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Newsletter

TOWARDS CLIMATE RESILIENT AGRICULTURE

NICRA NEWS

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Introduction

Global food and nutritional security for an expanding human population is threatened by climate change. In this way, India's agriculture has become a major ecosystem of discussion and concern. Indian Council of Agricultural Research launched National Innovations in Climatic Resilient Agriculture (NICRA), a nation-wide project in response to the challenge of climate change facing Indian agriculture. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The overall focus of technology demonstrations under NICRA is to enhance resilience of farms and the farming community to climate risks so as to ensure sustainability over a period of time. The focus is on adaption to climate variability which entails appropriate response to contingency situations. The main objective of technology demonstrations is not on enhancing productivity but on interventions related to coping with vulnerability as well as improvement in natural resource use efficiency for sustaining the productivity gains.

Selected NICRA-KVKs' climate vulnerability was evaluated during the implementation of several modules, including NRM, Crop Production, Livestock and Fisheries, Institutional Interventions, Capacity Building, and Extension Activities of the NICRA-TDC program. These modules help to raise awareness of the need for various technological supports, human resource developments, and general farming community empowerment, empowering farmers to deal with climate vulnerabilities such as drought, unpredictable monsoon rainfall, heat waves, floods, cyclones, and more. The concept was warmly received in the majority of the districts and had a notable initial impact.

On-farm water harvesting in ponds, supplemental irrigation, early maturing drought-tolerant varieties, submersion-tolerant paddy varieties in flood-prone districts, improved drainage in water-logged areas, tube well recharging techniques, site-specific nutrient management and sodic soil management, mulching, and zero-till drills were among the technologies that farmers in NICRA villages nationwide enthusiastically adopted. One intervention that received a lot of support nationwide is the custom hiring centers.

A wide range of technologies are available to address various climate-related vulnerabilities. At the district level, Krishi Vigyan Kendras, which are regionally supervised by ICAR-Agricultural Technology Application Research Institutes (ATARIs), have carried out the project's component TDC.

ICAR-Agricultural Technology Application Research Institute Kolkata having seventeen KVKs where different activities under Technology Demonstration Components of National Innovations in Climate Resilient Agriculture (NICRA) programme in various modules viz. Natural Resource management, Crop Production, Livestock & Fisheries and Institutional Interventions are carried out.

It is critical to strengthen farming communities' resilience and adaptive capacity in order to effectively manage these extreme events. The selection of the NICRA village was based on how susceptible agriculture is to changes in the climate. Based on resource conditions, farming techniques, agricultural outputs during the last few years, and secondary meteorological data, the multidisciplinary KVK team examined the restrictions associated with climatic variability. Thus, in addition to helping farmers deal with climate vulnerability, the interventions carried out in NICRA villages by the NICRA-KVKs have also been crucial for farmers' adaptive capability and sustainable agricultural productivity.

Enhancing agricultural resilience by demonstrating stress tolerant chilli varieties (*Arka Tejasvi and Arka Yashasvi*) in NICRA adopted village Fatepur at Bhadrak

Frequent flooding during the Kharif season in NICRA village Fatepur has significantly affected agricultural productivity, limiting options for alternative crops due to the scarcity of upland areas. Farmers typically

cultivate traditional local varieties of chilli during Rabi and summer season, which exhibit low resistance to heat and biotic stresses, such as diseases and pests, resulting in low yield. To address this issue, demonstrations on stress and high temperature-tolerant chilli varieties, *Arka Tejasvi* and *Arka Yashasvi*, were conducted during the rabi season of 2024, involving 40 farmers.

These varieties were selected for their resilience under adverse conditions, with the aim of providing farmers with viable crop alternatives capable of withstanding biotic stress and also showing tolerance to high temperature.

In contrast to traditional varieties, the improved varieties *Arka Tejasvi* and *Arka Yashasvi* demonstrated significant agronomic advantages, including enhanced yields and effective high temperature tolerance. These varieties

also exhibit markedly lower incidences of diseases, such as chilli leaf curl virus and powdery mildew. Additionally, they showed a significantly greater number of healthy fruits per plant and a higher total fruit yield per plant compared to local varieties. Farmers have provided positive feedback regarding these improved varieties and express optimism about expanding their cultivation in the coming years.

Technology	Name of chilli variety	Number of healthy fruit/plant	Yield/ha (Green Chili) (q/ha)	Net income (Rs./ha)
FP	Local variety	11	181	1,84,420
Demo	Arka Tejasvi	25	259.26	2,63,890
Demo	Aka Yashasvi	23	238.51	2,34,765

(Dr. S. Mohanty, Dr. J. Maharana and Ms. Bhanumati Dinda, Bhadrak Krishi Vigyan Kendra, Odisha

Dr. P. J. Mishra and Dr. A. Phonglosa, OUAT, Odisha)

An integrated approach for managing Coastal Saline Soils under the Context of Climate Change at Jagatsinghpur

Coastal regions are becoming more susceptible to risk from the effects of climate change, which is worsening the existing challenges faced by agricultural ecosystems. A coastal district like Jagatsinghpur is facing a critical challenge with rising soil salinity, which

Green Manuring

is undermining both coastal agriculture and local livelihoods. In various blocks of the district such as *Kujanga*, *Balikuda* and *Erasama*, the infiltration of saline water has become a serious problem, influenced by factors like saline groundwater, tidal flooding and the release of saline effluents from prawn ponds. Hence, the soil salinity in this region is increasing which is drastically reducing agricultural productivity. Rice is the staple crop in this region and decrease in the yield of rice due to the soil salinity is straining local economies and putting long-term

Luna Suvarna

food security at risk. Additionally, the cumulative effects of salinity have led to the degradation of soil structure, decreased biodiversity and limiting the ability to cultivate salt-sensitive crops, compounding the crisis for farmers and communities dependent on agriculture.

The underlying causes of soil salinity may be due to several reasons like limited infiltration of freshwater, tidal

Crop Cutting

flooding in low-lying areas and capillary rise from the saline shallow inland freshwater aquifer system. Additionally, the lack of deep tillage practices has worsened the problem, leading to the development of a hardpan layer that hinders the percolation of freshwater

and diminishes natural leaching and groundwater recharge. This ongoing cycle of salinization has disrupted the traditional rice-greengram cropping system of the area, driving farmers to the edge of economic hardship.

To address the escalating issue of soil salinity in the coastal blocks of the district, the National Innovations in Climate Resilient Agriculture (NICRA) Project, under the leadership of the Krishi Vigyan Kendra (KVK) in Jagatsinghpur has formulated a comprehensive approach to mitigate soil salinity and revitalize agricultural productivity. This strategy includes a range of interventions such as deep ploughing in summer, green manuring with Dhanicha, introducing salt-tolerant rice varieties, implementing rainwater harvesting in farm ponds in the NICRA-TDC project village of Achyutdaspur, situated in the *Erasama* Block. The average electrical conductivity in the salt affected fields is around 4.01 dS/m, while groundwater conductivity measures approximately 3.8 dS/m.

Green Manuring with Dhanicha: The introduction of Dhanicha (Sesbania rostrata) as a green manure crop before rice planting was a significant intervention. Dhanicha enhances soil health by adding organic matter and plays a vital role in managing soil salinity. Its deep root system can penetrate through the hard pan layer, facilitating salt leaching from the root zone. This dual benefit helps to improve soil structure and fertility, making it a valuable addition to the cropping system prior to the planting of rice.

Introduction of Salt-Tolerant Rice Varieties: Varieties like Luna Suvarna, Luna Barihal, and Luna Ambiki, known for their salt tolerance, have been introduced to mitigate the negative effects of soil salinity on rice yields. These resilient varieties offer renewed hope for sustaining rice production in challenging conditions. Their introduction is vital for helping farmers combat the adverse impacts of salinity, ensuring successful cultivation and contributing to food security and livelihoods in affected areas.

Rainwater Harvesting Though on Farm Pond: The construction of farm ponds serve as a source of supplemental irrigation during dry spells, helping to maintain moisture levels in the soil.

Luna Barihal

Additionally, harvested fresh rainwater in farm ponds can dilute soil salinity, further improve the growing conditions for crops. This strategy supports the overall water management framework of the agricultural system, enabling farmers to better cope with the variable climate and saline conditions.

The comparative analysis between the traditional and revised practices revealed significant improvements in agricultural outcomes under the revised interventions. The adoption of deep ploughing, green manuring and the use of a salt tolerant rice variety (Luna Suvarna) coupled with supplemental irrigation from farm pond has led to substantial increases in crop yield, net profit and the benefit-cost benefit (B:C) ratio. The findings are summarized in the Table 1.

Comparison of farmers' practice and revised practice of *Luna Suvarna* rice variety

Treatment	Yield (q/ha)	Net Pro t (Rs/ha)	B:C Ratio
Farmers' Practice (FP)	32.5	19500	1.37
Revised Practice (RP)	42.7	32400	1.54
CD at 5%	8.6	-	-

The revised practices significantly outperformed the traditional methods, demonstrating a higher yield and better economic returns. The implementation of these practices under the NICRA-TDC project highlights the potential for improving the sustainability and resilience of coastal agricultural system in the face of climate change and increasing soil salinity.

Luna Ambiki

Farm Pond

The NICRA-TDC project in Achyutdaspur village has demonstrated promising results in enhancing the productivity and sustainability of coastal rice-based ecosystems. As climate change intensifies, scaling up these interventions is crucial for broader adoption of resilient agricultural strategies in saline affected regions. The project offers hope in combating soil salinity by promoting sustainable agricultural practices, including the introduction of salt-tolerant crop varieties and efficient water management strategies. These efforts aim to support farmers in thriving under saline conditions while enhancing soil health and optimizing water use. Through this integrated approach, the NICRA-TDC project seeks to foster resilience and prosperity in coastal communities facing agricultural challenges.

(Dr. Dwarika Mohan Das, Dr. P. Majhi, Dr. J. Sen, Dr. B. M. Rout and Dr. D. Panda
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Dr. P. J. Mishra and Dr. A. Phonglosa, OUAT, Odisha)

Different climate smart activities for improving agricultural production and livelihood in NICRA village of Bolangir

Sri Nityananda Sai is a progressive farmer of *Odiapali* village. He was cultivating rice, green gram along with rearing of poultry with dairy as additional income. He was in search of technologies on enhancement of productivity and income as he was getting low productivity due

to practicing of traditional practices. In the meantime he came in contact with KVK scientists and suitable technologies

under NICRA project in 2021 were adopted by him. After adopting the technologies under NICRA project, he can able to enhance the productivity and income from Rs.1,70,000 to Rs.2,20,000 and many climate resilient technologies can helpful to conserve moisture and tolerate drought situation in crop production.

KVK scientists initiated the

demonstration on stress tolerant rice variety *Swarna Shreya*, maize and the farmers got satisfactory yield of rice 34q/ha. He has been trained on skill on preparation and use of organic inputs, foliar application of NPK (18:18:18) in green gram, feeding of mineral mixture and bypass fat for increase milk production. Azolla cultivation help in poultry and dairy feeding which increases the body weight of bird and milk yield in

developed poultry and dairy unit by the technical guidance of KVK scientists and now he is getting a minimum net income of Rs. 80,000. The demonstration on stress tolerant rice variety *Swarna Shreya* and foliar application of NPK(18:18:18) in green gram enhanced the productivity of rice and green gram for which he is getting an net income of Rs.1,40,000 per year.

After adoption of different climate resilient technologies on crop and livestock production, his income enhanced from Rs.1,70,000 to Rs.2,20,000. His participation toward

social activities has been increased and he is recognized as key agent for motivating the farmers for adoption of the technologies. The technologies under NICRA project are disseminated to nearby 4-5 villages and the farmers are adopting the technologies and able to increase their income.

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Animal Health Camp in NICRA-adopted villages of Coochbehar

The primary goals of conducting the Animal Health Camp are to understand the overall health status of livestock, assess management practices, and identify common disease issues in the area, allowing for systematic livestock-related interventions.

The camp will not only help spread information on general health and production matters but also offer direct services to livestock owners who have limited access to veterinary care.

Acknowledging the vital role livestock

plays in the livelihoods of Scheduled Caste and tribal families, and their limited access to animal healthcare, camps were set up in NICRA-adopted villages in the Cooch Behar district to provide veterinary services at their doorstep. Farmers were advised to carry out regular deworming, vaccinations, and provide supplemental mineral-vitamin mixtures to improve livestock nutrition and overall health.

(Dr. Bikash Roy, Dr. Samima Sultana and Dr. Bablu Ganguly
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Fodder cultivation for dairy nutrition – An alternative feed for sustainable milk production at Ganjam

Dairy farming has been a long standing animal husbandry sector going hand in hand with humanity. From being a provider now the dairy sector has immersed as an industry. In the last few decades our country has progressed a lot in dairy sector with the advent of artificial insemination, improved feeding and health management. However like all the agricultural sectors livestock and especially dairy has taken a blow by the climate change. Last decade has shown a shift in usual climatic conditions all across the globe. Indian sub-continent has suffered mostly due to the climatic change as the region is largely dependent on sea driven monsoon for its climate.

Initiation of perennial fodder cultivation

Climate change is causing mercurial shift in agriculture and livestock farming. The effects of climate change can be equated with the tip of an iceberg hiding a vast enormity beneath the abyss. The visible effects of climate change on livestock are only the beginning and the actual apocalyptic effect is yet to be felt. However, even the present problems poses a gigantic challenge and are capable enough to destroy the livestock ecosystem of small and marginal farmers. In the recent years mitigating climatic extremes in both agriculture and livestock sector has cannon balled to some extent. Though many attempts are now being made for agriculture survivability, the same is lagging behind in-case of livestock sector.

Krishi Vigyan Kendra, Ganjam-I is constantly working in villages like *Chopra*, *Nada*, *Chikili* and *Lepa* of *Jagannathprasad* block, Ganjam district of Odisha on climate resilient agriculture and livestock production. Hot and humid climate with long dry spells affect the livestock sector in the region. The adverse climate has forced the farmers to reduce or close their dairy animal production owing to shortage of naturally available forages. Moreover increase in cost of feed has made it un-economical to raise large cross breed dairy animals. Increased cost of production and reduced profit forced farmers to look for other economic options.

Krishi Vigyan Kendra, Ganjam – I in collaboration with Dept of Animal Husbandry promoted fodder and azolla cultivation for dairy nutrition as an alternative of commercial feed. Dairy farmers were perused to start fodder cultivation on un-used fallow lands with perennial fodder variety Hybrid Napier (CO4). Farmers were provided with incentives for the fodder cultivation by linking with different schemes. One farmer in each village was selected for the purpose of production and supply fodder to other dairy farmers at a minimal price. Soon the cost of production reduced substantially as compared to the commercial feed and profit increased for sale of milk. Health

Fodder Cultivation

Azolla Cultivation

Fodder feeding to dairy animals

improvement and increase in quality of milk was also observed by the farmers and this promoted more number of farmers to adapt fodder cultivation for their dairy animals.

Along with fodder cultivation the farmers also initiated azolla cultivation in the backyard for dairy animal nutrition. Azolla which is rich in protein and Vitamin A provided balanced nutrition to the dairy animals. Azolla cultivation was also linked with different schemes for financial benefits to the farmers. Both azolla and fodder in unison reduced the feed cost by 40 – 50% as compared to commercial feed and also provided proper nutrition to the dairy animals for optimum production. Reduced cost of production made the dairy farming more economically viable and sustainable in long run. Now the dairy farmers in the area have adapted fodder and azolla cultivation as an integral part of dairy farming for its sustainability and survivability.

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Poly mulching: A Soil Moisture Conservarion technology under climate stress senario at Kalahandi

Bikram Sa is a dedicated farmer from Kalahandi, entirely dependent on agriculture for his livelihood. He primarily grew vegetables like tomatoes and brinjals using traditional methods. However, erratic rainfall and rising temperatures posed significant challenges, leading

to low soil moisture and inconsistent yields. This resulted in financial strain for his family. Previously, he relied on basic farming techniques, such as bare soil cultivation and limited use of organic matter. These methods contributed to soil erosion and further moisture loss, making it difficult for him to cope during dry spells. Despite his hard work, the lack of effective moisture conservation strategies restricted his productivity and income. Recognizing the need for a better approach, he was considered as a beneficiary farmer under the NICRA Project, which introduced him to innovative techniques like poly-mulching. This marked the start of a transformative journey to improve his farming practices and enhance his livelihood.

Under the NICRA Project, he was considered as a beneficiary for the demonstration of poly-mulching, a technique designed to conserve soil moisture in vegetable farming. This intervention involved applying a layer of mulch, either plastic or organic materials, over the soil, which effectively reduces evaporation, suppresses weed growth, and helps maintain an ideal soil temperature.

The innovation of poly-mulching lies in its ability to enhance water retention and improve soil health. By minimizing water loss, Sri Sa was able to maintain

consistent moisture levels, crucial for the growth of his vegetable crops, particularly during dry spells. This technique not only led to increased yields but also reduced the need for frequent irrigation, lowering labor and water costs.

Additionally, the gradual decomposition of organic mulch enriched the soil with nutrients, further promoting crop health and productivity. Overall, the poly-mulching intervention significantly transformed his farming practices, providing a sustainable solution to

the challenges posed by erratic rainfall and climate variability. This approach not only improved his livelihood but also contributed to resilience in his agricultural practices.

After the intervention of poly-mulching under the NICRA Project, he experienced significant technological benefits in his vegetable farming. The primary advantage was improved soil moisture retention, which minimized evaporation and allowed his crops to thrive even during dry spells. This resulted in higher and more consistent yields of vegetables like tomatoes and brinjals.

Additionally, poly-mulching reduced weed growth, decreasing the need for manual weeding and lowering labour costs. The use of organic mulch also enriched the soil over time, enhancing its fertility and structure. Overall, these benefits led to increased productivity, improved crop quality, and a more stable income, reinforcing his reliance on agriculture as a sustainable livelihood. The successful implementation of this technology has empowered him to adapt to climate challenges and strengthen his farming practices.

The implementation of poly-mulching under the NICRA Project had a profound social impact not only on him but also on his community. By improving his vegetable yields and income, he enhanced his family's nutrition and financial stability. His success inspired neighbouring farmers to adopt similar practices, fostering a spirit of collaboration and knowledge sharing within the community. Additionally, increased agricultural productivity contributed to local economic growth, creating opportunities for better livelihoods. Overall, the intervention not only strengthened his resilience but also uplifted the entire farming community, promoting sustainable agricultural practices and greater food security. The village is known in the district for vegetable cultivation.

KVK, Kalahandi played a pivotal role in his success by facilitating the demonstration

of poly-mulching techniques. The Scientist from KVK, Kalahandi provided essential training and guidance on implementing this moisture conservation strategy, helping him understand its benefits and applications in vegetable farming. KVK also conducted field visits to monitor progress and offer ongoing support. By sharing knowledge and resources, KVK empowered Sri Sa and other local farmers to adopt innovative practices, ultimately enhancing their agricultural productivity and resilience against climate challenges. Krishi Vigyan Kendra has played a multifaceted role in Sri Sa's agricultural journey, ranging from knowledge transfer and technical guidance to providing critical support through the implementation of specific interventions and the distribution of quality planting materials.

His farm land has been visited by farmers of in and out of the district and been renowned as technical expert in his village in terms of modern methods of vegetable farming.

Impact factor	Before Adoption	After Adoption
Farmer Practice	Only tomato and Brinjal were grown only during rainy season in basic farming practices such as bare soil cultivation and limited use of organic matter without any scientific care and management. No hybrid varieties were cultivated.	Vegetable component includes Tomato, Brinjal, Chili, Okra, Bottlegourd, Cauliflower, Cabbage, Bittergourd, Cucumber etc are grown throughout the year. Proper care and management was taken into practice. Hybrids and grafted cultivars are used.
Yield of Product	Tomato Production is around 9.4q from 0.2 acre of land.	Tomato production from 0.5 acre of land is around 40.1q.
	Brinjal Production is around 11.6q from0.2acreof land.	Brinjal production from 0.5 acre of land is around 43q.
	-	Total vegetable production from his farm is around 185q annually.
Gross Income	1,28,675/-per Year	4,71,000/-per Year
Total Expenditure	54155/- per Year	114500/- per Year
Net Profit	74,520/-per Year	3,56,500/-per Year
Dissemination of knowledge in the locality	No any farmers have taken up any activity regarding the conservation of soil moisture in that locality and bare soil cultivation was followed up regularly, no proper care and management.	The farmers residing to vicinity to Indramal village were adopted to Mulching technology, cultivation of vegetables throughout the year using hybrid cultivars and taken scientific care and management.
Knowledge gain based on 1-5scale*	1	5
Feeling of economic security based on 1-5 scale*	1	4
Ability to understand and solve problems based on 1- 5 scale*	1	5
Self image in community based on 1-5scale*	1	4
Self confidence based on 1-5scale*	1	5

*1-5 scale indicates 1 = lowest and 5= highest

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Village seed bank: Empowering farmers and addressing climate risks in flood affected coastal areas of Kendrapara

Ensuring availability and accessibility to climate resilient crop varieties by farmers is one of the factors of building resiliency of the production system. Flood occurs regularly in low-lying rice ecosystems of coastal Odisha which often damages rice crop in early and late crop growth stages. Few flood tolerant varieties are being promoted in this vulnerable rice ecology with encouraging performance as compared to farmers' variety. However, quality seeds of those varieties are not adequately available to meet the farmers' need. Making the seeds of those varieties available at village level at right time and at affordable prices would sustain the productivity of crops and strengthen livelihood security of small and marginal farmers. Analysis of problems and root causes in the NICRA (National Innovations in Climate Resilient Agriculture) project area of Kendrapara district revealed the issues of timely availability of quality seeds of suitable varieties is one of the major

Seed Bank

constraints in yield stabilization in flood years. In flood prone areas, availability of fodder for dairy animals is the major concern for which development of fodder bank will help the livestock farmers with green fodders. Keeping these issues in view, the concept of village seed banks and fodder banks were developed through demonstrations in NICRA adopted village of KVK, Kendrapara.

Seed banks are mainly informal institutions, locally governed and managed, whose core function is to preserve seeds for making the village self-reliant for stress resilient crop varieties. As adapting strategies to combat climatic vulnerability, flood tolerant rice varieties *Swarna Sub-1* and *CR 1009 Sub-1* have been introduced in the village. These varieties could tolerate submergence up to 11 days during the demonstrations. *Swarna Sub-1* and *CR 1009 Sub-1* varieties were included in seed production and their promotion in NICRA as well as in nearby non-NICRA villages through establishment of seed banks. Breeder seed / foundation seed was sourced from certified sources for multiplication in farmers' fields. Community seed bank was formulated and implemented through demonstrations in the selected village. For seed production activity farmers were selected by village committee in presence of scientists. Flood resilient varieties Swarna Sub-1 was given to 12 (5 ha) number of farmers, whereas *CR 1009 Sub-1* was grown by 10 (4.5 ha) farmers in 2023. The participated farmers were trained on seed production techniques and special operations like roguing, seed cleaning, processing etc. were demonstrated for maintaining seed purity and seed vigour. Seed testing for quality parameters were done at KVK as labelled as truthfully labelled (TL) seed.

Fodder Bank

Fodder banks are the participatory fodder production units as developed and maintained by identified farmers for conservation as well as supply of green fodder to needy dairy farmers. Hybrid nappier, Co-4 root slips were planted in selected 12 households in their backyards or fields.

In 2023, a total of 15.3 t of *Swarna Sub-1* and 14.4 t of *CR 1009 sub-1* were produced with a revenue of Rs.8,91,000 (Table 1). The acceptance of these varieties is attributed to their adaptability to both flood and normal situations with better performance over the existing farmers' varieties. However, some issues arisen in establishment of community seed bank at a common place. Community concept of sharing seed created controversy among the members. Instead of keeping seeds at one common place the individual farmers stored the seeds at their own space.

Table: Quantity of seeds produced and revenue generated under seed bank

Stress resilient variety	No. of farmers and area	Quantity produced, (t)	Total revenue generated (Rs.)
Swarna sub-1	12 (5 ha)	15.3	459,000
CR 1009 sub-1	10 (4.5 ha)	14.4	432,000
Total		**29.7**	**891,000**

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Broad Bed cum Trench: A Boon for the Marginal Farmers of Sundarbans

Shri Mihir Haldar is an experienced (59 years old) passionate and innovative farmer from the NICRA adopted village 'Kaikhali'. Till 2022-23, he do have one 0.13 ha low-lying land with only option of traditional deep water paddy (like *Dudheswar*, *Morisal*, *Kalomota* etc.) in kharif and no other crop in rest of the year for late release of the land after kharif paddy and non-availability of irrigation water. Shri Haldar had to remain satisfied with low income from his land as he does not have the options to grow high-value crops like vegetables

or any high yielding rice varieties due to intensive rainfall followed by submergence during kharif season. Sometimes he had practiced growing greengram as summer crop, however, it faces huge loss due to unseasonal rainfall at the time of maturity stage of greengram .

Under the situation, Shri Haldar approached to VCRMC of Kaikhali-2 under the 'National Innovations in Climate Resilient Agriculture' project for his land development and thus converted his 0.13 ha of lowland into alternate Broad Bed and Trenches, each of around 4-6 ft wide. Thus, this small piece of land is developed as a series of trenches of 4 - 6 feet wide at 4 feet intervals, each of 3 feet deep from surface. The dugout soil is used to raise the land in between two trenches, by 3 feet. These raised beds are use for growing high value off-season vegetables round the year. During rainy season, the rainwater is collected in the trenches, where rearing of fish is done for a short period of 4-6 months. A portion of the water is used for life saving irrigation

of the vegetable crops during November to February-March.

Presently Shri Mihir Babu is growing vegetables like bitter gourd and cowpea on the broad beds, during kharif season. During winter, some high value horticultural crops like cucumber, aniseed, cole crops is being grown. This modified technology has helped

him to save the high value crops from submergence during monsoon season and made provision for irrigation during winter. The rain water stored in the trenches has been used for life saving irrigation during dry spell. At the same time, he has been using this stored water in the trenches to grow fish.

In the traditional cultivation practice he hardly earned a net profit of Rs 5000/- per year from the said low land (0.13 ha). After adopting broad bed cum trench technology, he is earning Rs. 22000/- per year from the same piece of land.

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Inauguration of Custom Hiring Centre and awareness on climate resilient agriculture at *Ramayanpur* village of Malda

The National Initiative in Climate Resilient Agriculture (NICRA) project has launched at *Ramayanpur* village of Malda district in the financial year 2023-24. Custom Hiring Centre (CHC) for farm implements is an integral part of the project. Therefore, CHC for farm implements was started in the NICRA adopted village. The center was officially inaugurated by Prof. P.K. Pal, DEE, UBKV on 09.06.2024. On this occasion, a mass awareness programme was also organized on climate resilient agricultural practices where about 150 farmers and farm women have participated.

During the programme, Prof. Pal stated about the importance of climate resilient agriculture in reducing crop loss, restoring natural resources and earning higher income. He also stated that the farmers can

hire farm implements easily from the CHC. He pointed out the accessibility of these modern implements will modernize the agricultural practices that can contribute to improve farm income.

Dr. Rakesh Roy, Senior Scientist and Head of Malda KVK assured that the technical support to the implementing project at adopted village and also spoke on formation of a committee for handling and maintenance of implements and fixed the price for hiring of implements to smooth running of CHC. Moreover, Dr. Roy have motivated the farmers about Climate Resilient Agriculture practices which can uplift the socio-economic status of farmers in the village. Dr. Adwaita Mondal, SMS (Fishery Science) and Dr. Bhabani Das, SMS (Agronomy) of Malda KVK both have addressed the gathering and explained the importance of a CHC and uses of farm machinery and implements. Dr. Victor Sarkar, SMS (Agricultural Extension); Dr. Bankim Chandra Rudra, Farm Manager; Md. Shajahan, Program Assistant (Lab Technician), of Malda KVK they also discussed about the importance of Climate Resilient Agricultural practices as well as CHC also. Representative of KVK, Kalimpong Dr. Ranajit Panda, SMS (Soil Science) was present in the programme and observed the NICRA activities in the village.

(Dr. Rakesh Roy, Dr. Victor Sarkar and Dr. Sachin Sarkar

Malda Krishi Vigyan Kendra, West Bengal)

Field Day on green gram variety "*Virat*" under rice fallow system at Dhenkanal

A field day programme on "Green gram Variety *Virat*" under Rice Fallow system was organised at *Arachua* village, Block-

Gondia, GP-*Mathatentulia*, District-Dhenkanal, Odisha under NICRA-TDC Project, KVK, Dhenkanalon on 13th March, 2024 The main objectives of the programme are to encourage sustainable rice fallow management during the Rabi

season and to promote the cultivation of green gram. Around 100 numbers of farmer, farm women, rural youth along with line dept. officials and KVK Scientists actively participated in the programme. During this programme, crop cutting and Farmers-Scientists Interaction was organized. At the outset of the meet, Dr.

Dibya Sundar Kar, Scientist Horticulture cum Co-PI NICRA-TDC Project welcomed the guests, participants and briefed about the demonstration programme on green gram variety Virat under Rice fallow management system. Participating farmers on this occasion shared their experiences and provided valuable feedbacks regarding the performance of Green gram var. *Virat*. According to the

farmers the green gram variety Virat matured early within 50-55 DAS, it's highly resistant to yellow mosaic virus and having large attractive green and shining seeds. They found an average yield of 7.5- 8.5 q/ha as compared to local variety yielding 5q/ha.

Chairing the interaction meet, Dr. Bimalendu Mohanty, Senior Scientist and Head Cum PI NICRA –TDC Project, KVK, Dhenkanal expressed his happiness over the performance of demonstrations and outlined all interventions like, selection of appropriate variety, seed

treatment, IPM, soil test based fertilizer application, mechanized threshing by using power operated pulse thresher and post-harvest processing practices to reduce cost of cultivation and promote value addition. Mrs. Sanghamitra Sahu Scientist Plant Protection, emphasized on IPM practices, waste management and use of bio-chemicals instead of synthetic chemicals. Miss. Soumyashree Swain, SRF, NICRA-TDC Project stressed the importance of integrating green gram into crop rotation systems to enhance agricultural productivity and income. Block Agriculture Officer Mr. Subhransu Sekhar Mahanta of Gondia block expressed his satisfaction towards the demonstration and assured to promote the demonstrated variety for further dissemination in the district. At the end of the programme, Dr. Kar gave his valuable remarks and advised all the beneficiary farmers not to use the harvested seeds of these varieties for consumption purpose this year, rather use as seeds for next season and to supply surplus seeds to fellow farmers to replace the low yielding varieties.

The event showcased the benefits of growing green gram in rice fallow areas, including improving soil fertility and increasing crop yields. Farmers received hands-on training and demonstrations on seed selection, planting methods, pest control and post-harvest techniques. The field day provided a valuable opportunity for knowledge exchange and skill development encouraging farmers in Arachua village to embrace innovative and eco-friendly farming practices. The field day on Green gram was successfully conducted with the support of FMU Coordinator Vanya Surakshya Samiti Sri Dinesh Sharma, President, Sri Dasarathi Sahoo and all members of VCRMC.

(Dr. Bimalendu Mohanty, Dr. Dibya S Kar and Ms. Soumyashree Swain
Dhenkanal Krishi Vigyan Kendra, Odisha
Dr. P.J. Mishra and Dr. A. Phonglosa, OUAT, Odisha)

QRT Visit-cum-interaction with NICRA beneficiaries at Puri

The QRT lead by Hon'ble Chairman, Prof. Panjab Singh, Chancellor, Rani Lakshmi Bai Central Agricultural University along with other team members visited NICRA village *Jatipur* of Puri sadar block on 27th June, 2024 An interaction meeting with the farmers along with scientists of KVK, Puri was arranged in the village. Director CRIDA, Principal Scientists of CRIDA and Scientists of AICRPs operating in OUAT also interacted with the farmers of the village regarding NICRA activities conducted by KVK during past years. They visited the community mushroom unit, community vermicompost unit, grain bank and custom hiring centre established in the village. They appreciated the technology of sequential Rice cum fish farming implemented in 17 acres of compact patch where fish farming is carried out during kharif season and after the fish are harvested in December, the Rice variety Bina Dhan 11 is cultivated. They visited the 1.0km renovated bund surrounding the compact area, where banana plantation is done to generate extra income. After visit of the units and interaction with farmers the QRT team suggested in increasing the horizontal spread of the above technology in the flood prone Kharif waterlogged area of different blocks of district with the help of district administration. The farmers expressed their thankfulness for their visit and giving valuable suggestions regarding climate resilient practices and also enormous support they are getting from ATARI Kolkata and CRIDA, Hyderabad through NICRA project running under the supervision of Krishi Vigyan Kendra, Puri, OUAT, Bhubaneswar.

(Dr. S. N. Mishra, Dr. Dipsika Paramjita and Dr. Pranaya Pradhan
Puri Krishi Vigyan Kendra, Odisha
Dr. P. J. Mishra and Dr. A. Phonglosa, OUAT, Odisha)

ATARI Kolkata organized Annual Zonal Workshop of NICRA KVKs of Zone V at North 24 Parganas KVK, Ashokenagar

ICAR-Agricultural Technology Application Research Institute, Kolkata organized the Annual Zonal Workshop on National Innovations in Climate Resilient Agriculture (NICRA)-TDC Project for Krishi Vigyan Kendras of Odisha (9 KVKs), West Bengal (7 KVKs) and A&N Islands (1 KVK) under Zone V during June 19-20, 2024 at North 24 Parganas KVK, Ashokenagar, West Bengal. The objective of the workshop was to review the progress of activities of the project in 2023-24 and finalization of the action plan for 2024-25.

Prof. D. Basu, Vice-Chancellor, Uttar Banga Viswavidyalaya, Coochbehar, in his inaugural address, shared his valuable experiences in conservation farming and requested the participants and farmers to propagate the knowledge to their fellow farmers. He stressed upon the judicious use of natural resources towards sustainability.

Dr. Pradip Dey, Director, ICAR-ATARI Kolkata stated that conservation agriculture has a huge importance in the scenario of climate changes and advocated to link production system to market intelligence for better profitability.

Dr. G. Pratibha, PI, NICRA, ICAR-CRIDA Hyderabad made the house concerned about the precedented gradual increase of global temperature and its related consequences. She exhorted her views towards the NICRA-KVKs of Zone V

for an intensive care towards nurturing the interventions against climatic vulnerability and upscaling the climate resilient technologies in an integrated way.

Directors of CRIJAF Barrackpore and

CIFRI Barrackpore were also present in the workshop. The Heads of Eastern Research Station, IVRI Kolkata and Eastern Regional Station, NDRI Kalyani were present including different Line Department Officials and representatives from the 17 NICRA KVKs of the zone. Around 30 farmers and farm women from NICRA village and its adjacent villages of North 24 Parganas district were present in this workshop and some progressive farmers were felicitated by Hon'ble Vice-Chancellor, UBKV.

Earlier, Dr. S K Mondal, Principal Scientist-cum-Nodal Officer of the project appreciated the role of all 17 NICRA KVKs of this zone in disseminating the climate resilient technologies in respect of different modules *viz*. NRM, Crop Production, Livestock & Fisheries and Institutional Intervention among the farmers of 24 villages so far in combating the climate adversities upon agriculture and allied sectors.

Two Technical Bulletins on 'Promising Climate Resilient Technologies for Coastal Area of North 24 Parganas District' and '*Bigyansammoto Upaye Supari Chash*' were released.

All the KVKs presented their progress of activities of the project conducted during last year 2023-24 which were critically reviewed by the experts and panelists and action plan for 2024-25 of each KVK was finalized.

A PDF version of the Newsletter is also available at: http://www.atarikolkata.org/publications

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