. of Grain Storage Bin (100 L) for storing food grain and 54 nos. of tarpaulin were also distributed to the participants to control post-harvest losses of field crops.

3) Capacity-Building Program on Mushroom Production and Improved Vegetable Cultivation

A capacity-building program focused on mushroom production was held on March 4, 2025, featuring practical demonstrations on the use of poly mulch film and shade net house techniques for vegetable cultivation. Around 60 farm women took part in the training session, which emphasized oyster mushroom production. A small pond (Hapa) of size 10×10×4 meter (L×W×H) was constructed at farmer field for strong rain water. These ensure and facilitated availability of water in off season to the near by fields of 4-5 farmers covering area of 10 acre.

Table 8.4 Input support during capacity building program.

Sl. No.	Name of Inputs	Qty	No of beneficiaries
1	Mushroom spawn	25 kg	54
2	Bitter gourd seeds	1 kg	
3	Pumpkin, bottle gourd, and cucumber seeds.	One packet (10 gm) each	



Fig. 8.8. Demonstration of mushroom production



Fig. 8.9. Hapa (Small pond) under construction



Fig. 8.10. Demonstration of polymulch for vegetable production

4) Farmers-Scientist Interaction cum Kisan Gosthi

A Farmers-Scientist Interaction cum Kisan Gosthi was held on March 21st, 2025, with a focus on promoting sustainable agricultural practices. The event aimed to enhance livelihood opportunities through training on mushroom cultivation and duck farming. Over 119 farmers from Hatinada village-comprising 79 women and 40 men-participated in the program, along with farm women and a team of scientists from the institute. The sessions offered valuable knowledge on sustainable techniques for mushroom cultivation and highlighted the economic potential of duck farming as a supplementary income source.

Input support

550 ducklings, each 28 days old, were distributed to 65 tribal farmers in Hatinada village.



Fig. 8.11 Farmers-Scientist Interaction cum Kisan Gosthi at Hatinada village



Fig. 8.12 Smt. Sarawasti Mundi is monitoring her Oyster Mushroom Production centre at Hatinada village



Fig. 8.13 Shri Kisan Mundi, a Progressive farmer with his shade net house, at Hatinada village



Fig. 8.14 Distribution of ducklings among ST farmers at Hatinada village

Chandandighi (Adina) village, Gazole Block

Chandandighi village (Adina) is located in Gazole block of Malda district in West Bengal, India. It is situated 3.6 km away from the sub-district headquarters Gazole (tehsildar office), and 17.4 km away from the district headquarters, English Bazar. Pandua is the gram panchayat of Adina village. The total geographical area of the village is 905.47 hectares. Adina has a total population of 6,581 people, out of which the male population is 3,361, while the female population is 3,220. Literacy rate of adina village is 47.96%, out of which 53.59% of males and 42.08% of females are literate. There are about 1,357 houses in adina village

Table 8.5: Details of Chandandighi (Adina) village

1	Name of Village	Chandandighi (Adina) village
2	Total Household	72
3	Partner Institute	KVK, and Regional Station (CISH), Malda
4	Major Interventions	Training cum awareness program on improved agricultural practices and livestock farming

Problems and needs identified: Lack of market, unemployment and marginalization, lack of improved varieties of crops, chicks and fisheries

Interventions under taken: Keeping in mind the above problems of the farmers, ICAR-RCER, Patna with the collaboration of RS-CISH, Malda and KVK CISH, Malda have taken certain initiatives like training and input distribution for Mushroom cultivation, Poultry and goat and fish based interventions to solve the problems of the villagers.

Training/ awareness programme/ demonstration

(5) Training-cum-awareness program of improved agricultural technology and livestock farming under TSP

Two one-day training cum awareness programs under Tribal Sub-Plan (TSP), a Govt. of India Initiative was conducted on 07.03.2024 and 08.03.2024 among tribal farmers from Chandan dighi Village, Block: Gazole, Malda. It was jointly organized by KVK, Malda, and ICAR Research Complex for Eastern Region, Patna. The training was about the different agriculture and livestock technologies suitable for them to enhance their income. More than 250 farmers participated in the program, with the majority being women farmers. A few inputs like vegetable, paddy, and jute seeds were also distributed among farmers under PRAYAS at Chandandighi.

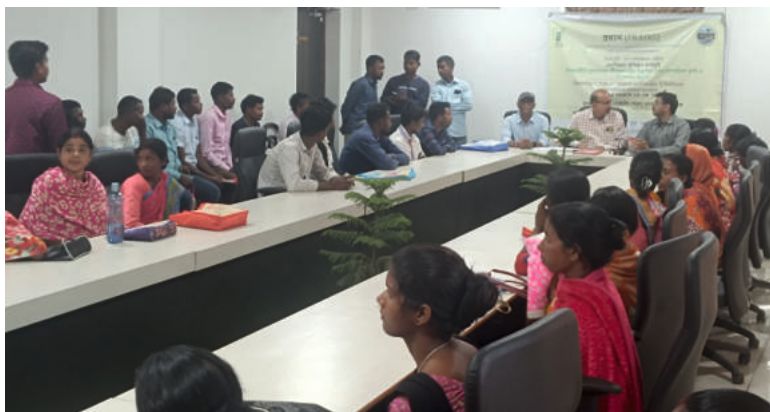


Fig. 8.15 Farmer's scientist interaction programme at Chandandighi



Fig. 8.16 Distribution of inputs among ST farmers at Chandandighi



Fig. 8.17 Low-cost poultry house construction at Chandandighi

Table 8.5 Input support given to total beneficiaries (72)

Sl. No.	Name of Inputs	Qty (kg/ns)	No of beneficiaries
1	Hy Radish	2.0	72
2	Nm Dhania/Coriander	1.0	
3	Cauliflower	0.1	
4	Cabbage	0.2	
5	Bio-Abha Bhendi	1.0	
6	Meghdut Lao	0.1	
7	Bottle gourd	0.1	
8	GK-3122 Maize	4.0	
9	Namdhani Beans	1.0	
10	GK Marsal paddy	40.0	
11	National Jute seed	150.0	
12	Poultry Chicks	2000 No.	

After training cum awareness program of Improved Agricultural Technology and livestock Farming we have distributed Hy. radish 2 kg., Nm Dhania/Coriander 1 kg., Cauliflower, 0.1 kg, Cabbage 0.2 kg., Bio-Abha Bhendi 1 kg., Meghdut Lao 0.1 kg., Bottle gourd 0.1 kg., GK-3122 Maize 4 kg., Namdhani Beans 1 kg., GK Marsal paddy 40 kg., National Jute seed 150 kg. and 2000 nos. of poultry chick where distributed for increasing of their livelihood.

Begunbari village Habibpur Block

Begunbari village is located in the Habibpur block of Maldah district in West Bengal, India. It is situated 0.5 km away from sub-district headquarters Habibpur (Tehsildar office) and 25.3 km away from district headquarters English Bazar. Habibpur is the gram panchayat of Begunbari village. The total geographical area of the village is 189.07 hectares. Begunbari has a total population of 1,056 people, out of which the male population is 546 while the female population is 510. The literacy rate of Begunbari village is 50.09% out of which 58.06% of males and 41.57% of females are literate. There are about 257 houses in Begunbari village.

Table 8.6 Details of Begunbari village

1	Name of Village	Begunbari village Habibpur, Malda , West Bengal
2	Total Households	257
3	Partner Institute	RS-CISH, Malda and KVK CISH Malda
4	Major Interventions	Mushroom cultivation, poultry and goat and fish based interventions , Agroforestry inputs, Honey bee

Problems and needs identified: Lack of market, unemployment and marginalization, lack of improved varieties of crops, chick, and fisheries

Interventions undertaken: Keeping in mind the above problems of the farmers, ICAR-RCER, Patna with the collaboration of RS-CISH, Malda, and KVK- CISH Malda has taken certain initiatives like training and input distribution for mushroom cultivation, poultry, goat, and fish based-interventions to solve the problems of the villagers.

Trainings/ awareness programme/ demonstration

(6) Training program on Livelihood improvement of SC Farmers through harnessing improved Agricultural Technology

Three-day training program on Livelihood improvement of SC farmers through harnessing improved agricultural technology under PRAYAS was conducted (Dr. Anirban Mukherjee, during March 2024). It was jointly organized by KVK, Malda, and ICAR Research Complex for Eastern Region, Patna in collaboration and funded by ICAR-NIBSM, Raipur. More than 64 farmers participated in the program, with the majority being women farmers.



Fig. 8.18 Demonstration under PRAYAS at Begunbari village.



Fig. 8.19 Farmer scientists' interaction programme at KVK, Malda



Fig. 8.20 Awareness programme at Begunbari village.



Fig. 8.21 Input support through grain storage Bins among SC farmers



Fig. 8.22 Distribution of veterinary medicines



Fig. 8.23 Demonstration of pigeon pea cultivation in a farmer's field

Table 8.7 Input distribution: Total beneficiaries (53)

Sl. No.	Name of Inputs	Qty (Nos/kg)	No of beneficiaries
1	5 hp diesel water pump	01 (Group of 10 Farmers)	53
2	Grain storage Bin	53	
3	Tarpaulin	53	
4	Vermi compost Bed	53	
5	Water Can	53	
6	Mineral Mixer (Each 30 kg)	1590 kg	
7	Poultry house:	02	

After three days training program on Livelihood improvement of SC Farmers through harnessing improved Agricultural Technology under PRAYAS, 1 no. of 5 hp diesel water pump was provided to a group of farmers (10 farmers) for irrigation of field crops, 53 nos. of Grain storage Bin for consistent supply, year-round access and weather protection of grain, 53 nos. of tarpaulin for controlling of post-harvest losses of grains and 53 nos. of vermicompost bed for producing vermicompost by their own and 53 nos. water can for increasing their water use efficiency in kitchen garden or field, 1590 kg. (30 kg. each farmer) mineral mixture. Two nos. of poultry house installing materials were also distributed among the participants to increase their livelihood.

(7) Livelihood enhancement initiative under SCSP in Malda district

Under the SCSP program, we aim to strengthen the livelihoods of marginalized farmers in the Malda district by providing support for need-based critical input. Recognizing the limited production performance of indigenous (desi) poultry breeds traditionally reared by farmers, we introduced improved poultry strains, such as Vanaraja and Sonali, which are known for their superior productivity and

adaptability to local conditions. One thousand improved poultry chicks were distributed to enhance the farmers' income from poultry farming. Additionally, to diversify income sources and promote integrated farming systems, we provided the following support:

- **Mango Saplings:** 1,000 saplings distributed to encourage horticulture and enhance long-term income through fruit production.
- **Bee Boxes:** 100 bee boxes to support apiculture, enabling farmers to generate additional income through honey production.
- **Fish Fingerlings:** 400 kg of fish fingerlings supplied to promote aquaculture and increase fish yields in local water bodies.
- **Poultry Equipment:** Distribution of essential poultry management tools, including feeders, drinkers, crates, etc., to improve rearing efficiency and reduce losses.

This holistic intervention targeted at enhancing livelihood opportunities for farmers, leveraging improved breeds, integrated farming practices, and modern inputs to ensure sustainable income generation.

(8) Capacity Building Programme on Improved Packages and Practices for Rabi Crops Cultivation under SCSP at KVK-CISH, Malda

Two one-day capacity-building programs on "Improved Packages and Practices for Rabi Crop Cultivation" were conducted on October 21 and 22, 2024, at KVK (CISH), Malda, West Bengal. Organized under the Scheduled Caste Sub-Plan (SCSP), these sessions aimed to enhance scientific awareness among Scheduled Caste farmers, with a special focus on empowering women. Participants received expert guidance on best practices for Rabi crop cultivation to help improve their agricultural productivity and overall livelihoods.

Table 8.8 Input Support: Total beneficiaries (101)

Sl. No.	Name of Inputs	Qty (Nos/kg)	No of beneficiaries
Chaitpur village			
1	Grain storage bins	75	86
2	Battery operated post-hole digger	01	
3	Battery operated power weeder	01	
4	Mineral mixture	850 kg	
5	Battery-operated sprayers	11	
6	Foot sprayers	06	
7	Tricycle ricksaw van,	01	
8	Ducklings	200	
9	Hybrid maize seed	80 kg	
10	Mustard seed	120 kg	
11	Lentil seed	10 kg	
Begunbari village			
1	Poultry chicks	50	15
2	Mustard seed	30 kg	
3	Lentil seed	30 kg	



Fig. 8.24 Input distribution of storage bin, mineral mixture, maize seed etc

(9) Training on Hybrid Maize cultivation for SC farmers under PRAYAS

A three-day training program on Hybrid Maize Cultivation was successfully organized by ICAR-CISH KVK Malda II under the PRAYAS initiative from 24th to 26th March 2025. The training aimed to empower Scheduled Caste (SC) farmers with advanced agricultural techniques. A total of 50 SC farmers from Malda district participated in the program. Dr. Anirban Mukherjee, Principal Investigator of the project, along with Dr. D.K. Raghav, Head of KVK Malda, led the sessions and provided hands-on guidance on improved crop production practices.

The training emphasized the benefits of hybrid maize cultivation, which can significantly boost farm income. It was highlighted that farmers could earn up to Rs. 14,000 profits per bigha through hybrid maize, compared to Rs. 9,000 from traditional methods, marking a 35% increase in earnings. The initiative received positive feedback from participants and is expected to contribute to sustainable livelihood improvement.



Fig. 8.25 Seed support (GK-30 variety) for trial at Farmers Field at Malda West Bengal
Chak Kanthalia village Bagda block, North 24 Parganas

North 24 Parganas is a district in southern West Bengal, of eastern India. North 24 Parganas extends in the tropical zone from latitude 22° 11' 6" North to 23° 15' 2" North and from longitude 88°20' East to 89°5' East. Barasat is the district headquarters of North 24 Parganas. North 24 Parganas is West Bengal's most populous district.

Table 8.9 Details of North 24 Parganas village

1	Name of Village	North 24 Parganas district of West Bengal
2	Total Households	151
3	Partner Institute	ICAR-ATARI, Kolkata and KVK, North 24 Parganas
4	Major Interventions	Goat and Fish based interventions

Problems and needs identified

The village is located in North 24 Parganas district of West Bengal near the Bangladesh-India border. The region is prone to frequent cyclones and heavy rainfall. The villagers are mostly tribal and livelihoods are dependent on agriculture and animal husbandry. The land is mostly irrigated (tube well) and 2-3 crops are taken annually. Rice and Jute are the major crops grown in the area. Besides, vegetables, fruits, and flowers are also grown. Farmers also rear cattle, goats, ducks, and chickens within their household premises. Commercial broiler farming is also common. Being a cyclone-prone area, people are interested in goat farming, particularly the Black Bengal goat, which is small in size but has a high prolificacy rate. However, there is no commercial goat farm in the area. The goat's holding size in the village ranges from 3-5.

Intervention undertaken

The village was selected under PRAYAS to empower the tribal farmers in cyclone-prone areas to search for livelihood options through Goat based Integrated Farming System so that the income from agriculture is increased and at the same time the vagaries of monsoon are minimized. Initially, a common interest group was formed involving five farmers from the village and a goat shelter was established under AICRP on the Goat Improvement project being operational in the institute. Under TSP fund provided by NIBSM, Raipur, 26 female and 4 male Black Bengal breeds of goats were procured for establishing a goat-based integrated farming system model and fish culture in two ponds (40 x 20 sq.m and 80 x 30 sq.m), vegetable farming, fruits tree plantation (banana and guava) and vertical farming for vegetable production also introduced in village.



Fig. 8.26 Low-cost goat shed for farmers



Fig. 8.27 Banana and vegetables growth on pond dyke

(10) Capacity building program on Integrated Farming System for Enhancing Income and Employment

A capacity building program on Integrated Farming System for Enhancing Income and Employment was organized by ICAR-RCER, Patna, on 14th December 2024 at Chak Kanthalia village of North 24 Pargana district of West Bengal in collaboration with KVK, 24 Pargana North, West Bengal University of Animal and Fisheries Sciences and ICAR-ATARI, Kolkata. In this programme around, 100 farmers from ST and SC communities and experts from ICAR-RCER, KVK and ATARI, Kolkata participated. In this program farmers were trained in integrated farming systems, vegetable production, integrated nutrients; pest management, fish and livestock farming.



Fig. 8.28 Organized capacity building of farmers on Integrated Farming System at Chak Kathalia village



Fig. 8.29 Felicitation of Honorable dignitaries for the trainig programme



Fig. 8.30 Traditional dance performance by women farmers.

Capacity-Building Program on Mushroom Production and Improved Vegetable Cultivation under the Tribal Sub-Plan (TSP) at Harinada Village, Ajodhya Hills, Purulia, West Bengal.

A capacity-building program on mushroom production, along with demonstrations on poly mulch film and shade net house techniques for vegetable cultivation, was conducted on March 4, 2023, for tribal farmers in Harnadu Village, Block: Baghmundi, Agodiyas Hills, Purnia, West Bengal. The initiative was organized under the Tribal Sub-Plan (TSP) by the ICAR Research Complex for Eastern Region (ICAR RCER), Patna. Approximately 60 farm women participated in the training session on cyste mushroom production, where Dr. Ajit Kumar Das, Principal Scientist, provided detailed insights into mushroom production technology. As part of the initiative, 25 kg of mushroom spawn was distributed among the participants to encourage adoption of the technology. Additionally, 34 farmers received critical inputs to enhance their agricultural productivity and livelihoods. The distributed inputs included 34 tarpulin sheets, 1 kg of bitter melon seeds and One packer (10 gm) each of pumpkin, bottle gourd, and cucumber seeds. The distribution was carried out in the presence of a team of scientists from ICAR RCER, Patna, comprising Dr. B. Sarkar (Principal Scientist), Dr. Ajit Kumar Das (Principal Scientist), Dr. P. K. Soudharn (Senior Scientist) and Shri A. S. Mahapatra (Senior Technical Officer). At the conclusion of the program, the participating farmers expressed strong interest in scientific interventions and showed enthusiasm for adopting new agricultural technologies to enhance their income and livelihoods.



Demarcation of Mushroom traditions



Map 1 Small pond water Chemistry



Shadrun house under Construction for Vegetable production



Demonstration of Polymatch for Vegetable Production

লক্ষ্য স্বনির্ভরতা:আদিবাসী কৃষকদের উন্নয়নে
বিশেষ প্রশিক্ষণ শিবির অয়োধ্যায়

নিম্নতম সংখ্যকভাষা, অর্থাৎ: আইকার-বিসর্গ কমরেজ দল ইউনিট বিজয়নের উল্লেখ্য
এক বিবেচনায় বিকাশ রেজের সহযোগিতায় আইকারদের কর্মসম্পাদনের লক্ষ্যে চক্রান্তের
আয়োজিত হল ‘ভায়াস’ প্রকল্পের এক নির্দিষ্ট সচেতনতামূলক ও প্রশিক্ষণ শিবির।
পূর্বলিঙ্গা ভাষার অধ্যাপক গাভার কোলো অনুষ্ঠিত হল এই শিবির। এদিনের মূল নিয়ম
কিছু মতোক এবং শুধু পালনের অধ্যায় আইকারী কৃষকদের উদ্দেশ্যে। অন্য দল,
আইসিএআর-বিসর্গ কমরেজ, পালির বিজ্ঞানীদের একটি দল ‘ভায়াস’ প্রকল্পের অধীন
হয়িনন্দা জিলায় ট্রান্সিওর উপজাতি কৃষকদের উদ্দেশ্যে অন্য দল প্রকল্পে: “ভায়াস”
হলে অনুষ্ঠিত হওয়ারের অধ্যায় জীবন উদ্দেশ্যে অন্য নির্দিষ্টকরণের একটি প্রাথমিক
হয়েছে, যা কর্মসম্পাদন ভাষারের সাহায্যে পূর্বলিঙ্গা জাতিগোষ্ঠীমতল, গাভার, গিয়ের,
কুইশা, অসেন, জিগিন্ডা এবং পূর্ব উত্তর ভাষারের পরিচয়গত হয়ে। এক নির্দিষ্ট
সচেতনতামূলক ও প্রশিক্ষণ শিবিরের প্রকল্পে সুশাসন পালির আইসিএআর-
আইসিউআর-এর পরিচালক ড. অমুন লস। এদিন আইসিএআর-আইসিউআর, পালির
প্রথম বিজ্ঞানী ড. বিকাশ সতকার এই কর্মসূচির স্বাগতগীত করেন। তিনি কৃষি প্রযুক্তির
প্রশংসামূলক কৃষির ওপর তালত এবং উপজাতি কৃষকদের নিউট্রিভা-করন, পেশি
পালন এবং উন্নয়ন বিকাশের মতোক অন্য কৃষির জন্য উপকরণ-পালন, যা ভাষার
কৃষির উন্নয়নের সাহায্য করে। বিবেচনায় বিকাশ রেজের সম্প্রদায় অরসিন ভাষার
উপজাতি কৃষকদের কৃষি বিজ্ঞানীদের সাথে মূল হয়ে উন্নত কৃষি প্রযুক্তি গ্রহণের আহ্বান
জানেন। তিনি এই কর্মসূচী উদ্বোধনের জন্য আইসিএআর-আইসিউআর, পালির পুরো
দলকে ধন্যবাদ জানান। এই কর্মসূচির ড.অমুন কুমার বা, ড.অমুন জি, এ.এস.
আলাদার প্রকল্পে অধ্যায় নির্দিষ্ট কৃষকগণ উপকরণ জিলায়।



আমাদের বাংলা

মাশরুম ও পশুপালনের মাধ্যমে উপজাতি কৃষকদের জন্য
জীবিকা উন্নয়নের লক্ষ্যে প্রশিক্ষণ শিবির আয়োজ্য পাহাড়ে



has little value, unless some
major effort is made to
develop additional facilities, and
improve the efficiency of the
existing facilities and the way
they are used. The fact that
the existing facilities are not
being used to their full capacity
is a major problem. The
existing facilities are not being
used to their full capacity, and
the existing facilities are not
being used to their full capacity.



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ভোটার তালিকা স্কুটিনির জন্য জেলার প্রতিটি বুথে
কমিটি গঠন করার নির্দেশ সৌমেন বেলথরিয়ার



দাশা অনুষ্ঠানটি: অধিবাসী কৃষকদের উন্নয়নে
বিশেষ প্রতিশ্রুতি শিরির আশাশুভ

[illegible]

STANLEY KUNITZ, JOHN KENNEDY, JAMES KENNEDY, JAMES KENNEDY

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Fig. 8.31 Media coverage of the activities taken up under PRAYAS in West Bengal



Fig. 8.32 Happy and empowered farmers of West Bengal after PRAYAS intervention

Transformational Impact on Marginalized Farmers

The PRAYAS initiative has gone beyond being a technology dissemination program—it's a livelihood transformation model. By empowering marginal farmers with knowledge, institutional support, and market access, it has contributed towards creating a resilient, inclusive, and sustainable agriculture in Eastern India.

1. Confidence Building and Empowerment

The rise in income reflects more than just monetary gain. It represents a boost in confidence among farmers—especially from Scheduled Castes (SCs) and Scheduled Tribes (STs)—who now believe in the value of scientific practices blended with indigenous knowledge. Farmers are increasingly seen taking initiative, experimenting with diversified cropping systems, and becoming proactive in decision-making.

2. Improved Awareness and Knowledge Sharing

Through participatory demonstrations and field-level capacity building, the awareness levels of farmers regarding improved agronomic practices, integrated farming systems, water conservation, and post-harvest handling have significantly increased. Peer learning and idea sharing have fostered a vibrant culture of collective problem-solving and innovation.

3. Economic Upliftment and Income Diversification

The increase in net income per family is a direct reflection of improved productivity, reduced input costs, and market linkages. Livelihood diversification—through poultry, goatery, horticulture, and kitchen gardening—has provided additional income streams, enhancing resilience to climate and market shocks.

4. Strengthened Institutional Linkages

The project facilitated better access to government schemes, credit systems, FPOs, and agri-startups, strengthening the institutional ecosystem around farmers. NGOs and Farmer Producer Companies (FPCs) played a pivotal role in this transformation, acting as bridges between research institutions and rural communities.

5. Enhanced Social Capital and Grassroots Networks

Community involvement and the formation of farmer interest groups have improved social cohesion and collective bargaining power. The project also created avenues for women and youth participation, contributing to inclusive development.

6. Strengthened ICAR Outreach

One of the major impacts has been the deepening of ICAR's field presence. Scientists and extension professionals are now more engaged with grassroots realities, ensuring that research is more demand-driven and farmer-centric. This shift has amplified the visibility and credibility of ICAR institutions among rural communities.

Table 9.1 Economic impact of PRAYAS interventions in the farmers' fields:

State	Major intervention	Major Components of Interventions	Average Net Income before intervention (in Rs.) (Per family) In 2023	Average Net Income after intervention (in Rs.) (per family) in 2025	Increase (%)
Jharkhand	Bridging traditional wisdom and modern agricultural practices for farmers' prosperity	TND Pig, Improved vegetable varieties, fruit plants, drought-tolerant paddy varieties, poultry, duck, feeding mineral mixture, vaccination, deworming, fencing in irrigated areas, etc.	85900	119000	38.53%
WB	Enhancing income and nutritional security	Mushroom, Goat Nutrigarden, Poultry Hybrid crop varieties, Fish	152000	174300	14.67%
Assam	Integrated horticulture-based interventions	Water facility at fields, plantation seedlings, crop, and vegetable seeds	61000	72400	18.68 %
Bihar	Backyard farming and nutri-garden innovations for year-round income and rural prosperity	Backyard farming, nutri-garden, Poultry, Rice-fallow, Mushroom, Farm Machines, Rice-Fallow	76000	104000	36.84%
Chhattisgarh	Sustainable goat-based farming solutions for tribal and smallholder farmers	Improved vegetable varieties, drought-tolerant paddy varieties, Goat-Based intervention, Rice fallow management by oilseed and legume crops, animal husbandry,	65,400	78208	19.58%
Odisha	Empowering farmers through alternate livelihood opportunities	Poultry-based intervention, improved vegetable seed, Mini-rice-mill, Mineral Mixture	46200	59100	27.92 %



Fig 9.1 Economic impact of PRAYAS interventions in the farmers' fields in Eastern States of India

Figure 9.1 and Table 9.1 show a consistent rise in average net income across all seven states post-PRAYAS intervention, reflecting its success in enhancing the livelihoods of marginal farmers. Jharkhand and Bihar recorded the highest income jumps (38.53% and 36.84%, respectively), largely due to targeted interventions like livestock integration, improved crops, backyard farming, and mechanization. Odisha (27.92%) and Chhattisgarh (19.58%) also saw notable gains through poultry, goat-rearing, and crop diversification. In Assam and Eastern Uttar Pradesh, vegetable and horticulture-based models led to 18.68% and 21.11% increases, respectively. West Bengal, despite already having higher baseline income, achieved a 14.67% rise through hybrid crops, fisheries, and nutrigardens. These outcomes highlight the effectiveness of combining traditional practices with scientific inputs, promoting diversification, and strengthening institutional support. The income boost signifies a positive shift toward more resilient and sustainable farming systems across the region.

The evidence from the pre and post-intervention income data clearly demonstrates that context-specific, integrated agricultural interventions can significantly enhance rural household incomes. The variation in percentage increases across states underscores the importance of customizing livelihood strategies to the agro-climatic, socio-economic, and cultural contexts of each region. For instance, states like Jharkhand and Bihar, with lower initial income baselines, showed higher relative gains due to interventions that addressed both productivity gaps and market accessibility. The incorporation of livestock-based components (e.g., goat, poultry, duck), drought-tolerant crops, and nutrition-sensitive models like nutri-gardens not only diversified income sources but also reduced risk and seasonal dependency. Moreover, technological support in the form of improved seeds, farm machinery, and value addition (e.g., mini rice mills) enhanced operational efficiency. The relatively modest improvement in West Bengal, despite having diverse interventions, suggests the saturation of income opportunities or the need for further innovation and scaling to reach higher marginal returns.

Another critical factor contributing to success was the enhancement of input services such as vaccination, mineral mixture feeding, water facility provision, and fencing, which directly influenced the productivity and health of livestock and crops. Capacity building, convergence with government schemes, and community engagement also played pivotal roles in ensuring the sustainability and adoption of the interventions. Furthermore, attention to women's participation in mushroom cultivation, backyard poultry, and nutrigarden activities helped promote inclusive growth and household-level nutrition security.

Environmental impact

The PRAYAS initiative, implemented across seven eastern Indian states, enhances bio-cultural resilience through the promotion of organic farming, climate-resilient crops, indigenous livestock breeds, and traditional agro-ecological tools. By integrating locally adapted, low-input sustainable practices, the program reinforces ecological knowledge while improving systemic resilience. Interventions include introduction of low cost water harvesting structures, organic manure application, green manuring, and agroforestry, fruits and plantation crop based systems contributing to soil fertility enhancement, carbon sequestration, and ecosystem conservation. Rather than displacing indigenous practices, the program provides cost-effective, scientifically validated improvements—such as improved crop varieties livestock breeds and livestock feeding—that align with existing socio-ecological systems. This approach ensures minimal disruption to cultural frameworks while increasing climate adaptation capacity of marginal farmers. Empirical outcomes include reduced water use, agrochemical dependency, enrich biodiversity, improve soil health and strengthened food security.

Policy Recommendations

1. **Promote Area-Specific Livelihood Models:** Policymakers should prioritize designing and implementing livelihood strategies tailored to the region's ecological conditions, socio-economic status, and local knowledge systems.
2. **Strengthen Agri-Allied Activities:** Interventions that integrate livestock, fisheries, horticulture, and nutritionally rich crops must be scaled up to ensure income stability and nutritional security.
3. **Year-Round Income Planning:** Support programs that enable off-season income opportunities (e.g., mushroom, nutri-gardens, rice-fallow utilization) to reduce income seasonality and enhance resilience.
4. **Capacity Building and Extension Support:** Continued investment in farmer training, especially in modern practices, input management, and small enterprise skills, should be emphasized.
5. **Convergence of Schemes:** Aligning central and state agricultural schemes with grassroots programs can enhance resource utilization and avoid duplication.
6. **Access to Credit and Markets:** Ensuring access to affordable finance, inputs, and market linkages will facilitate technology adoption and enhance profitability.

7. **Monitoring and Impact Assessment:** Periodic evaluation of intervention outcomes using indicators like income, food security, and women's empowerment can help refine programs for greater impact.

Conclusion

The analysis of interventions across seven Eastern Indian states between 2023 and 2025 highlights the transformative potential of integrated, multi-sectoral agricultural development models. States that focused on both diversification and value chain strengthening experienced substantial gains in average household incomes. The results affirm that when traditional wisdom is combined with scientific

State wise interventions under PRAYAS during 2024

Program	Assam	West Bengal	Bihar	Jharkhand	Chhattisgarh	Eastern UP	Odisha
Capacity Building							
Trainings (No.)	2	3	4	8	3	2	3
Awareness programs (No.)	4	7	5	14	5	4	4
Tribal farmers conclave							
Tribes attended	<i>Rabha</i>	<i>Santhal</i>	<i>Tharu</i>	<i>Santhal</i>	<i>Gond</i>	<i>Gond</i>	<i>Munda</i>
Farmers participated	7	14	100	30	7	15	7
Beneficiaries							
SCSP	-	341	225	-	159	255	192
TSP	144	647	748	8550	-	-	-
Total beneficiary	144	988	973	8550	159	225	192
Female	35	547	587	2736	61	22	35
Male	109	441	386	5814	98	203	157

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