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ANNUAL REPORT
वार्षिक प्रतिवेदन

जलवायु समुत्थानशील कृषि पर राष्ट्रीय नवोन्मेष
NATIONAL INNOVATION ON CLIMATE RESILIENT AGRICULTURE

भा.कृ.अनु.प.–कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, क्षेत्र–IV
ICAR- Agricultural Technology Application Research institute, Zone-IV

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Technology Demonstration Component

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PREFACE

Indian Council of Agricultural Research, build up a strong network of Krishi Vigyan Kendra's (KVKs) as frontline demonstration network in the country with the continuous support from GoI through its different ICAR- Agricultural Technology Application Research Institutes (ATARIs) for delivering science led technology development.

Realizing the importance of climate change, ICAR, launched and implemented a network project National Innovations on Climate Resilient Agriculture (NICRA), since February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration.

TDC-NICRA Annual Report 2022-23 includes all the relevant and required information of ICAR-ATARI, Zone IV, Patna and achievements of selected NICRA-KVKs coping with the challenges of climate vulnerabilities in farming practices as well as livelihood pattern for the empowerment of farming community. Compilation of NICRA Annual Report of ICAR-ATARI Patna for 2022-23 depicts a close assessment of endeavor of selected NICRA-KVKs in climatically vulnerable zones under supervision and guidance of ICAR-ATARI Patna and simultaneous attainment in the area of technology demonstrations, VCRMC, institutional interventions, seed production, capacity building, extension activities, review workshops *etc.* were also noted.

In this report salient achievements of NICRA KVKs under ICAR ATARI, Patna in developing functional linkage with various stakeholders, are represents in a very systematic manner to enable a clear vision about this Institute, mode of functioning and contribution of KVKs towards the progress in agriculture.

I wish to express my sincere gratitude to Dr. Himanshu Pathak, Secretary DARE & DG, ICAR for his innovative leadership and unrelenting dedication to agricultural innovation. We are also grateful to Dr. S.K. Choudhary, DDG, (NRM), Dr. U.S. Gautam, DDG (AE), Dr. V. K. Singh, Director, CRIDA, Hyderabad, for his assistance and strategic guidance on the project. We would like to take this opportunity to thank Dr. J. V. N. S. Prasad, National Coordinator, TDC-NICRA, and Dr. P. K. Pankaj, Zonal Coordinator, for their support, advice and assistance during the project's execution and documentation of achievements. I acknowledge the assistance received from the DEEs of SAUs of this Zone and cooperation of all the selected NICRA implementing KVKs in providing information in time. The support and help rendered by all the staff of ICAR-ATARI Zone IV; Patna are duly acknowledged.
We also appreciate the commitment of the Project Investigators, whose tireless efforts have been crucial to the NICRA success. We are confident that this publication will aid in the ongoing enhancement and execution of the NICRA project.

As we delve into the details of the Annual Report, we invite you to witness the transformative impact of the NICRA and join us in envisioning a future where Indian agriculture thrives through sustainable climate resilient approaches. We expect that this book will be extremely useful to all stakeholders involved in agriculture and allied sector industries.

(Anjani Kumar)
Director

EXECUTIVE SUMMARY

The Technology Demonstration Component (TDC) of NICRA offers a valuable opportunity to collaborate with farmers and apply climate-resilient technologies under real-world conditions, thereby accelerating their adoption. Participatory on-farm demonstrations for climate resilience are being conducted in 151 climatically vulnerable districts across the country though KVKs under ATARIs by ICAR- CRIDA, Hyderabad. Emphasis is placed on understanding the performance of technologies in various Agro-ecologies and farming systems, as well as identifying the factors that contribute to climate resilience in different biophysical and socioeconomic contexts.

Under NICRA PROJECT, ATARI Zone IV with support of KVK prepared and implemented village-level contingency crop plans and measures for revealing the need for technological support, human resource development, and overall empowerment of the farming community to cope with climate vulnerabilities (droughts, erratic rainfall, heatwaves, floods, and cyclonic storms). Accordingly, annual action plan was prepared to compile and document implement technological interventions related to crop production, resource conservation, livestock and fish rearing, water harvesting, and more, in the vulnerable villages of these KVK districts.

14 KVKs (11 Bihar and 03 Jharkhand) carried out different activities under TDC-NICRA Programme in various module though 54 technologies; benefitting 9488 farmers (NRM-1869; Crop Production-1776; Livestock & Fisheries- 469, and Extension activities-5374).

Natural Resource Management module covered various practices aiming to in situ moisture conservation, construction of new water harvesting, improving drainage in flood-prone areas and cleaning of water bodies like farm pond, check dams, and tank roof water harvesting. Additionally, it covered land shaping, conservation tillage, groundwater recharge methods, and water-saving irrigation methods. These interventions covered an area of 896 ha and benefited 1,869 practicing farmers.

Under the **Crop Production module**, NICRA-KVKs implemented area-specific interventions like; introduction of drought, or flood-tolerant, advancing sowing time of *Rabi* crops in areas where terminal heat stress occurs frequently. Promoting water-saving paddy cultivation methods, such as DSR, AWD technique, establishing community nurseries and other location specific interventions like inter-cropping, crop diversification, and promoting pulses. These interventions covered 593.04 ha area and benefitting 1776 farmers.

Similarly, under the **Livestock and Fisheries** module, various livestock-centric interventions were carried out viz. Livestock demonstration, improved feed and fodder, renovation of ponds/ water bodies for fish culture, backyard poultry and shelters for animal to reduce heat/ cold stress. Other interventions area specific mineral mixture, health management through deworming and vaccination and fish farming. Through these interventions 469 livestock owners benefited.

Along with this NICRA villages also implemented several **Institutional interventions** such as seed banks, commodity groups, custom hiring centers, and community nursery raising. Village climate risk management committee was established to discuss and take positive decision on how to mitigate climatic vulnerability by implementation of NICRA module. The President of VCRMC and the Head of the

relevant KVK jointly opened a bank account in their name, marking the start of VCRMC's operations. In addition to overseeing the special renting of different farm tools and implements, VCRMC also made critical decisions regarding the technological interventions to be carried out at the village in consultation with the KVK. Farm equipment such as, thresher, reaper, water pump, zero-till drill, raised bed planter, sprayer, and weeder are available at Custom Hiring Center. VCRMC have grown very popular within the farmers with sufficient income generation. During 2022–2023, the VCRMC of all NICRA KVKS generated Rs. 3,14,494, of which Rs. 1,05,200 came from Custom Hiring Centers.

5374 participants (3634 men and 1740 women) benefited from a total of 237 **Extension Activities** in various subject areas namely field days, diagnostic visits, technology week, kisan mela, animal health camps awareness, Agro advisory services, Kisan gosthi, and resource conservation technologies during the reporting period. Additionally, 276 Soil Health Cards were prepared and recommendations were given to the NICRA village farmers.

Along with this, NICRA KVKs implemented several interventions in **Convergence Programs** with developmental agencies that function in the communities during the year. Scaling up of effective initiatives in the community was made possible by funding from various development programs. During 2022–2023, Rs. 173.22 lakhs investment has been made in NICRA selected village though convergence with MNREGA, NABARD and State line departments.

CONTENTS

Introduction

In the recent years, almost all the metropolitan cities are experiencing serious problem of higher temperature and to mitigate these high demands in the cities on the cost of rural people who is suffering from severe power shortage. In the previous 5-6 years we saw that those area which were under the cultivation becomes barren due to increasing salinity or other problems.

Due to climatic variations river like Ganga and its tributaries wash out the embankment leading to flood and damage of agriculture and allied sector in large scale. Now the occurrence of flood and increase inundation area, the situation going to alarming. Not only the flood but drought and prolonged heat wave causing serious threats to human being and societies. The crop yield is severely affected by early heat waves resulting in decreasing food chain production and shriveled grains. Delayed monsoon arrival the situation becomes alarming and experiences decrease in total food grain production. We come to across that due to high temperature in hills production of apple and other temperate fruits like olive suffered a lot not only in yield but also in respect to fruit quality. Sometime, torrential rain and cloud bursting causes flood situation in the hills and landslides resulting in the severe loss to human being, agriculture and other infrastructure.

It is matter of great debate that in spite of long bright sunshine hours we are unable to harness it due to lack of infrastructure, policy support and awareness among people. Differences of day and night temperature going to be lesser and day temperature more than 45^{0}C has been experiencing the most part of the country (India) and huge power demands during whole day, situation becomes more alarming. Year 2022, has been recalled as the warmer April month as more than 100 Crore Indian people faced higher temperature >38^{o}c during the months. Increasing temperature has adverse effect on the human health, because due to higher temperature our body and minds gets affected badly.

Paris corps summit-2015 discussed the need of climate resilient issue. Now it is well established that lower and middle countries people have less contribution in global warming than the peoples of developed nation and peoples of those countries suffers very badly hence, immediate need to adopt climate resilient. On the large-scale people make arrangements at individual, domestic, local and national level to save from hot winds (loo). People afraid coming out between (1 to 4 PM) and wears loose cotton cloth, cover their face and head, wear sunglasses. When people don't care about the precautions then comes in the effects. One thing is clear that the small children and old age people suffer from excess sweating which leads to dehydration of body in comparison to young and adult.

Agriculture crop also suffers heavily and production of fruits and vegetable badly due to water deficit and lower humidity. Most of them have been facing several major constraints such as input supply, credit availability, proper transport, and market facility, etc. Their share nearly 60 per cent in total food grain production: approx. 49 per cent rice, approx. 40 per cent wheat, approx. 29 per cent coarse cereals and approx. 27 per cent pulses as well as over half of the country's fruits and vegetable production, according to Agricultural Census.

Agriculture is the primary source of livelihood for about 58 per cent of India's population. Other natural resource-based enterprises are also the foundation for the country's economic growth. Its related sectors, including field crops, horticulture, livestock, fishery and poultry are strongly associated with several United Nations Sustainable Development Goals (SDG) such as zero hunger, nutrition, and climate action, among others.

Food production must double by 2050 to match the country's population and income growth. The small and marginal farmers, therefore, have a major role in the country's food security and meeting the SDG goals.

The Global Hunger Index 2022 placed India at the 107positions among 120 countries. Achieving 'zero hunger' by 2030 is a huge challenge, and needs an integrated and multi-dimensional approach for overall sustainable agriculture and food systems in the country. One of the critical challenges for food security is climate change and its impact in form of extreme weather events. The predicted 1-2.5 degrees Celsius temperature rise by 2030 is likely to show serious effects on crop yields. High temperatures may reduce crop duration, permit changes in photosynthesis, escalate crop respiration rates and influence pest population.

Climate change accelerates nutrient mineralization, hampers fertilizer use efficiency (FUE) and hastens the evapotranspiration in soil.

The impact of climate change is directly or indirectly related to crop, water and soil as it influences the water availability, changes the intensity and frequencies of drought, effects microbial population, soil organic matter reduction, yield reduction, depletion of soil fertility as driven by soil erosion, etc.

Climate-resilient agriculture (CRA) is an approach that includes sustainably using existing natural resources through crop and livestock production systems to achieve long-term higher productivity and farm incomes under climate variabilities.

Climate change can reduce agricultural income by 15- 25 per cent; it is high time that rationale of climate- resilient agriculture (CRA) is valued and implemented more rigorously.

Climate change and achieve sustainable development goals (SDG) in India are as follows:

- Adaptation of appropriate mitigation technologies such as the cultivation of tolerant breeds to overcome the climate stress
- Water and nutrient management for efficient productivity and resource utilization
- Agro-advisories for timely crop monitoring
- Conservation agricultural practices to build soil organic carbon and to build congenial environment for plant growth, manure management

Keeping these challenges in view, the Government of India, Ministry of Agriculture, and Farmers Welfare and Indian Council of Agricultural Research (ICAR) has taken several proactive policies that are being implemented at the village level.

National Innovations on Climate Resilient Agriculture (NICRA), was launched in 2011 to address the challenges of sustaining domestic food production in the face of

changing climate and to generate information on adoption and mitigation in agriculture. Technology Demonstration Component (TDC) of NICRA offers great opportunity to work with farmers and apply such technology under field conditions with the background of current climate hostility. The emphasis has been capturing and improving the understanding on performance of technologies in different Agro-ecologies and farming systems. This also facilitates quantification of various components of climate resiliency in different biophysical and socio-economic context

The objectives of this network project are:

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies
- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks
- To enhance the capacity building of scientists and other stakeholders in climate resilient agricultural research and its application
- The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project is comprised of four components.
- Strategic research on adaptation and mitigation
- Technology demonstration on farmers' fields to cope up with current climate variability
- Sponsored and competitive research grants to fill critical research gaps
- Capacity building of different stakeholders
- Among these components, Technology Demonstration is one of the most important components under NICRA project through which demonstrations are conducted with site specific technology packages on farmers' fields. This encourages the farmers to adopt new technologies to cope with the emerging threat of climate change as well as current climate vulnerability. Both short-and long-term output are expected from the project pertaining to new and improved varieties of crops, livestock breeds, management practices that help in the development of policy making to mainstream climate resilient agriculture in the path of developmental planning.

The project was formulated and addressed based on the following steps:

- Analysis of climate constraints of the village based on long term data
- Assessment of natural resources status of the village
- Identification of major production systems
- Studying of existing institutional structures and identifying the gaps
- Focus group discussion with the community to finalize the interventions

The interventions being implemented are based on four modules, *i.e.* (1) Natural resources management, (2) Crop production, (3) Livestock and fisheries and (4) Institutional interventions.

Basic information climate, vulnerability and pre-dominant farming system typology of NICRA KVKs districts and adopted village

Enhancing resilience is one of the important keys to achieve sustainability in agriculture especially in the background of climate

vulnerability and climate change. The vulnerabilities of the respective KVK districts are mentioned below:

Table 1: List of districts and KVKs with climate vulnerability under TDC-NICRA

S. No.	State	Agro-climatic Zone	Districts	Climate vulnerability
1	Bihar	North-east alluvial plain (Zone-2)	Kishanganj	Flood/ Moisture stress
2	Bihar	North-east alluvial plain (Zone-2)	Saharsa	Flood/ Moisture stress
3	Bihar	North-east alluvial plain (Zone-2)	Supaul	Flood/ Moisture stress
4	Bihar	South-east alluvial plain (Zone-3b)	Bhagalpur	Flood/ Moisture stress
5	Bihar	South-east alluvial plain (Zone-3b)	Lakhisarai	Flood/ Moisture stress
6	Bihar	North-west alluvial plain (Zone-1)	Darbhanga	Flood/ Moisture stress
7	Bihar	North-west alluvial plain (Zone-1)	Siwan	Flood/ Moisture stress
8	Bihar	North-west alluvial plain (Zone-1)	West Champaran I	Flood/ Moisture stress
9	Bihar	North-west alluvial plain (Zone-1)	Sitamarhi	Flood/ Moisture stress
10	Bihar	South-west alluvial plain (Zone-3a)	Nalanda	Flood/ Moisture stress
11	Bihar	South-west alluvial plain (Zone-3a)	Buxar	Flood/ Moisture stress
12	Jharkhand	Western plateau-Region-II	Garhwa	Rainfed / Moisture stress
13	Jharkhand	Central north eastern plateau-Region I	Godda	Rainfed / Moisture stress
14	Jharkhand	Western plateau-Region-II	Gumla	Rainfed / Moisture stress

The TDC-NICRA village was selected by the KVKs based on vulnerability of agriculture towards climatic variability. The multidisciplinary team of KVK analyzed the constraints related to climatic variability based on secondary weather data, farming system prevalent, resource mapping, and agricultural yields in the past few years for village selection. Thus, the interventions executed in selected NICRA village have not only enabled the farmers to cope up climatic vulnerability but also played a key role in the farmers' adaptive capacity for sustainable agricultural production. Climatic vulnerability of selected fourteen KVK districts of Bihar and Jharkhand assessed during implementation of NICRA programme brought forward definite requirement in terms of technological support, human resource development and overall empowerment of farming community to enable them to cope up with climate vulnerabilities like droughts, erratic rainfall, heat wave, flood, cyclonic storm and early and delayed monsoon arrival. Plan of action, accordingly, was prepared for its implementation through executing technological interventions to initiate crop production, resource conservation, livestock and fish rearing, water harvesting *etc*. in the climatically vulnerable villages of KVK districts. Demonstration of appropriate practices and technologies with a climate focus is taken up in farmer participatory mode in NICRA villages. The NICRA villages have become hubs of learning on climate resilient agriculture in the other parts of the districts also. TDC -NICRA programme was implemented in the 29 villages covering 2165 ha flood and 1464ha drought area (Table 2).

The weather data of all NICRA KVKs showed that deficit rainfall has been recorded in the few districts Buxar, Bhagalpur, Nalanda, Darbhanga, Siwan and Sitamarhi in Bihar state while, excess rainfall has been received in the Kishanganj district. In case of Jharkhand, Godda, Gumla and Garhwa deficit rainfall around 45% or more has been received. Almost all the KVKs has reported higher temperature

Table 2: Climatic Vulnerability and Pre-dominant Farming System Typology (FST)

KVKs	Climatic Vulnerability	Farming system typologies	No. of Village	Climatic vulnerable area	
				Flood Prone(ha)	Rainfed (ha)
West Champaran I	Flood/ Moisture stress	FST3, FST4	2	180	-
Sitamarhi	Flood / Moisture stress	FST3, FST4	1	78	-
Supaul	Flood/ Moisture stress	FST3, FST4	2	430	-
Kishanganj	Flood/ Moisture stress	FST3, FST4	1	128	-
Saharsa	Flood/ Moisture stress	FST3, FST4	1	45	-
Darbhanga	Flood/ Moisture stress	FST3, FST4	3	900	-
Siwan	Flood/ Moisture stress	FST3, FST4	3	75	-
Bhagalpur	Flood/ Moisture stress	FST3, FST4	1	80	-
Lakhisarai	Flood/ Moisture stress	FST3, FST4	3	130	-
Nalanda	Flood/ Moisture stress	FST3, FST4	2	36	-
Buxar	Flood/ Moisture stress	FST3, FST4	2	83	-
Garhwa	Rainfed / Moisture stress	FST1, FST2, FST3	2	-	440
Godda	Rainfed / Moisture stress	FST1, FST2, FST4	3	-	575
Gumla	Rainfed /Moisture stress	FST1, FST2, FST4	3	-	450
Total			29	2165	1465

more than 40^{0}C and the maximum temperature goes up to 46^{0}C in Garhwa. Except Kishanganj all the KVKs has experienced dry spell of more than 15 days at least once during the paddy growing stage.

Table 3: Weather data of the districts and NICRA adopted village by KVKs in the districts during 2022-23

KVKs Name	Districts data				NICRA Adopted village					
	RF (mm) district		Temperature^{0}C		Dry spell/ drought			Intensive rain >60 mm	Flood	
	Normal	Received	Max.	Min.	> 10 days	> 15 days	> 20 days		Water depth (cm)	Duration (days)
Buxar	984.60	395.91	43.00	4.40	4	2	1			12
Godda	1094.80	636.40	44.80	4.40	1	1				
Gumla	1100.00	856.60	43.00	2.00	1		1	0		
Supaul	1344.00	1126.20	43.00	8.00		1		1		
Kishanganj	2215.00	2627.00	43.00	13.0				9		
Saharsa	1305.00	1117.70	40.30	7.50	4	2		2	60.00	8
Bhagalpur	1317.40	625.60	42.00	7.50	1	2		1	60.96	35
Lakhisarai	1108.60	647.80	43.00	6.00	1	1				
Nalanda	977.90	753.15	44.00	8.00	1	1		1		
Darbhanga	1142.30	379.50	41.50	13.80	1	1				
Siwan	1029.30	834.13	-	-		2				
W. Champaran I	1472.60	1380.70	40.50	5.80	1	1		1		
Garhwa	1078.80	666.50	46.00	7.00	1	1		1		
Sitamarhi	1680.00	457.00	41.90	13.0			1	1		

2. Interventions with Modules

Module I: Natural Resource Management

In-situ moisture conservation, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods and rainwater harvesting structure development.

Module II: Crop Production

Introducing drought, salt and flood tolerant/ resistant varieties, advancement of planting dates of rabi crops in areas with terminal heat stress, water saving paddy cultivation methods (AWD technique, aerobic, DSR), community nurseries for delayed monsoon, location specific intercropping systems with high sustainable yield index, introduction of new crops/ crop diversification, custom hiring centers for timely planting, etc.

Module III: Livestock and Fisheries

Use of community lands for fodder production during drought/flood, improved fodder/feed storage methods, preventive vaccination, improved livestock demonstration, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water.

Module IV: Institutional Interventions

Strengthening the existing institutional interventions or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring center (CHC), collective marketing group, introduction of weather index-based insurance and climate literacy through a village weather station are part of this module.

2.1 Module I: Natural Resource Management

The major emphases of the intervention were on augmenting rainwater availability through its efficient use by adopting site-specific rainwater harvesting strategies. Major interventions under this theme included in-situ moisture conservation; construction/renovation of new water harvesting and recycling structures/farm ponds/checks dams/tank roof water harvesting tank; land shaping and RWH structure; improved drainage in flood prone areas; conservation tillage where appropriate; artificial ground water recharge and water saving irrigation methods; green manuring; crop residue management; bunding of field; broad bed furrow; soil test based nutrient application; micro irrigation techniques; compost pits; participatory soil health management through identification and correction of major and micro nutrients. The impact of interventions aimed and enhancing rainwater harvesting and utilization capacity was very significant across the clusters. The efforts in this area resulted in the creation of an additional rainwater harvesting capacity of over 34710 cu m leading to increase cropping intensity by bringing around 79.97 ha of area benefitting 191 farmers under protective irrigation regime since the inception of the project.

Table 4: Rainwater harvesting facility and area coverage under NICRA programme in adopted village

Name of KVKs	Water Volume Cum.	No of farmers	Covered area (ha)
Buxar	21310	75	9.97
Godda	13400	116	70.00
Total	**34710**	**191**	**79.97**

2.1.1 In-situ Moisture Conservation-Resource Conservation Technology:

In-situ rainwater management through farm bunding, sowing against the slope, mulching, DSR, etc. adopted to conserves rainwater at field level and also drains out excess water into community drainage channels. This water can also be utilized for recharging ground water to provide supplemental irrigation to post-rainy season crops, which is otherwise not possible with flatbed planting under various crops. Through these methods, soil moisture is managed by maximizing the use of rainfall through increased infiltration and moisture retention and reducing runoff and soil erosion. These conservation technologies have been demonstrated in NICRA adopted villages in paddy crop covering 405 farmers in 261.50 ha area. Paddy yield ranged 28.50 to 56.10q/ha with average yield 39.27 q/ha with B:C ratio 1.81 (Table 5a). Performance of different technologies under rabi wheat crop were adopted 82 farmers covering 37.10ha area and obtained average yield of 39.03 q/ha with a B:C ratio of 1.88. However, in case of green gram and Black gram average yield of 8.80 and 10.00q/ha respectively has been obtained (Table 5b). Water conservation technology mulching has been adopted in different vegetables like okra, watermelon and potato cultivation in an area of 4.25 ha involving 34 farmers (Table 5c).

Fig :1 View of In-situ soil moisture conservation

Table 5a: Demonstration of in-situ water conservation technologies in Paddy in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)	Economics (Rs/ha)		
					Gross Cost	Net Return	BCR
Lakhisarai	DSR	10	4.00	40.67	28500	57840	3.03
Sitamarhi	DSR	22	8.00	41.90	66560	32211	1.93
Bhagalpur	Farm Bunding	29	7.00	47.35	42000	56000	1.33
	Alternate wet & dry	18	5.00	48.23	43000	58000	1.34
Siwan	DSR paddy	10	2.00	28.50	24491	43390	1.77
	Green manuring	25	5.00	35.34	32016	53787	1.69
Godda	Farm Bunding	220	88.50	32.90	31500	24430	1.78
Buxar	Raised bund	71	142.00	56 .10	47405	74500	1.57
Total/ Av.		**405**	**261.50**	**39.27**	**39434**	**50020**	**1.81**

Table 5b: Demonstration of in-situ water conservation technologies in Rabi crop in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)	Economics (Rs/ha)		
					Gross Cost	Net Return	BCR
Buxar	ZT Wheat	30	13.10	40.00	42600	48400	1.13
Sitamarhi	ZT Wheat	40	16.00	34.60	66515	37265	2.27
West Champaran I	ZT Wheat	12	8.00	42.50	26200	58800	2.24
Total/ Av.		**82**	**37.10**	**39.03**	**45105**	**48155**	**1.88**
Garhwa	Green gram	25	10.00	8.80	25000	43244	2.73
	Black gram	25	10.00	10.00	28300	41000	2.46
Total/ Av.		**50**	**20.00**	**9.40**	**26650**	**42122**	**2.60**

Table 5c: Demonstration of in-situ conservation technologies mulching in vegetable crops in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)	Economics (Rs/ha)		
					Gross Cost	Net Return	BCR
Bhagalpur	Okra	13	0.75	25	186000	48000	2.86
Supaul	Watermelon	5	2.00	1000	45000	87000	1.93
	Okra	5	1.00	140	75000	160000	2.13
Nalanda	Potato	11	0.50	275	93870	126160	2.43
Total/ Av.		**34**	**4.25**	**--**	**--**	**--**	**--**


Fig : 2 View of ZT field operation


Fig : 3 View of In-situ conservation technologies

2.1.2 Conservation tillage:

Sowing of rabi crops depends on the harvesting time of the preceding kharif crop and also soil moisture status for undertaking land preparation before sowing. In case of wheat, this involves 2 to 3 or even more tillage operations for obtaining appropriate tilth before sowing of wheat. In addition to the costs incurred and energy required, this causes delay in planting of wheat which often results in coincidence of vulnerable stage with high temperature stress during February/ March. This often leads to reduction in grain yield and loss to farmer. Zero tillage (ZT) technology offers a viable and practical solution by avoiding repeated tillage for land preparation and sowing, reducing cost of cultivation and also permits planting early by 10-15 days. Advancement in sowing date is an adaptation to avoid terminal heat stress. Zero- tillage refers to direct drilling of wheat without ploughing in paddy fields immediately after paddy harvest using zero till drill or happy seeder. Conservation tillage in wheat, paddy, lentil, and green gram demonstrated in NICRA villages in an area of 218.77 ha involving 638 farmers. Best performance of ZT was found in paddy with an output of 49.50 q/ha followed by wheat 39.07 q/ha, while green gram had highest B:C ratio 2.79 followed by lentil 2.78 and minimum 2.05 in paddy. The technologies followed mainly by zero tillage operation. The results of the ZTD in various crops are presented in below table 6.

Table 6: Performance of ZTD in various field crops in the NICRA adopted village

Name of KVKs	Name of the crops	No. of farmers	Area (ha)	Output (q/ha)	Economics (Rs. /ha)		
					Gross Cost	Net Return	BCR
Bhagalpur	Wheat	27	10.00	41.40	38420	45421	1.18
Darbhanga		36	12.21	32.00	24980	50400	2.01
Lakhisarai		71	24.00	33.83	31500	41160	2.31
Nalanda		41	16.40	50.50	28270	60257	2.13
Saharsa		40	16.00	34.60	36515	37265	1.02
Sitamarhi		35	7.00	37.60	32504	37060	2.14
Siwan		15	4.00	39.16	30879	56507	1.83
West Champaran I		12	8.00	42.50	26200	58800	2.24
Buxar		45	21.00	40.00	42600	48400	1.13
	Sub Total/Av.	**322**	**118.61**	**39.07**	**40763**	**49474**	**2.19**
Bhagalpur	Paddy	27	10.00	47.35	42000	56000	1.33
Darbhanga		31	10.51	53.15	34680	65670	1.89
Siwan		20	6.00	48.00	32750	63250	1.93
	Total/Average	**77**	**26.51**	**49.50**	**36477**	**61640**	**1.71**
Bhagalpur	Lentil	21	12.00	12.30	68880	47880	3.28
Darbhanga		25	6.06	11.42	26840	48737	1.81
Nalanda		22	4.40	14.60	24730	65000	3.24
	Sub Total/Av.	**68**	**22.46**	**12.77**	**40150**	**53872**	**2.78**
Bhagalpur	Green gram	24	12.00	11.40	88407	59407	3.04
Darbhanga		122	33.19	4.57	16300	28865	1.77
Sitamarhi		25	6.00	8.60	17300	44620	3.57
	Sub Total/Av.	**171**	**51.19**	**8.19**	**40669**	**44297**	**2.79**
Grand Total		**638**	**218.77**	**--**	**--**	**--**	**--**

Fig : 4 View of ZTD field operation

2.1.3 Artificial ground water recharge Demonstration in paddy

Artificial ground water recharge in paddy field has been made by field bunding, trench cum bunding and DSR to manage in-situ water harvesting. In paddy 132 ha area involving 154 farmers by KVK Bhagalpur with benefit: cost ratio 1.37 (Table 7).


Fig : 5 View of ground water recharge

Table 7: Performance of Artificial ground water recharge demonstration in paddy in the NICRA adopted village

KVK Name	Technology demonstrated	No. of farmers	Area (ha)	Output (q/ha)	Economics (Rs. /ha)		
					Gross Cost	Net Return	BCR
Bhagalpur	Bunding	27	7.00	47.35	42000	56000	1.33
	Trench cum bunding (convergence)	125	125.00	54.80	43000	61000	1.41
Total		**154**	**132**	**--**	**--**	**--**	**--**
Average		**77.00**	**66.00**	**51.07**	**42500**	**58504**	**1.37**

2.1.4 Water saving irrigation methods

Water saving irrigation methods like direct seeded rice (DSR) and raised bunding in paddy crop has been demonstrated in NICRA adopted villages covering an area of 168.51 ha in 141 farmers' fields. Maximum demonstration yield of 53.40q/ha reported by KVK Buxar with BC ratio of 3.02. Detailed results of water saving are presented in Table 8.

Table 8: Performance of different water saving irrigation methods in the NICRA adopted village

KVKs name	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
Nalanda	DSR(Rajendra Sweta)	40	16	49.30	42.80	15.18	34180	62872	2.94
Buxar	Raised Bund Height	71	142	53.40	47.80	11.70	43570	88320	3.02
Darbhanga	DSR(Rajendra Mahsuri)	30	10.51	53.15	49.60	7.15	34680	65670	1.89
Total		**141**	**168.51**	**--**	**--**	**--**	**--**	**--**	**--**
Average		**47**	**56.17**	**51.95**	**46.73**	**11.34**	**37477**	**72287**	**2.62**

Fig : 6 View of DSR technologies

2.1.5 Other Crop Demonstrations:

Demonstrations like zero tillage in pulses, mulching, banana covering, contingent crop of radish, crop diversification with pointed gourd, bio-pesticides were carried out in 333 farmers' fields covering an area of 76.90 ha of land. Out of these demonstrations ZT in wheat showed highest economic return of 3.59 followed by ZT in lentil (3.57). Detailed has been presented in Table 9.

Table 9: Performance of other Crop demonstrations in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield(q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
Siwan	Uttara	15		6.16	N/A	100.00	11273	21869	1.94
	Rajendra Suflam	10	05.00	15.88	12.36	20.46	29732	60606	2.03
	PM 30	10		13.90	12.36	12.46	27940	56470	2.02
Nalanda	Wheat with ZT	41	16.40	50.50	44.50	13.48	28270	60257	2.13
	Lentil with ZT	22	4.40	14.60	13.10	11.45	24730	65000	3.24
	Paddy with DSR	40	16.00	49.30	42.80	15.18	34180	62872	2.94
	Mulching (Potato)	11	0.50	275.00	250.00	10.00	93870	126160	2.43
Lakhisarai	Lentil (IPL-220)	13	4.00	13.20	11.20	18.09	21500	55210	3.57
	Linseed (S. Tisi-1)	36	5.00	12.20	10.27	19.15	19600	41560	3.12
	Chick Pea (RVG-202)	30	12.00	13.50	11.70	15.95	22800	53720	3.35
	Mustard (RH-725)	65	10.00	11.90	10.06	18.21	21500	43355	3.02
Kishanganj	Bunch cover (Banana)	10	2.00	455.00	410.00	10.90	280000	584500	2.08
Darbhanga	Radish(contingent)	20	0.60	95.40	88.60	7.67	44500	160500	2.61
Sitamarhi	Pointed gourd (Rajendra Parwal-02)	10	1.00	139.00	125.00	11.20	102000	176000	2.72
Total		333	76.90	**--**	**--**	**--**	**--**	**--**	**--**
Average		23	6.40	83.25	80.15	20.3	54421	112719	2.76

Fig : 7 View of crop production modules

2.2 Module II: Crop Production

Monsoon contingency action plans were prepared and implemented in NICRA KVKs which experienced delayed onset/ deficit rainfall conditions during 2022-23. Contingency crop plans for late planting (after mid-August) involving appropriate crop, soil moisture, nutrient management measures, crop diversification etc. were taken up in NICRA villages. The impact of resilient practices and technologies is highlighted through different intervention mentioned below

2.2.1 Introducing drought tolerant varieties

During the current year (2022-23) delayed onset of monsoon was experienced in several districts of Bihar and Jharkhand and a number of short duration and drought tolerant varieties were demonstrated to make effective use of the remaining growing season. Introductions of drought resistant varieties of paddy, sesame, black gram, tomato, pigeon pea etc. were demonstrated in NICRA adopted villages involving 914 number of farmers in 356.80 ha area. Performance of the different drought resistant varieties of various crops is presented in the following Table 10. Result revealed that average paddy yield (37.63 q/ha) under demonstration and 30.68 q/ha in the farmers field has been observed. In case of wheat maximum yield 40.10 q/ha was recorded in wheat var.DBW-187 under the demonstration where as in the farmer practices 34.05q/ha. In case of pigeon pea average demonstration yield of 12.92q/ha against farmer practices 9.50q/ha has been recorded. Under oilseed in groundnut 19.46q/ha of demonstration. (Table 10)


Fig : 8 View of drought tolerant variety

Table 10: Performance of different drought tolerant varieties in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield(q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gros cost	Net Return	BCR
Paddy									
Supaul	Sahbhagi	12	5.00	39.00	37.00	5.40	45000	75000	1.60
Gumla	Swarna Shreya	91	36.40	42.06	28.40	48.00	38000	47802	2.25
	CR Dhan 320	1	0.40	37.70	28.40	32.70	38000	38908	2.02
Godda	Sahbhagi	195	81.50	25.00	20.20	23.76	31500	11000	1.35
	Sabour Sree	110	47.00	32.20	25.80	24.81	31500	23240	1.74
Garhwa	IR64-Drt-1	50	20.00	31.40	26.00	20.76	40000	33470	1.84
Bhagalpur	Sabour Sampan	27	10.00	47.35	34.80	36.06	42000	56000	1.33
Buxar	Swarna Shreya)	30	14.00	46.30	44.85	3.23	36540	53590	1.40
Total / Av.		**516**	**214.3**	**37.63**	**30.68**	**24.34**	**37818**	**42376**	**1.69**
Wheat									
Sitamarhi	DBW-187	10	5.00	40.10	34.05	17.76	36450	39990	2.09
Godda	Sabour Nirjal	70	26.00	32.40	25.80	25.58	37750	27050	1.72
Total / Av.		**80**	**31.00**	**36.25**	**29.93**	**21.67**	**37100**	**33520**	**1.91**
Millets	**(Ragi)**								
Gumla	BM-3	22	8.50	14.33	11.20	27.90	22600	28672	2.26
Garhwa	BM-3	25	10.00	12.40	10.60	16.98	30600	13690	1.48
Total / Av.		**47**	**18.50**	**13.37**	**10.90**	**22.44**	**26600**	**21181**	**1.87**
Pulses	**Pigeon pea**								
Gumla	Rajeev lochan	6	2.25	13.15	9.80	34.10	28800	57990	3.01
Godda	IPA-203	30	13.00	9.80	7.80	25.64	31500	16520	1.52
Garhwa	IPA203	25	10.00	15.80	10.90	4.90	26000	78280	4.01
Total / Av.		**61**	**25.25**	**12.92**	**9.50**	**21.55**	**28767**	**50930**	**2.85**
Gumla	Black gram (PU-31)	7	2.00	10.86	8.50	27.70	25400	46256	2.82
Godda	Horse gram (Indira Kulthi-1)	35	13.00	6.70	5.90	13.56	16500	7620	1.46
Garhwa	Green gram (HUM 16)	25	10.00	8.80	7.70	14.29	25000	36714	2.47
Oilseeds	**Ground nut**								
Gumla	TG-51	3	1.00	19.46	14.50	34.20	45500	68376	1.66
Godda	K-6	25	12.50	10.20	9.10	12.09	38250	43350	2.13
Total / Av.		**28**	**13.50**	**14.83**	**11.80**	**23.15**	**41875**	**55863**	**1.90**
Gumla	Sesame (Suprava)	5	2.00	10.37	6.00	72.80	28800	52397	1.54
Godda	Mustard (PM-28)	45	17.00	13.80	11.40	21.05	25750	43250	2.68
Vegetable									
Godda	Tomato (Swarna Palima)	15	1.00	238.00	182.00	30.77	77500	255700	4.30
	Brinjal (Swarna Pratibha)	15	1.00	272.00	202.00	34.65	75600	278000	4.68
	Cucurbits (OP)	35	8.25	138.00	129.00	6.20	39600	105300	3.66
Total		**914**	**356.80**	--	--	--	--	--	--

Fig : 9 View of flood tolerant paddy variety

2.2.2 Introducing flood tolerant varieties

Flood tolerant varieties of rice like Swarna sub-I, Rajendra Mahsuri, Sabour Sampan, Sabour Shree were introduced through demonstration in 131.01 ha area in 418 farmers' fields(Table 11).

Table 11: Performance of flood tolerant varieties in the NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% Increase in yield	Economics of (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
West Champaran I	Rajendra Mahsuri	20	6.00	48.00	39.00	18.75	32750	63250	1.93
Supaul		13	5.00	54.00	37.00	45.00	45000	95000	2.10
Darbhanga		31	10.51	53.15	49.60	7.15	34680	65670	1.89
	Sub_total/Av.	**64**	**21.51**	**51.72**	**41.87**	**23.63**	**37477**	**74640**	**1.97**
Siwan	Swarna Sub1	30	13.00	35.34	28.76	22.88	32016	53787	1.69
Sitamarhi		30	13.00	42.30	36.00	17.50	33450	52842	2.57
Nalanda		25	10.00	52.10	44.20	17.80	37840	67384	2.80
Kishanganj		25	0.40	45.80	37.50	22.10	35807	58932	1.64
Buxar		30	7.50	52.30	42.60	41.37	32560	73800	3.20
	Sub-total/ Av.	**140**	**43.90**	**45.57**	**37.81**	**24.33**	**34334**	**61349**	**2.38**
Saharsa	Sabour Sampan	20	8.00	41.90	31.20	34.29	69135	36845	2.14
Lakhisarai		93	36.00	44.50	40.67	9.42	32800	61400	2.87
Kishanganj		30	0.40	39.40	35.50	10.90	31510	45876	1.45
Bhagalpur		27	10.00	47.35	34.80	36.06	42000	56000	1.33
	Sub_total/ Av.	**170**	**54.40**	**49.40**	**35.54**	**40.23**	**66215**	**47285**	**1.97**
Bhagalpur	Sabour Shree	27	10.00	40.00	34.70	15.27	87320	36900	2.70
	Total/ Av.	**401**	**129.81**	**46.67**	**37.48**	**25.87**	**54248**	**55729**	**2.31**
Other crops									
Kishanganj	Sabour Makhana -1	7	1.00	24.30	18.50	32.40	97000	158150	1.63
	JBO 2003H	10	0.20	27.20	20.00	36.00	58465	70735	1.20
Grand total		**418**	**131.01**	--	--	--	--	--	--

Fig : 10 View of flood tolerant paddy variety

2.2.3 Community nurseries for delayed monsoon

In case of paddy, seedlings of 25-30 days are transplanted in July so as to complete flowering and harvesting on time and farmers can perform timely sowing of rabi crops. This practice ensures optimum performance of both kharif and rabi crops. It appeared that delay arrival of monsoon is responsible for late transplanting of paddy and resulting in lower productivity and a cascading negative impact on rabi crops. Delay in transplanting of paddy affects productivity as over aged seedlings suffer from low tillering ability various crops

of different crop duration and varieties has been promoted. KVK Buxar introduce the intervention of community nursery of paddy var. CO51 and Swarna Samridhi involving 09 farmers covering as area of 3.45ha under paddy. These interventions were carried out in 02 NICRA adopted villages and performance is given on Table 12.

Fig : 11 View of community nursery

Table 12: Performance of Community nursery of paddy in the NICRA adopted village

KVK name	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
Buxar	CO 51	3	1.25	42.20	38.40	9.80	43580	58333	2.30
	Swarna Samriddhi	6	2.20	44.50	41.30	7.70	44650	62817	2.40
Total/Av.		**9**	**3.45**	**43.35**	**39.85**	**8.75**	**44115**	**60575**	**2.35**

2.2.4 Location specific inter cropping systems with high sustainable yield

Location specific various inter cropping were demonstrated in regions. Inter cropping demonstration in fruit orchard Mango + Turmeric (1:16); Banana + Potato (1:1) and Pigeon pea + Groundnut (1:2) has been tried as mechanism for obtaining produce in adverse situation. Intervention on location specific inter cropping was demonstrated in few NICRA adopted villages. The demonstrations were carried out in 4.40 ha area of 47 number of farmers' fields. Of all these inter cropping of Mango + Turmeric (1:16) was found most profitable with maximum B:C (3.68) Table13.

Table 13: Performance of location specific intercropping systems in NICRA adopted villages

KVKs Name	Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)				% Increase in yield	Economics (Rs. /ha)		
				Main crop	Inter crop	Eq. Yield	Local		Gross Cost	Net Return	BCR
West Champaran I	Mango + Turmeric (1:16)	12	0.40	80.70	87.00	138.70	75.50	83.71	113000	303100	3.68
Kishanganj	Banana + Potato (1:1)	10	2.00	390.00	101.00	430.40	340.00	26.59	366000	279600	1.76
Garhwa	Pigeon pea + Groundnut (1:2)	25	2.00	11.80	6.80	19.22	9.70	98.14	58000	47700	1.82
Total/ Av.		**47**	**4.40**					**69.48**	**179000**	**210133**	**1.42**

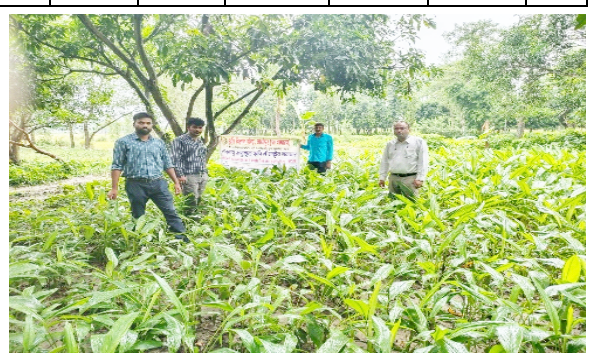

Fig : 12 Field view of inter cropping system

2.2.5 Introduction of new crops/crop diversification:

Crop diversification through introducing new crops in prevailing cropping pattern was demonstrated in the different NICRA adopted villages in order to have higher return. During kharif season diversification of the crops in an area of 44.09ha involving 187 farmers were demonstrated of which 27.74% yield enhancement in green gram has been recorded however, maximum net return Rs. 94000/ha obtained in turmeric Table 14.

Table 14: Performance of different diversified crop replacing paddy during Kharif season in the NICRA adopted village

Name of KVKs	Technology demonstrated (Diversified crop name)	No. of farmers	Area (ha)	Yield (q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
West Champaran 1	Turmeric	12	0.40	165.00	142.00	13.93	42722	94000	2.21
	Okra	16	0.10	55.00	46.00	16.36	41500	68500	1.65
Darbhanga	Green gram	122	33.19	4.57	4.11	11.19	16300	28865	1.77
West Champaran 1		12	0.40	15.50	11.20	27.74	24510	52990	2.16
Garhwa	Ragi	25	10.00	12.40	10.60	17.00	30600	13690	1.45
Total		**187**	**44.09**						


Fig : 13 Field view of crop diversification

Crop diversification program was also demonstrated during rabi season replacing the main crop wheat in an area of 53.29 ha with involvement of 201 farmers. Maximum demonstration yield 32.51 q/ha has been found in vegetable pea which is 15.84% higher than local. Though the maximum benefit B:C ratio 3.24 has been founds in lentil crop from Nalanda KVK (Table 15).

Fig : 14 Field view of inter crop diversification

Table 15: Performance of different diversified crop replacing wheat during Rabi season in the NICRA adopted village

Name of KVKs	Technology demonstrated (Diversified crop name)	No. of farmers	Area (ha)	Yield (q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
West Champaran 1	Vegetable Pea	20	8.00	32.51	27.36	15.84	38900	63500	1.63
	Cow Pea	24	4.00	10.30	7.90	23.30	23600	48500	2.05
Siwan	Lentil	25	10.00	9.37	7.46	25.60	17737	43102	2.43
Nalanda		22	4.40	14.60	13.10	11.45	24730	65000	3.24
Darbhanga		25	6.06	11.42	10.97	5.01	26840	48737	1.81
Nalanda	Mustard	26	5.20	11.60	10.00	16.00	21490	37400	2.72
Darbhanga		33	12.13	11.52	11.37	1.31	26985	50561	1.87
Nalanda	Lathyrus	15	3.00	13.20	10.80	22.22	22520	50550	2.81
Nalanda	Potato	11	0.50	275.00	250.00	10.00	93870	126160	2.43
Total		**201**	**53.29**						

2.3 Module III – Livestock and Fisheries

In this module, interventions include introduction of stress tolerant animal and poultry breeds, nutrient supplementation through area specific mineral mixtures, balanced ration using locally available feed material, fodder production especially during drought/flood situations, improved shelters for reducing heat stress in livestock, breed selection for fish production in farm ponds.

2.3.1 Performance of Improved fodder:

Different types of fodder Berseem, Hybrid Nippier, Sorghum, Oat were commonly used as feeds for the ruminant animals with varying yield potential. Some fodders are perennial in nature while others are seasonal and large variation in their potential yield. 06 KVKs of the zone demonstrated the different fodder crops in 60.94 ha involving 223 farmers. Among the fodder category oats are the least performer while, Hybrid Nippier CO4 gave highest fodder yield (2240 q/ha). Details of the improved fodder performance has been given in the Table 16.

Fig : 15 Field view of hybrid Nippier as fodder

Fig : 16 Field view of hybrid Nippier

Table 16: Performance of Improved fodder in TDC-NICRA adopted village

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Green fodder yield (q/ha)		% Increase in yield	Economics (Rs. / ha)		
				Demo	Local		Gross Cost	Net Return	BCR
Supaul	Oat (RPO)	25	10	380	300	26.66	12000	20000	1.60
Kishanganj	Oat (Phule Surabhi)	10	1	465	425	8.80	32430	74070	2.30
Saharsa	Oat	55	22	250	232	7.75	27550	15750	2.33
Sub Total/Av.		**90**	**33**	**365**	**319**	**14.40**	**23993**	**36607**	**2.08**
Supaul	Sorghum (UPMG503)	40	15	450	350	28.57	12000	20000	1.60
Nalanda	Sorghum (Anant)	40	2	375	150	15.00	47000	65500	2.39
Sitamarhi	Sorghum (CSV33MF)	24	1.7	510	385	32.46	42400	34100	1.80
Sub Total/Av.		**104**	**18.7**	**445**	**295**	**25.34**	**33800**	**39867**	**1.93**
Saharsa	Berseem	20	8	500	455	9.89	32370	17245	2.14
Buxar	Hybrid Nippier (Co3)	4	0.75	2150	1540	39.60	101500	221000	3.17
	Hybrid Nippier (Co4)	5	0.49	2240	1500	49.30	101850	234150	3.29
Sub Total/Av.		**29**	**9.24**	**1630**	**1165**	**32.93**	**78573**	**157465**	**2.87**
Grand total		**223**	**60.94**						

2.3.2 Management of ponds / tanks for fish and duck rearing:

Composite fish, Amur carp and Tilapia fish rearing in the existing pond or in renovated pond were demonstrated in 35 farmers' fields covering 21.35 ha area under NICRA adopted village (Table 17).

Table17: Performance of fish in the ponds/ water bodies in NICRA adopted villages

Name of KVKs	Technology demonstrated	No. of farmers	Area (ha)	Fish yield (q/ha)		% Increase in yield	Economics (Rs. /ha)		
				Demo	Local		Gross Cost	Net Return	BCR
West Champaran I	Tilapia	10	10.00	46.50	32.50	43.07	334800	362700	2.08
Godda	Composite fish culture	15	1.35	22.20	8.80	150.00	13000	62000	5.77
Kishanganj	Amur carp	10	10.00	60.00	37.20	61.20	361250	832600	2.30
Total		**35**	**21.35**	**--**	**--**	**--**	**--**	**--**	**--**
Average		**11.67**	**7.12**	**42.90**	**26.17**	**84.76**	**236350**	**419100**	**3.38**

Fig : 17 Field view of fish farming ponds/ water body

2.3.3 Livestock demonstration:

Mineral mixture has a potential to prevent rickets and osteoporosis in bovine animal apart from enhancing reproductive health. It also improves the weight in calves and better utilization of absorbed nutrients resulting into higher milk production. Demonstration on mineral mixture as cattle feed were carried out in 114 farmers and 180 animals and significant increase milk yield up to 23.23%. In case of small ruminant area specific mineral mixture also performed well. Detailed result of area specific mineral mixture has been given in the Table 18(a) and 18(b).

Table 18a: Performance of area specific mineral mixture demonstration among livestock in NICRA adopted village

Name of KVKs	Technology Demonstrated	Animal	No. of farmers	Unit/ No.	Milk/lactation/ animal (lit)		% Increase in yield	Economics (Rs. /ha)		
					Demo	Local		Gross Cost	Net Return	BCR
Supaul	Area specific mineral mixture	Cow	19	19	960	850	12.94	18000	33600	1.80
Kishanganj	Area specific mineral mixture	Cow	20	22	1344	1232	9.00	29568	17472	0.60
Darbhanga	Pusa Mineral Mixture	Cow	14	27	2440	1980	23.23	40150	109800	2.73
Sitamarhi	Area specific mineral mixture	Cow	35	50	1167	985	18.47	22600	24300	2.07
	Dewormer	Buffalo	40	62	1955	1760	11.08	44600	53150	2.19
Total			**114**	**180**	**--**	**--**	**--**	**--**	**--**	**--**
Average			**28.50**	**36.00**	**1573.20**	**1361.40**	**14.94**	**28692**	**47664**	**1.88**

Fig : 18 View of area specific mineral mixture as fodder cultivation

Table 18b: Performance of area specific mineral mixture demonstration among small ruminant animal

Name of KVKs	Technology Demonstrated	Animals	No. of farmers	Unit/ No.	Body wt. animal (kg)		% Increase in yield	Economics (Rs. /ha)		
					Demo	Local		Gross Cost	Net Return	BCR
Darbhanga	Area specific Mineral mixture	Goat	18	20	12	9	25.00	1950	4800	2.46

2.3.4 Performance of backyard poultry

Backyard poultry rearing is an important intervention to obtain sustainability of the farming system especially in small and marginal farmers. Demonstration on three different types of poultry breed (Sonali, Karaknath and Khaki Campbell) has been given involving 54 farmers and performance recorded. Under backyard poultry condition breed Sonali laid 135 eggs with highest B:C ratio 8.30. However, in case of duck breed Khaki Campbell, BC ratio of 8.21 recorded (Table 19).

Table:19 Performance of livestock (Poultry) demonstration in NICRA-adopted villages

Name of KVKs	Technology Demonstrated	No. of farmers	Unit (No.)	Eggs/hen/year (no.)		% Increase in yield	Economics (Rs. /animal)		
				Demo	Local		Gross Cost	Net Return	BCR
Nalanda	Backyard Poultry(Sonali)	13	13	140	60	133.30	490	350	1.71
Gumla	Backyard Poultry (Sonali)	20	400	135	98	30.00	150	760	8.30
Garhwa	Backyard poultry (Karaknath)	06	80	100	80	87.50	200	1100	7.50
Sub total		**39**	**493**						
Gumla	Duck (Khaki Campbell)	05	100	132	78	70.00	200	824	7.70
Godda	Duck (Khaki Campbell)	10	10	138	75	84.00	491	337	8.21
Total		**54**	**603**	--	--	--	--	--	--
Average		**10.80**	**120.60**	**129.00**	**78.20**	**80.96**	**306**	**674**	**6.68**

Fig : 19 View of poultry demonstration in NICRA villages

2.3.5 Improved shelters for reducing heat stress in livestock:

Improved shelter in Poultry shed recorded low mortality rate due to reduced heat stress under shed condition. Standard spacing in improved shed resulted better performance in poultry. Interventions to reduce heat stress for higher survivability of backyard poultry was demonstrated of improved shelter. Detailed result has been presented in Table 20.

Table 20: Performance of improved shelters for poultry in NICRA adopted villages

Name of KVKs	Technology demonstrated	No. of farmers	Unit/ (No.)	Survival rate		% Increase in survival	Economics (Rs. /ha)			
				Demo	Local		Gross Cost	Gross Return	Net Return	BCR
West Champaran I	Backyard Poultry (Vanraja)	21	59	85.50	60.85	40.50	18575	31320	12745	0.68
Nalanda		4	40	75.00	70.00	7.14	18050	31200	13200	0.73
Total		**25**	**99**	--	--	--	--	--	--	--

Fig : 20 View of improved shelter for poultry farming

2.4 Module IV: Institutional Interventions

Strengthening the existing institutional interventions like seed bank, fodder bank, custom hiring center, collective marketing group and introduction of weather index-based insurance and climate literacy through a village weather station and awareness developed of 2040 number of farmers in the zone.

2.4.1 Seed Bank: Village level seed production of short duration, drought and flood tolerant varieties were taken up by farmers and seed societies in several NICRA villages with the technical support of KVKs in rice and wheat. It has now become a regular practice to store seed of drought tolerant and short duration cultivars in NICRA villages so that interested farmers can purchase and farmers utilize for their own purposes (Table 21).

2.4.2 Fodder bank: Fodder bank was established in the village under NICRA project to serve as the need based during drought/ flood situation when there is no fodder available. Farmers of the region store fodder of Paddy, Wheat, oat and pulses crop residues.

2.4.3 Collective marketing: Collective marketing is where a number of growers work together to sell their combined crops. This may require additional storage, processing or packaging of the crop, with the costs shared by the collective.

2.4.4 Commodity group: An Agricultural Commodity can be defined as grain, livestock, poultry, fruit or any other items produced from agricultural activities. The general price level of an agricultural commodity, whether at a major terminal, port, or commodity futures exchange, is influenced by a variety of market forces that can alter the current or expected balance between supply and demand.

2.4.5 Climate literacy through village level weather station: The Village Climate Risk Management Committee (VCRMC), after the PRA to assess the climate related problems in the village and baseline survey. Then they followed recommendation by KVK and other institute scientist through village level weather station.

Table 21: Performance of seed/ fodder bank in the NICRA adopted village

Name of KVK	Seed Bank		Fodder Bank		
	Crop	Quantity in (q)	KVKs	Crop	Quantity in (q)
Buxar	Sabour heera	940.00	Buxar	Hybrid Napier	2000.00
Garhwa	IR64 (Drt1)	150.00	Saharsa	Oat	0.80
Saharsa	Sabour Shree	24.00	Gumla	Paddy	600.00
	Sabour Sampann	10.00	Supaul	Oat	0.80
Sitamarhi	Swarna Sub-1	150.00	**Total**		**2601.60**
Godda	Sahbhagi & Sabour Shree	590.00			
Gumla	Sahbhagidhan & Swarna Shreya	1160.00			
Nalanda	CR Dhan 320	20.00			
Total Paddy		**3044**			
Supaul	Wheat (Sabour Nirjal)	0.48			
Saharsa	Sabour Nirjal	15.00			
Total wheat		**15.48**			
Total		**3059.48**			

Fig : 21 View of seed bank at NICRA village

2.4.6 Village Climate Risk Management Committee (VCRMC):

Village Climate Risk Management Committee (VCRMC) was constituted after in-depth discussion with the villagers about the mitigation of the climatic vulnerabilities of the villages and the strategies to be adopted under NICRA. The members of the committee were selected by the villagers under the facilitation of KVKs where NICRA was being implemented. VCRMC became operational with opening of a bank account in their name being jointly handled by the President of VCRMC and the Programme Coordinator of the KVK concerned. The custom hiring of various farm tools and implements was being supervised by VCRMC apart from taking important decisions on the technological interventions to be implemented at the village in consultation with the KVK.

2.4.7 Custom Hiring Centre:

Timeliness of agricultural operations is crucial to cope with climate variability, especially in case of sowing and intercultural operations. Access to implements for planting in ZT, cultivator, leveler, weeder, power sprayer, etc. are essential for widespread adoption of resilient practices for in situ soil moisture conservation and drainage of excess water in heavy soils. In rainfed areas, availability of such farm implements to small and marginal farmers is important. Similarly in irrigated areas, residue management of kharif crops through zero till cultivation of rabi crops reduces the problem of burning of residues and adds to the improvement of soil health and increases water use efficiency. Custom Hiring Centers (CHCs) for farm implements were established in NICRA villages. A committee of farmers manages the custom hiring center. The rates for hiring the machines/ implements are decided by the VCRMC. This committee also uses the revenue generated from hiring charges and deposits in a bank account opened in the name of VCRMC. The revenue is used for repair and maintenance of the implements and 25% share is earmarked as a sustainability fund. Different types of farm machinery are stocked in the CHCs, the most popular being zero till drill, drum seeder, power weeder and chaff cutter. During the year A sum of Rs. 105200/- has been generated and total fund is Rs. 314494/-. Total revenue of Rs. 218094/- has been generated by VCRMC of KVK Gumla. Revenue generated through custom hiring and under VCRMC in different KVKs is presented in the following Table22.

Table 22: Revenue generation by Custom Hiring Centers and VCRMC during 2022-23

Name of KVKs	Revenue Generated (Rs.)	
	Custom Hiring Center	VCRMC
Bhagalpur	53000	53000
Godda	26050	26050
Gumla	8800	218094
Nalanda	850	850
Sitamarhi	8600	8600
Buxar	7900	7900
Total	**105200**	**314494**

Fig : 22 Field view of CHCs at NICRA villages

3. Extension activities

NICRA implementing KVKs conducted a total of 237 extension activities on various thematic areas benefitting 5374 practicing farmers and farm women (Male-3634, Female- 1740) during 2022-23. The extension activities were conducted on Kisan Gosthi, Field Day, PRA, Awareness programme, Exposure visit, Animal health camp, Method demonstrations, agro advisory services, kisan mela etc. (Table 23).

Table 23: Extension activity in NICRA adopted village

Name of KVK	Name of the activity	No. of Programme	Number of beneficiaries		
			Male	Female	Total
Buxar	Kishan Gosthi	1	30	0	30
West Champaran		2	54	90	144
Sitamarhi		4	71	31	102
Saharsa		2	94	24	118
Nalanda		1	75	42	117
Lakhisarai		3	43	10	53
Gumla		5	37	94	131
Darbhanga		4	237	229	466
Sub Total		**22**	**641**	**520**	**1161**
Bhagalpur	Field day	2	70	9	79
Garhwa		4	96	52	148
Godda		2	103	36	139
Gumla		3	53	49	102
Kishanganj		28	118	28	146
Lakhisarai		1	41	10	51
Sitamarhi		48	170	217	287
Siwan		1	69	28	97
Supaul		6	132	38	170
Buxar		1	81	19	100
West Champaran		12	130	12	142
Saharsa		2	110	34	144
Sub total		**110**	**1173**	**532**	**1605**
Darbhanga	PRA	3	59	14	73
Lakhisarai		3	74	7	81
Nalanda		1	17	-	17
West Champaran		2	20	14	33
Sub total		**9**	**170**	**35**	**204**
Siwan	Awareness programme	2	39	20	59
Gumla		4	55	40	95
Bhagalpur		1	114	41	155
Sub total		**7**	**208**	**101**	**309**
Bhagalpur	Exposure visits of farmers	1	56	8	64
Godda		2	48	18	66
Siwan		1	36	14	50
Buxar		3	88	36	124
Sub total		**7**	**228**	**76**	**304**
Darbhanga	Animal Health Camp	2	40	46	86
Lakhisarai		1	91	9	100
Saharsa		1	204	47	251
West Champaran		1	35	15	50
Sub total		**5**	**370**	**117**	**487**

Name of KVK	Name of the activity	No. of Programme	Number of beneficiaries		
			Male	Female	Total
Supaul	Method Demonstration	3	57	4	61
Siwan		3	70	22	92
Godda		3	20	44	64
Sub total		**9**	**147**	**70**	**217**
Darbhanga	Village Level Committee	3	65	11	76
	Harvesting of paddy	1	5	10	15
Gumla	Agriculture Drone Technology Demonstration	2	32	13	45
	RAWE Programs	1	6	9	17
	Zonal NICRA Workshop	1	63	77	140
	Agriculture Education Day	1	-	51	51
Kishanganj	Farmer's Scientist Interaction	3	54	18	72
	Workshop-cum-Training	1	86	42	128
	Mobile Agro Advisory	35	245	42	287
Nalanda	Kisan Gosthi cum field day	1	40	-	40
West Champaran	Diagnostic visit	14	17	8	25
Buxar	Strengthening SHGs/FIG	3	30	5	35
	Kishan Gosthi	1	30	0	30
	Group discussion	1	24	3	27
Grand total		**237**	**3634**	**1740**	**5374**




Fig : 23 View of different extension activity by NICRA KVKs

4. Soil Health Cards Distribution and Observance of World Soil Day

All the NICRA KVKs has organized the Farmers- Scientist interaction meeting on 5th December, 2022 on the occasion of 'World Soil Day' and discussed the importance of soil health. Soil health is the most critical component of the nature and play as vital contributor to human well being. The World Soil Day campaign aims to connect people with soil and create awareness for improvement of soil health for sustaining its productivity. On this occasion, 270 soil health card was distributed to the concerned farmers and discussed their soil health issue in details. KVK wise distribution of soil health cards are presented in the following Table 24.

Fig : 24 World Soil Day observation

Table 24: Soil Health Card prepared and distributed during 2022-23 of NICRA adopted village

Name of KVKs	Soil samples collected(no.)	Samples analyzed (no.)	SHC issued	No. of farmers benefitted
Garhwa	22	22	22	22
Godda	60	60	60	60
Gumla	80	80	80	80
Nalanda	40	40	40	40
Sitamarhi	62	62	54	48
Buxar	20	20	20	20
Total	**284**	**284**	**276**	**270**

5. Convergence programme:

A number of interventions were taken up by KVKs in NICRA village during the year as convergence with developmental programs of different line department to facilitate the climate resilient farming. The developmental agencies support facilitates the farmers to scaling up of proven interventions in the village. Programmes under natural resource management (water harvesting structures, recharge structures), micro irrigation systems, tree planting of horticulture crops and agroforestry, etc. In crop production, promotion of SRI, DSR and other demonstration programme. In case of livestock interventions such as AI, vaccination camps and health camps, were taken as convergence. The prominent development schemes are MGNREGA, NABARD, NFSM, Irrigation Department, different Departments of the concerned states. RKVY etc. During the report period KVK Godda able to mobilize Rs. 109.50 lakh the NICRA village and KVK Gumla Rs. 51.85 lakh (Table 25).

Table: 25 Convergence programme undertaken in NICRA adopted villages

Name of KVKs	Development Scheme /Programme	Nature of work	Amount (Rs. in lakh)
Bhagalpur	DAHO	Vaccination in livestock	0.21
	PMSY, DHO	Micro irrigation	1.24
	Green Manuring (sesbania)	Green Manuring	0.02
		Sub Total	**1.47**
Godda	PRADAN	Lift irrigation with solar pump	13.00
	Birsa Harit Gram Yojana	Plantation programme under MGNREGA	10.00
	DDDO, Godda	Dairy (cow) to BPL family	3.00
	MGNREGA	Cow & Goat Shed (summer and rainy season)	12.50
	IWMS (NABARD)	Wheat (Sabour Nirjal) less water requirement	0.90
	IWMS (NABARD)	Vegetables seedlings	0.40
		Manual Seed grader	1.00
	IWMS, NABARD	Community pond	40.00
	NABARD	FPO formation	2.00
	MGNREGA	Irrigation well	8.00
	Birsa Harit Gram Yojana	Plantation (fruit) Dept. of Rural Dev. & MGNREGA	15.00
	NFSM	Demonstration of HQPM by ATMA	0.50
	MGNREGA	Water Harvesting Tank	2.70
	KVK (TSP)	Agriculture equipment's /implements	0.50
		Sub Total	**109.5**
Gumla	Beej gram, NFSM	Rice var.- Swarna Shreya, Sahbhagi Dhan	4.20
	District administration	Ragi var. BM3	0.25
	MGNREGA	Well creation	36.00
	PMSSY	Drip irrigation	3.00
	PMMSY	Biofloc	7.00
	MGNREGA	Plantation	1.40
		Sub Total	**51.85**
Buxar	Mukhyamantri Triva Beej Vistar Yojna, Govt. of Bihar	Flood tolerant Rice Var. Swarna Sub1	0.11
		Pigeon pea Var. Narendra Arhar 2 and IPA203	0.02
	District Agril. Depart.	Rice Var. Sabour Aradh Jal	0.65
	District Agril. Depart.	CRM,*in-situ* moisture conservation	1.87
	BSA Buxar	Rain water harvesting Moisture conservation	7.75
		Sub Total	**10.4**
		Grand Total	**173.22**

Fig : 24 View of convergence programme in NICRA villages

MEDIA COVERAGE

जलवायु परिवर्तन से कृषि पर होनेवाले कुप्रभाव को कम करना जरूरी

हिंदी दैनिक आज

जाले (दरभंगा), (आससे)। निकरा परियोजना के अंतर्गत तीसरे चरण में प्रधान वैज्ञानिक डॉ पंकज कुमार ने गुरुवार को केविके टीम के साथ चयनित मुरैठा, जोगियारा एवं चंदौना गांव का भ्रमण किया एवं स्थानीय किसानों से रूबरू होकर कृषि पर विस्तार से चर्चा कर महत्वपूर्ण जानकारी साझा किया। मौके पर डॉ पंकज ने बताया कि इस परियोजना के द्वारा जलवायु परिवर्तन से हो रहे कृषि पर कुप्रभाव को कम करने की दिशा में प्रयास किए जा रहे हैं। वैज्ञानिकों द्वारा शोध कार्य एवं किसानों को विभिन्न प्रशिक्षण जैसे फसल उत्पादन तकनीक, प्राकृतिक संसाधन प्रबंधन, फसल एवं फसल प्रणाली,पशुपालन,मत्स्य पालन, क्षमता निर्माण आदि घटक के तहत यह कार्य चल रहा है। भ्रमण के समय केंद्र के अध्यक्ष डॉ दिव्यांशु शेखर, फसल उत्पादन वैज्ञानिक डॉ सिराजुद्दीन एवं एसआरएफ अभिषेक रंजन मौजूद थेइ वहीं अटारी निदेशक डॉ अंजनी कुमार ने नीकरा परियोजना अंतर्गत कृषि विज्ञान केंद्र जाले परिक्षेत्र का भ्रमण करते हुए बताया कि कृषि विज्ञान केंद्र किसानों के हित मे उत्कृष्ट कार्य कर रहा है। जरूरत है कि किसान जागरूक होकर बताए गए उन्नत तकनीक को अपनाकर अपनी आय को बढ़ाये।

कार्यक्रम: विकास भारती बिशुनपुर में जलवायु अनुकूल कृषि पर राष्ट्रीय नवाचार का जोनल स्तरीय समीक्षा कार्यशाला का आयोजन

कृषि विज्ञान केन्द्र की प्रकाशित पुस्तक एवं प्रसार पत्रिका का किया गया विमोचन

आजाद सिपाही 26-11-2022

दैनिक भास्कर

हरनात • अस्थावां • बिहारशरीफ आ

कृषि • जिले के शेरपुर व गोखुलपुर में निक्रा की शुरुआत की गई है, मत्स्यपालन में जीरा उत्पादन कराया जा रहा है

जलवायु अनुकूल राष्ट्रीय कृषि कार्यक्रम से कृषि व संबंधित विधाओं का प्रत्यक्षण होगा

किसान व कृषि वैज्ञानिक

कराया जा रहा जीरा उत्पादन

डॉ.कुमार ने बताया कि मत्स्यपालन में जीरा उत्पादन कराया जा रहा है। अब तक मत्स्यपालक दूसरे प्रदेशों से मंगवाये गये जीरा पर ही निर्भर रहते थे। वे जून-जुलाई में जीरा डालते थे। जबकि अक्टूबर-नवंबर में ठंड के कारण मछलियों की वृद्धि रुक जाती है।अब गांव में ही जीरा का उत्पादन करवाया जा रहा है। इससे अप्रैल में ही मत्स्यपालक तालाब में जीरा डाल सकते हैं। गर्मी के दिनों में मछलियों की वृद्धि अधिक होती है। इससे अधिक वजन की मछलियां तैयार होंगी। इससे मत्स्यपालकों की आय बढ़ेगी।

कम अवधि वाले प्रभेद की खेती

कृषि वैज्ञानिकडॉ. उमेश नारायण उमेश ने बताया कि निक्रा गांवों में ऊपरी सतह वाली जमीन जहां सिंचाई की सुविधा कम हो,वहां कम अवधि वाले फसल के प्रभेद की खेती करवाई जाती है। क्षेत्र विशेष के अनुसार खरीफ सीजन में धान के राजेंद्र श्वेता,सम्भर सुरभित और स्वर्णा सब्बन प्रभेद की खेती करवाई गई। उन्होंने बताया कि आगामी रबी मौसम में सरसों,मसूर, गेहूं और खेसारी के उन्नत प्रभेदों का प्रत्यक्षण जीरो टिलेज मशीन के माध्यम से करेंगे।लगभग में भिंडी की काशी लालिमा प्रभेद की खेती करवाई गई है। अब आलू की खेती भी होगी।उन्होंने बताया कि समावेशन अनुकूल प्रभेद व तकनीक का प्रयोग करके फसल उत्पादन व उत्पादकता को बढ़ाना है।

कराया जा रहा है मुर्गी पालन

पशु चिकित्सा विशेषज्ञ डॉ. संजीव रंजन ने बताया कि गांवों में सोनाली किंड का वैकयाई मुर्गी पालन करवाया जा रहा है। इनका ग्रोथ काफी अच्छा है। इसके अलावा पशुचारा के लिए सीरगम के अनेत चन प्रभेद का बीज दिया गया था। अब तक किसान उसकी आठ से नौ चार तक उपज ले चुके हैं। उन्होंने बताया कि किसान इससे अपनी आमदनी बढ़ा सकते हैं।

दिए गए हैं आलू के बीज

इस संबंध में बागवानी विशेषज्ञडॉ. विन्ध्य रानी ने बताया कि किसानों से भिंडी की खेती करवाई गई है। अब मूली के बीज भी दिये गये हैं।किसान मूली की खेती भी करेंगे। गृह वैज्ञानिक डॉ. ज्योति सिन्हा ने बताया कि मशरूम का प्रत्यक्षण भी करवाया जा रहा है। इसके अलावा20 किसानों को पोषण वाटिका का किट भी दिया गया है।

दैनिक भास्कर गुमला सिमडेगा 06-12-2022

गुमला • सिसई • पालकोट • घाघरा • डुमरी

कृषि विज्ञान केंद्र ने निकरा परियोजना के तहत विश्व मृदा दिवस का आयोजन किया

80 किसानों के बीच जीवामृत व स्वास्थ्य कार्ड का किया वितरण

अपना बक्सर | हिन्दुस्तान पटना, मंगलवार, 24 मई 2022

खेती-किसानी | बिचड़े जब दस से बारह दिन के हो जाएं तो 1.5 किलोग्राम यूरिया व डाई सौ ग्राम जिंक सल्फेट का प्रयोग करना चाहिए

धान की नर्सरी में पोषक तत्व का प्रबंधन करें किसान

- पैडलिंग से धान की नर्सरी में पोषक तत्व प्रबंधन करने की दी सलाह
- तीन वर्ग मीटर में डीएपी व एमओपी, पोटाश व जिंक सल्फेट का प्रयोग

धान की नर्सरी में खाद डालता किसान।

नालंदा

दरभंगा/गया

जलवायु परिवर्तन के साथ फसल एवं पशुओं पर उसके प्रभाव को जानना जरूरी है : डॉ पंकज

नवबिहार दूत संवाददाता

जाले। निकरा परियोजना के अंतर्गत तीसरे चरण में कृषि विज्ञान केंद्र जाले द्वारा मुरैठा, जोगियारा एवं चंदौना गांव को चयनित किया गया है। इस परियोजना के द्वारा जलवायु परिवर्तन से हो रहे कृषि पर कुप्रभाव को कम करने के लिए काम किए जा रहे हैं। जिसमें वैज्ञानिकों द्वारा शोध कार्य एवं किसानों को विभिन्न प्रशिक्षण जैसे फसल उत्पादन तकनीक, प्राकृतिक संसाधन प्रबंधन, फसल एवं फसल प्रणाली, पशुपालन, मत्स्य पालन, क्षमता निर्माण आदि विषय पर कार्य चल रहा है।

मौके पर डॉ पंकज कुमार प्रधान वैज्ञानिक क्रीडा हैदराबाद ने निकरा के चयनित गांव में प्रक्षेत्र भ्रमण किया, भ्रमण के समय साथ में केंद्र के अध्यक्ष डॉक्टर दिव्यांशु शेखर, फसल उत्पादन वैज्ञानिक डॉक्टर सिराजुद्दीन एवं एसआरएफ अभिषेक रंजन मौजूद थे' भ्रमण के दौरान डॉक्टर पंकज दर्जनों किसानों से रूबरू हुए और निकरा में चल रही परियोजना के बारे में महत्वपूर्ण जानकारी साझा की' इसके साथ साथ कृषकों द्वार कृषि से जुड़ी समस्याओं पर अपना सुझाव भी दिया' भ्रमण के दौरान निकरा के तहत कृषि विज्ञान केंद्र जाले ने जो भी अजोला इकाइयां, सीधी बुवाई से लगा हुआ धान, पंक्ति में लगी हुई मसूर एवं तोरी का भी भ्रमण किया। साथ साथ कृषि विज्ञान केंद्र की विभिन्न इकाइयों का भी जायजा लिया।

दैनिक भास्कर गढ़वा 17-11-2022

जलवायु परिवर्तन के अनुकूल वैज्ञानिक तरीके से पशुपालन व प्रबंधन की आवश्यकता : वैज्ञानिक

दैनिक भास्कर गुमला सिमडेगा 06-12-2022

गुमला • सिसई • पालकोट • घाघरा • डुमरी

कृषि विज्ञान केंद्र ने निकरा परियोजना के तहत विश्व मृदा दिवस का आयोजन किया

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भास्कर न्यूज़ | गुमला

कृषि विज्ञान केंद्र विकास भारती बिशुनपुर द्वारा आज घागरा प्रखंड के शिवराजपुर गांव में निकरा परियोजना अंतर्गत विश्व मृदा दिवस 2022 का आयोजन किया गया। इस कार्यक्रम की अध्यक्षता विकास भारती बिशुनपुर के संयुक्त सचिव महेंद्र भगत ने की। महेंद्र भगत ने किसानों को परंपरागत कृषि एवं जैविक कृषि पर प्रकाश डालते हुए कहा कि हमें प्राकृतिक संसाधनों के समुचित उपयोग के साथ-साथ मृदा स्वास्थ्य को भी ध्यान में रखने की आवश्यकता है। जिससे हमें आने वाले दिनों में फसल उत्पादन में कोई अड़चन न आए। क्योंकि धीरे-धीरे रासायनिक खादों अंधाधुंध उपयोग से हमारी मिट्टी के ऊपर विपरीत प्रभाव पड़ा है जिसे रोकने की आवश्यकता है। इस

कार्यक्रम में सुनील कुमार ने मृदा स्वास्थ्य एवं बागवानी फसलों पर विशेष चर्चा करते हुए कहा कि मृदा संरक्षण मुख्यता हम वृक्षारोपण से कर सकते हैं। साथ ही साथ वृक्षारोपण के माध्यम से जलवायु परिवर्तन के प्रभाव को भी हम कम कर सकते हैं। इस कार्यक्रम में कृषि विज्ञान केंद्र के वैज्ञानिक अटल बिहारी तिवारी ने किसानों को मृदा स्वास्थ्य को बनाए रखने के विभिन्न उपाय पर चर्चा की। साथ ही साथ उन्होंने जीवामृत बीजामृत घनमृत एवं अन्य जैविक उत्पाद को बनाने हेतु किसानों को प्रोत्साहित किया। अटल बिहारी तिवारी ने मृदा स्वास्थ्य कार्ड की उपयोगिता पर बल देते हुए कहा कि जिस प्रकार हम अपने स्वास्थ्य पर विशेष ध्यान रखते हैं। उसी प्रकार हमें स्वास्थ्य पर भी ध्यान रखना होगा क्योंकि हमारे जिले की मिट्टी अम्लीय है। इसलिए हमें और भी ध्यान देने की आवश्यकता है। इस विश्व मृदा दिवस के अंतर्गत शिवराजपुर के 80 किसानों के बीच जीवामृत एवं स्वास्थ्य कार्ड का वितरण निकरा परियोजना के अंतर्गत किया गया। जिससे इस क्षेत्र में प्राकृतिक खेती को बढ़ावा दिया जा सके एवं किसानों ने यह संकल्प लिया कि हम प्राकृतिक खेती करेंगे। इस कार्यक्रम के अंतर्गत निखरा परियोजना के सीनियर रिसर्च फेलो शुभमन दास ने किसानों को मिट्टी जांच हेतु मृदा सैंपल लेने के विभिन्न उपायों पर किसानों को जागरूक किया। साथ ही साथ इस कार्यक्रम का धन्यवाद ज्ञापन किया। विश्व मृदा दिवस 2022 कार्यक्रम में लालमोहन उराव, रानी देवी, भीम यादव मंजू उराँव, लछमी देवी, सरिया देवी के अलावा 103 किसानों ने भाग लिया।

दैनिक जागरण भागलपुर, 14 सितंबर, 2022

शिविर में महिलाओं को दी गई कुपोषण से मुक्ति की जानकारी

संवाद सहयोगी, गोड्डा : अग्रिम पंक्ति प्रदर्शन तथा स्वच्छ भारत अभियान के तहत ग्रामीण विकास ट्रस्ट-कृषि विज्ञान केंद्र के तत्वावधान में बोआरीजोर प्रखण्ड के ग्राम-बेल्थू में प्रगतिशील किसानों का एक दिवसीय प्रशिक्षण शिविर का आयोजन किया गय। इस दौरान गृह वैज्ञानिक डा. प्रगतिका मिश्रा ने ग्रामीण महिलाओं को शिशुओं के लिए पूरक आहार का महत्व बताया। उन्होंने कहा कि जन्म से छह माह तक के शिशुओं के लिए मां का दूध एक सम्पूर्ण आहार का काम करता है। छह माह के बाद जब शिशु को भोज्य साम्रगी से अवगत कराया जाता है तो गरीबी एवं अज्ञानता के कारण शिशु की बढ़ती हुई शारीरिक आवश्यकता के अनुसार शिशु को पूर्ण रूप से वृद्धि के लिए पोषक तत्व नहीं मिल पाता है। इसके फलस्वरूप शिशु कुपोषण का शिकार हो जाता है। शिशुओं को कुपोषण से बचाने के लिए ग्रामीण महिलाओं को घर पर ही पूरक आहार बनाने की जानकारी दी गई। इससे शिशुओं को आवश्यकता के अनुसार पौष्टिक व सुपाच्य भोज्य उपलब्ध कराया जा सकेगा। घरेलू स्तर पर पूरक आहार में गेंहूँ का दलिया, मूंगफली का सत्तु, मूंग का सत्तु तथा चीनी शिशु को भोज्य मिश्रण के रूप में खिलाने के लिए महिलाओं को वितरित किया गया। प्रत्येक दिन दो से चार चम्मच मिश्रित भोज्य को दूध के साथ मिलाकर खिलाने से शिशुओं की बढ़ती हुई पोषक तत्वों की आवश्यकता को पूरा किया जा सकता है। पशु पालन वैज्ञानिक डॉ. सतीश कुमार ने बकरियों को छेरा रोग से बचाने के लिए पीपीआर का टीका लगवाने की विस्तृत जानकारी दी। हरा चारा प्रबंधन में नेपियर तथा सुबबूल के पौधे लगाने के लिए प्रेरित किया। कृषि प्रसार वैज्ञानिक डॉ. रितेश दुबे ने स्वच्छ भारत अभियान के तहत नियमित रूप से साफ-सफाई करने के लिए प्रेरित किया। कूड़ा- करकट, खर-पतवार, गोबर को गड्ढे में डालकर जैविक खाद तैयार करने की विस्तृत जानकारी दी। प्रगतिशील महिला किसानों के बीच सहजन के पौधे वितरित किये गये। मौके पर अंजलि देवी, रीना देवी, लाली देवी, सावित्री कुमारी, लीलमुनी देवी, फूलमती देवी, मंजू देवी आदि प्रगतिशील महिला किसान प्रशिक्षण कार्यक्रम में उपस्थित थे।

प्रभात खबर (दिनांक: 22 जून 2022, पृष्ठ संख्या: 06)

संतुलित पोषक तत्वों के प्रबंधन से ग्लोबल वार्मिंग का प्रतिकूल प्रभाव होगा कम

MEDIA COVERAGE

7. Awards/ Recognition

Name and address of farmer	Name of the award	Conferring authority	Date and year
Mr. Sanjay Chaudhary, Buxar	Best Innovative farmer	Director, ICARRCER Patna	22 Feb 2023
Amrit Lal Singh, Godda		Director, CRIDA Hyderabad	12 April 2022

8. Workshop / seminar/symposia etc. organized

Review meeting cum annual action plan finalization workshop TDC-NICRA held at ICAR-ATARI Patna from 28-30 April 2022

Zonal level review of workshop TDC-NICRA held at KVK Gumla from 25-26 Nov.2022

Annual zonal workshop TDC-NICRA held at ICAR- ATARI Patna on 25 March 2023

Fig : 26 View of dignitaries visit

Table 26: Budget utilization

KVK/ Institutes	BE/ RE			Expenditure			Unspent Balance
	Operational	Capital	Total	Operational	Capital	Total	
Supaul	8.85	1.15	10.00	8.83	1.15	9.98	0.02
Saharsa	7.85	1.15	9.00	7.85	1.15	9.00	0.00
Lakhisarai	7.53	1.15	8.68	7.53	1.15	8.68	0.00
Kishanganj	7.858	1.15	9.01	7.86	1.15	9.01	0.00
Bhagalpur	7.53	1.15	8.68	7.47	1.15	8.62	0.06
Nalanda	7.95	1.15	9.10	7.95	1.15	9.10	0.00
Darbhanga	8.24	1.15	9.39	7.99	1.15	9.14	0.25
W. Champaran	7.80	1.15	8.95	6.42	0	6.42	2.53
Siwan	8.30	1.15	9.45	8.30	1.15	9.45	0.00
Garhwa	8.30	1.15	9.45	8.29	1.15	9.44	0.01
Buxar	10.21	0.80	11.01	10.21	0.77	10.98	0.03
Godda	9.00	1.15	10.15	9.00	1.15	10.15	0.00
Gumla	9.65	1.15	10.80	9.65	1.15	10.80	0.00
Sitamarhi	8.21	1.15	9.36	8.21	1.15	9.36	0.00
ICARATARI	7.18	0.00	7.18	6.82	0	6.82	0.36
Total	124.46	15.75	140.21	122.38	14.57	136.95	3.26

Table 27: Dignitaries visited TDC-NICRA adopted villages during 2022-23

Name of KVK	Name of visitors	Organization name	Date
Buxar	Dr. JVNS Prasad	National Coordinator (TDC-NICRA) ICARCRIDA, Hyderabad	28-04-2022
	Dr. P.K. Pankaj	Zonal Coordinator (TDC-NICRA) ICARCRIDA, Hyderabad	28-04-2022
	Dr. Amrendra Kumar	Principal Scientist & Nodal Officer, ATARI Zone IV, Patna	28.04.2022
Supaul	Dr. Anjani Kumar	Director ATARI Patna	09.06.2022
Godda	Smt. Nutan Raj	DDM, NABARD, Godda	18.07.2022
Sitamarhi	Vibhor Kumar	AGM, NABARD	30.07.2022
	Brajesh Kumar	DAO, Sitamarhi	12.09.2022
	Neeraj Jha,	ADH, Sitamarhi	14.09.2022
Godda	Dr. R. C. Sinha	DAO, Godda	21.10.2022
	Rakesh Kumar Singh	Dy. PD, ATMA, Godda	
Kishanganj	Dr. P.K. Pankaj	Zonal Coordinator (TDC-NICRA) ICARCRIDA, Hyderabad	08.11.2022
	Dr. Amarendra Kumar	Principal Scientist & Nodal Officer, ATARI Zone IV, Patna	
	Dr. G, Karunakaran,	Principal Scientist, ICAR-IIHR, Bengaluru.	
Saharsa and Supaul	Dr. Amrendra Kumar	Principal Scientist & Nodal Officer	09-11-2022
	Dr. P.K. Pankaj	Zonal Coordinator (TDC-NICRA) ICAR-CRIDA, Hyderabad	
Garhwa	Gorakh Nath Saw	State President of National Human Rights Organization	19.11.2022
Gumla	Dr. V. K. Singh	Director, ICARCRIDA, Hyderabad	26-11-2022
	Dr. Anjani Kumar	Director ATARI Patna	
	Dr. JVNS Prasad	National Coordinator (TDC-NICRA) ICAR-CRIDA, Hyderabad	
	Dr. J. Oraon	DEE, BAU, Ranchi	
	Dr. M.S. Kundu	DEE, RPCAU, Pusa	
	Dr. Amrendra Kumar	Principal Scientist & Nodal Officer, ATARI Zone IV, Patna	
Darbhanga	Ms. Akanksha	DDM NABARD, Darbhanga	21-02-2023

Table 28: List of PI and Co PI at KVKs

KVK Name	Name of PI	Name of CO-PI	KVK email Id
Buxar	Dr. Deo Karan	Mr. Hari Govind Mr. Ramkewal Dr. Mandhata Singh	buxarkvk@gmail.com
Bhagalpur	Dr. Arvind Kumar Sinha	Dr. Zeyaul Hoda Dr. Mamta Kumari	bhagalpurkvk@gmail.com
Siwan	Dr. Anuradha Ranjan Kumari	Dr. Harsha. B. R. Dr. Nandeesha. C. V. Er. Krishna Bahadur Chhetri Dr. Jonah Dakho	head.kvk.siwan@rpcau.ac.in
Garhwa	Dr. Ashok Kumar	Dr. Sushma Lalita Baxla	garhwakvk@gmail.com
Darbhanga	Dr. Dibyanshu Shekhar	Dr. Sirazuddin Dr. Gautam Kunal	head.kvk.jale@rpcau.ac.in
Supaul	Dr. Pramod Chaudhary	--	supaulkvk@gmail.com
West Champaran I	Dr. S. K. Ganngwar	Dr. Dhiru Tiwari, Dr. Jag Pal	head.kvk.madhopur@rpcau.ac.in
Saharsa	Dr. K. M. Singh	Md. Nadeem Akhtar	saharsakvk@gmail.com
Kishanganj	Er. Manoj Kumar	Dr. Hemant Kumar Singh	kishanganjkvk@gmail.com
Sitamarhi	Dr. Ram Eshwar Prasad	Mr. Manohar Panjikar	sitamarhikvk@gmail.com
Godda	Dr. Ravi Shanker	Dr. Surya Bhushan	kvkgodda@gmail.com
Gumla	Dr. Sanjay Kumar	Mr. Atal Bihari Tiwari	kvk.gumla@gmail.com
Nalanda	Dr. Brajendu Kumar	Dr. U.N. Umesh Kumari Vibha Rani Dr. Sanjeev Ranjan	nalandakvk2017@gmail.com
Lakhisarai	Dr Shambhu Roy	Dr S K Singh	lakhisaraikvk@gmail.com

Table 29: List of farm equipments purchased in TDC- NICRA KVKs during 2022-23

Name of KVK	Name of equipment	Quantity	Cost /unit	Total
Bhgagalpur	Digital Platform Weighing Balalnce	1	5264	5264
	Crane Hooked Weighing Scale	3	336	1008
	Moisture Meter	1	5488	5488
	Post Hole Digger	1	36960	36960
	Bund Maker	1	24804	24804
	Hatchery	1	10000	10000
	Sub Soiler	1	31476	31476
			Sub Total	**115000**
Lakhisarai	Power Sprayer	6	3300	19800
	Digital camera	1	12950	12950
	Raingauge	3	4365	13095
	Tractor mounted bund former	1	24885	24885
	Electonic weighing balance	3	7950	23850
	Spring Balance	3	5000	15000
	Thermameter	1	3841	3841
	Thermameter	3	526	1579
			Sub Total	**115000**
Kishanganj	Power Weeder	1	90400	90400
	Grain Moisture Metre	1	6926	6926
	Therma & Humidity metre (digital)	1	1232	1232
			Sub Total	**98558**
Nalanda	Zero Tillage Multicrop planter	1	100000	100000
			Sub Total	100000
Saharsa	Digital Weighing Machine Manual	1	4200	4200
	Post Hole Digger	2	17998.5	35997
	Hook weighing Scale	1	336	336
	Grain Moisture Meter	1	2176	2176
	Power Battery Spraye	5	2520	12600
	Neptune HTP complete Set	1	21000	21000
	Sony Digital Camera	1	24000	24000
	Rain Gauge	1	5015	5015
	Glass Rain Measuring Cylinder	1	590	590
	Maximum Thermometer	1	4543	4543
	Minimum Thermometer	1	4543	4543
			Sub Total	**115000**
Supaul	Incubator Cum hatcher	1	49000	49000
	Digital platform weighing balance	1	5488	5488
	Hand Weeder	4	300	1200
	Rain Gauge	1	2500	2500
	Crane hook weighing Scale	1	200	200
	Petrol Engine Sprayer	1	1400	1400
			Sub Total	59788

Name of KVK	Name of equipment	Quantity	Cost /unit	Total
Darbhanga	Grubber	1	4650	4650
	Digital Platform Weighing Balance	1	6000	6000
	Crane Hook weight balance	1	2800	2800
	Sprayer	4	3558	14233
	Digital Grain Moisture Machine	1	16048	16048
	Poultry Hatching Incubator	1	29000	29000
	Rain Guage	2	9500	19000
	Portable Power Spraye	1	23000	2300
			Sub Total	**94031**
Siwan	Rain Guage	4	649	2596
	Max-Min Thermometer	4	1180	4720
	Moisture Meter	1	14500	14500
	Crane hook weighing Scale	1	4956	4956
	Weighing Scale	1	13050	13050
	Chain Saw Petrol Engine	1	13511	13511
			Sub Total	**53333**
Buxar	Digital platform Weighing Machine	1	11446	11446
	Crane Hook Weighing Scale	1	5664	5664
	Hatching Incubator Low Cost	1	29999	29999
	Knapsack Sprayer Battery Operated	1	3500	3500
	Digital Grain Moisture Meter	1	10499	10499
	Soil Thermometer	1	1500	1500
	Digital Camera	1	9999	9999
	Rain Gauge	1	4335	4335
			Sub Total	**76942**
Sitamarhi	Digital Platform Weighing Balance	1	11363	11363
	Crane hook weighing scale (50Kg)	1	7670	7670
	Digital Grain Moisture meter	1	11387	11387
	Rain Guage	1	6608	6608
	Zero Tillage drill Machine	1	77972	77972
			Sub Total	**115000**
Garhwa	Rain Garuge	3	3600	10800
	Rain Meter	3	200	600
	Poultry Incubator cum Hatchery	2	30000	60000
			Sub Total	**71400**
Godda	Knapsac battery operated sprayer	1	4800	4800
	Weighing machine	1	4800	4800
	Rocking sprayer	1	7600	7600
	Pumpset with all aceesories	1	17200	17200
	Pipe	1	1350	1350
	Manual paddy thresher	1	5500	5500
	Rainpipe	1	13200	13200
	Manual sprayer	1	850	850
	Kodak Camera	1	14500	14500
	Digital moisture meter	1	5500	5500
	Rain gauge	2	3500	7000
	Thermometer	2	5200	10400
	Digital Hook weighing machine	1	2500	2500
			Sub Total	**95200**
Gumla	Electric Pump	4	9500	38000
	Hanging Scale	2	5664	11328
	Plateform Scale	2	6300	12600
	Portable Moisture metre	2	6000	12000
	Rain Gauge	2	9499	18998
	camera	1	22074	22074
			Sub Total	**115000**

NICRA-TDC PROJECT SITES

Bihar and Jharkhand

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