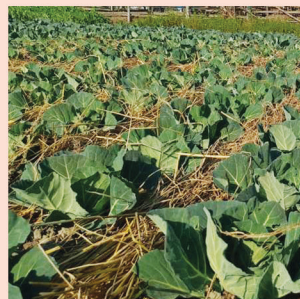


RESILIENCE IN ACTION: TRANSFORMING AGRICULTURE, COMMUNITIES & CLIMATE FUTURES

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ICAR-Agricultural Technology Application Research Institute, Zone-VII
Umiam, Meghalaya-793103
(An ISO 9001:2015 Certified Organization)

RESILIENCE IN ACTION: TRANSFORMING AGRICULTURE, COMMUNITIES & CLIMATE FUTURES **ANNUAL REPORT 2025-26** **(NICRA-TDC)**

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PREFACE

Greetings from Team ICAR-ATARI, Zone-VII, Umiam

It is a privilege to present ***Resilience In Action: Transforming Agriculture, Communities and Climate Futures***, the **NICRA-TDC Annual Report for 2025-26**. This report reflects the substantial progress made under the National Innovations in Climate Resilient Agriculture (NICRA) program, highlighting the unwavering commitment of scientists, field teams, and farmers across the Northeastern Hill Region. It demonstrates how collaborative efforts and scientific innovation are strengthening agricultural resilience in the face of climate uncertainty.



Since its launch in 2011, NICRA has served as a vital initiative in addressing the pressing challenges posed by erratic weather, heavy rainfall, floods, and landslides that endanger farmers' livelihoods. The Technology Demonstration Component (TDC), implemented through 15 Krishi Vigyan Kendras (KVKs) under ICAR-ATARI, Zone VII, Umiam, has played a key role in converting research into practical, location-specific solutions. This report showcases a range of resilience-building interventions—such as water harvesting, stress-tolerant crop varieties, and integrated livestock systems—that have strengthened farmer capacities and improved food security across Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

I express my sincere appreciation to the Heads and dedicated NICRA staff of the 15 KVKs for their steadfast commitment and relentless efforts in implementing these transformative technologies at the grassroots level. Their leadership and active engagement have been central to this success. I extend special thanks to **Dr. P.K. Pathak, Senior Scientist and PI of NICRA**, and **Dr. Amrutha T., Scientist and Co-PI**, for their visionary guidance and expert direction. I also acknowledge the valuable contributions of Ms. Stefynia Kharkongor whose diligence and meticulous work were instrumental in compiling and shaping this report.

This report stands as a powerful reflection of collaboration, innovation, and resilience in action. Moving forward, I am confident that its insights and accomplishments will inspire ongoing progress toward a more sustainable agricultural future for the Northeast and beyond.

Place: Umiam, Meghalaya
Date: 31-03-2026


(Dr. A.K. Mohanty)



ACKNOWLEDGEMENT

We, the authors of *Resilience In Action: Transforming Agriculture, Communities and Climate Futures: NICRA-TDC Annual Report 2025-26*, gratefully acknowledge the invaluable guidance, support, and teamwork that brought this report to fruition. It serves as a testament to the collective efforts of diverse stakeholders committed to strengthening climate-resilient agriculture across the Northeastern Hill Region.

We express our sincere gratitude to **Dr. Vinod Kumar Singh**, Director, ICAR-CRIDA, Hyderabad, for his visionary leadership and steadfast support, which have been pivotal to the success of the NICRA program. We also extend our heartfelt appreciation to **Dr. G. Pratibha**, Principal Investigator of TDC-NICRA, and **Dr. T.V. Prasad**, Co-Principal Investigator whose expertise and commitment have steered the Technology Demonstration Component with clarity and precision, benefiting farmers across vulnerable districts.

We extend our sincere appreciation to **Dr. Rajbir Singh**, Deputy Director General (Agricultural Extension), **Dr. Rajarshi Roy Burman**, Assistant Director General (Agricultural Extension), and **Dr. Ranjay K. Singh**, Assistant Director General (Agricultural Extension), for their valuable guidance and encouragement, which have significantly enhanced the outreach and effectiveness of the program. We also gratefully acknowledge **Dr. A. K. Mohanty**, Director, ICAR-ATARI, Zone VII, for his essential support. Our thanks further extend to all colleagues in the Agricultural Extension Division, whose collaborative efforts and shared expertise have enriched both this report and the broader NICRA initiative.

The completion of this work reflects the unwavering commitment of the Krishi Vigyan Kendras and their teams, the willingness of farmers to adopt innovative practices, and the steadfast support of ICAR-ATARI, Zone VII. We are privileged to document these transformative journeys and hope this report will inspire ongoing progress in sustainable agriculture.

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EXECUTIVE SUMMARY

The National Innovations in Climate Resilient Agriculture (NICRA) program, under the Technology Demonstration Component (TDC), continues to empower farmers in the Northeastern Hill Region of India by demonstrating site-specific, climate-resilient technologies across vulnerable districts. In 2025-26, 15 Krishi Vigyan Kendras (KVKs) under ICAR-ATARI Zone-VII implemented interventions in selected NICRA villages, focusing on enhancing agricultural resilience against climate variabilities such as erratic rainfall, moisture stress, droughts, floods, and temperature fluctuations. These efforts, aligned with NICRA's objectives of technology development, on-farm demonstrations, and capacity building, have significantly improved productivity, income, and sustainability for smallholder farmers in Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

Key highlights include the adoption of integrated farming systems, water harvesting structures, stress-tolerant crops, and low-cost management practices, shows significant positive impact on farm income and productivity increases significantly for NICRA farmers as compare to Non-NICRA farmers. In South Garo Hills, FTS-II demonstrates a 0.13% higher system productivity than non-NICRA villages under normal conditions, with the advantage increasing to 0.19% during stress years, indicating better resilience, FTS-III shows a 0.26% higher system productivity among NICRA farmers in normal years. However, during stress years, system productivity in non-NICRA farmers drops to 64%, suggesting comparatively lower resilience and FTS-IV records a 0.43% higher system productivity among NICRA farmers in normal years. However, during stress years, system productivity in non-NICRA farmers declines sharply to 69.70%, highlighting their comparatively lower resilience to stress conditions. Interventions were structured across six modules (Natural resource management, Crop production, Livestock and Fisheries, Institutional interventions, Capacity building and Extension activities). KVKs across various districts implemented climate-resilient technologies under natural resource management, conducting 578 demonstrations benefiting 767 farmers over 201.06 hectares. KVKs implemented climate-resilient crop production technologies across 697 demonstrations, benefiting 1020 farmers over 410.1 hectares. KVKs implemented climate-resilient livestock and integrated farming technologies, conducting 371 demonstrations that benefited 940 farmers and covered various areas and units. CHCs facilitated mechanization across 438.08 hectares, benefiting 2,687 farmers and generating ₹6,98,226 demonstrating their critical role in enhancing agricultural productivity and resilience in the region. 129.87 hectares were brought under seed production, involving 353 farmers and



generating ₹49,12,200, reflecting the region's strong commitment to self-reliance. The capacity building programme conducted by KVKs have significantly engaged farmers, with a total of 159 programs benefiting 4534 individuals, comprising 1970 males and 2564 females. The extension activities conducted by KVKs under Zone-VII in 2025 have significantly engaged farmers, with a total of 252 programs benefiting 8297 individuals, comprising 4656 males and 3661 females

Success stories have also been compiled from various KVKs exemplify the program's impact, transforming rainfed farming systems, fostering community-wide adoption and have a positive impact on increasing in the productivity as well as farmers income. Interventions were structured across six modules, as detailed below:

Module I: Natural Resource Management

This module emphasized sustainable resource conservation to mitigate water scarcity, soil erosion, and moisture stress. Key demonstrations included micro-irrigation through Jalkund structures in Lunglei district, a total of 85 nos RWHs was constructed. This technology addressed rabi-season water deficits, increasing cropping intensity to 204% and net returns to Rs. 47,880/ha (B:C ratio 2.19). Low cost RWHs was constructed covering about 20 hectare not only in the village but also in the other neighbouring village. Increasing in the yield and economic income of Rs. 1,90,000, 78,000 and 37,000 for Cabbage, Tomato and Bean respectively. The adoption of paddy straw mulching further enhanced soil moisture retention, moderated soil temperature, and reduced evaporation losses and acted as an effective natural insulator, conserving soil moisture, suppressing weed growth and gradually enriching soil organic matter through decomposition, thereby improving soil health and microbial activity. Similarly, paddy straw mulch (3-5 tons/ha) was introduced for garlic cultivation in Langmeing village (KVK Mon, Nagaland) by farmer Smt. Angpa Konyak, increases soil moisture retention by about 20- 30%, reducing weed incidence by 50-70%, reduced irrigation requirement by 25-40% leading to 15-25% yield boosts and net returns of Rs. 1,19,500/ha (B:C ratio 2.97). These practices promoted efficient rainwater harvesting and soil health improvement in rainfed areas.

Module II: Crop Production

Interventions focused on climate-adaptive crop varieties and practices to counter erratic rainfall, heat stress, and pest issues. Climate-resilient practices adopted in early planting of cabbage in Siaha district help farmers reduce risks from weather variability and improve crop performance with a yield of 185 q/ha, net return of Rs. 1,96,200/ha and BC ratio of 2.96. Composting using locally available resources in Serchhip district improves soil fertility thus directly affecting the growth and yield of crop like Tomato and cabbage with a gross return of Rs. 3,88,492/ha and Rs. 2,97,447/ha respectively



and BC ratio of 2.94 and 3.2 respectively. Mr. Weto of Phek district adopted a low cost hydroponic cultivation system as a climate resilient technology under the NICRA programme. It also allows for year round cultivation of high value crops like lettuce, chinese cabbage, and king chilli. In a year he could cultivate 6 - 7 cycles and in 1 cycle he could earn Rs. 1500-2000/-. Adoption of high yielding improved variety of Maize HQPM-1 which has much shorter stature than local cultivars which highly reduces the risk of crop failure and obtained higher yield of 43.2 q/ha with quality produce, net income of Rs. 61,200/ha and BC ratio of 3.42

Module III: Livestock & Fisheries

This module integrated livestock and fisheries for diversified resilient income sources amid climate vulnerabilities. KVK Lawngtlai successfully demonstrated rearing of Rainbow rooster under a backyard system in Ngengpuikai village involving five number of farmers. The intervention resulted in improved growth performance, higher survivability, and enhanced egg and meat production, thereby increasing household income, nutritional security, and encouraging wider adoption of improved poultry practices in the village. In Liarkhla (KVK Ri Bhoi, Meghalaya), Mr. Elbertroni Ramde implemented an Integrated Fish cum Raised Floor Poultry Farming System, using poultry droppings as fish feed to produce phytoplankton and zooplankton, reducing costs for fertilizers and feeds and providing an average yield of 650K q/ha/yr (from 2 ponds), average net return of Rs. 45,000/ ha/yr on Duck and average net return of Rs. 45,000/ha/yr on poultry. The adoption of an Integrated Paddy-Piggery-Fishery Farming System under the NICRA project at Chandel by Ms. Nl. Huimila significantly improved the farmer's livelihood. The yield of RC Maniphou-15 paddy reached about 51.21 q/ha, generating an approximate gross return of Rs.99,500. From a single harvest of the fish pond, she obtained around 120 kg of fish, with a gross return of Rs.32,600. She earned approximately Rs.47,000 from the sale of pigs and an additional Rs.49,000 from the sale of 7 piglets. Mushroom cultivation (100 bags) provided an extra income of about Rs.42,000, especially during the lean winter period. Furthermore, the introduction of a secondary crop, mustard, resulted in an income of approximately Rs.36,000. Overall, by integrating multiple farming components, the farmer achieved a total gross income of around Rs.3,06,100

Module IV: Institutional Interventions

Collaborations with state departments and community structures bridged gaps in resource access and implementation. The performance of Custom Hiring Centres (CHCs) managed by KVKs under Zone-VII during 2025-26 reflects a robust effort to support smallholder farmers with access to modern agricultural implements. The seed production systems in NICRA villages demonstrated a robust and coordinated



effort to strengthen agricultural resilience, input self-sufficiency, and income diversification among farming communities. Implemented through the network of Krishi Vigyan Kendras (KVKs), the programme emphasized quality seed production of climate-resilient crop varieties suited to the region's diverse agro-climatic conditions. The participatory approach promoted farmer-to-farmer seed exchange, encouraged local entrepreneurship, and improved adaptability to erratic climatic conditions through the use of resilient varieties. The initiative has also built farmer capacity in scientific seed production, processing, and storage, making the NICRA seed programme in Zone-VII a model for sustainable and climate-smart agriculture. These institutional linkages facilitated participatory technology selection and monitoring, ensuring widespread adoption beyond NICRA villages.

Module V: Capacity Building

KVKs conducted awareness programs, trainings, and technical empowerment sessions to equip farmers and stakeholders. Across the districts various demonstration and hands on training has been conducted to benefit the farmers including capacity building on integrated rice cum fish farming, programme on vermicomposting, sustainable management of crop residue through oyster mushroom production, backyard poultry rearing, importance of RWHs, nursery raising and vegetable production under low cost poly tunnel, scientific bee keeping etc. Multidisciplinary teams analyzed historical weather data and yield trends, building adaptive capacity among over 100 farmers across districts.

Module VI: Extension Activities

On-farm demonstrations, field visits, and pilot trials promoted technology uptake. KVKs organized focus group discussions for intervention finalization and ongoing monitoring, such as animal health camp, field day on RC Maniphou-15, Finger backyard Poultry Rearing, mulching on winter vegetables, intercropping of Maize with soybean, Vaccination camp for Vanaraja etc. These activities fostered community engagement and evidence-based scaling of resilient practices.

Capacity building and extension activities played a crucial role in scaling the benefits. Through trainings, demonstrations, and exposure visits, farmers gained practical knowledge and confidence to adopt climate-resilient technologies. This led to higher adoption rates and measurable improvements in productivity, income stability, and risk reduction at the household level. Looking ahead, NICRA-TDC will focus on expanding its reach to more climate-vulnerable areas, integrating advanced technologies, and strengthening community institutions. Continued emphasis on adaptive strategies will be essential to safeguard food security, enhance livelihoods, and build long-term resilience in the face of escalating climate challenges in the region.



INTRODUCTION

The National Innovations in Climate Resilient Agriculture (NICRA) is a programme initiated in 2011 which aims to strengthen the resilience of Indian agriculture to climate change and extreme weather events such as droughts, floods, heat waves, and erratic rainfall. Through a combination of strategic research, technology development, capacity building, and field-level demonstrations, NICRA promotes climate-resilient technologies and management practices that enable farmers to adapt to changing climatic conditions while ensuring sustainable agricultural production, livelihood security, and food security. The Technology Demonstration Component (TDC) of NICRA focuses on validating and promoting location-specific climate-resilient technologies in climate-vulnerable districts across the country. By testing these interventions under real farming conditions and actively involving farming communities, the programme facilitates the adoption of suitable technologies that reduce climate-related risks, enhance farm resilience, and improve the sustainability of rural livelihoods.

Under NICRA, Krishi Vigyan Kendras (KVKs) play a pivotal role in translating climate resilience strategies into practical interventions at the village level. KVKs are responsible for identifying climate-related vulnerabilities, preparing village-level contingency crop plans, conducting demonstrations of climate-resilient technologies, and building the capacity of farmers to effectively respond to climatic uncertainties. The ICAR-Agricultural Technology Application Research Institute (ATARI), Umiam coordinates fifteen KVKs across the North Eastern Region that implement various activities under the NICRA Technology Demonstration Component. These KVKs serve as important linkages between research institutions and farming communities, ensuring that scientific innovations reach farmers in a timely and effective manner.

The interventions undertaken by NICRA KVKs are designed to address local climatic challenges while improving the overall resilience of farming systems. Activities include water resource management through farm ponds, rainwater harvesting structures, and efficient irrigation methods; soil health improvement through conservation agriculture, organic amendments, and integrated nutrient management; crop diversification and introduction of stress-tolerant crop varieties; integrated farming systems; livestock and fisheries-based interventions; and the promotion of renewable energy technologies. These initiatives help farmers adapt to climate variability, minimize production risks, and maintain stable farm incomes despite adverse weather conditions.



In intensive production systems, NICRA emphasizes the efficient utilization of natural resources such as land, water, nutrients, and energy while sustaining or enhancing productivity. The programme promotes resource-conserving technologies and climate-smart agricultural practices that improve input-use efficiency, reduce environmental degradation, and enhance the long-term sustainability of agricultural production systems. By integrating scientific knowledge with local farming practices, NICRA seeks to develop resilient production systems capable of withstanding climatic stresses without compromising productivity.

Selection of NICRA villages is based on their susceptibility to climatic risks and the vulnerability of local farming systems to weather-related stresses. Before implementing interventions, KVK teams conduct detailed assessments of the selected villages using historical weather data, natural resource inventories, farming system characteristics, socioeconomic conditions, and crop productivity trends. These assessments help identify major constraints and opportunities for climate adaptation, enabling the development of location-specific intervention plans that address the unique needs of each village.

NICRA interventions are therefore designed not only to reduce the immediate impacts of climate variability and extreme weather events but also to strengthen the long-term adaptive capacity of farming communities. Through the demonstration and validation of climate-resilient technologies, the programme encourages their wider adoption beyond NICRA villages, creating a multiplier effect across surrounding areas. By improving farmers' preparedness, enhancing resource-use efficiency, stabilizing agricultural production, and promoting sustainable livelihood options, NICRA contributes significantly to building resilient agricultural systems capable of coping with future climatic challenges. Ultimately, the programme supports the broader goal of achieving climate-resilient and sustainable agriculture while safeguarding the livelihoods of rural communities under changing climatic conditions.

The major objectives of the NICRA programme are:

1. To enhance the resilience of crop, livestock, and fisheries production systems against climate variability and climate change through the development, assessment, and adoption of improved production technologies and risk management strategies.
2. To demonstrate and popularize location-specific climate-resilient technology packages on farmers' fields, enabling farming communities to adapt effectively to existing and emerging climate-related risks.



3. To strengthen the capacity of scientists, extension personnel, farmers, and other stakeholders through training, awareness creation, and skill development in climate-resilient agricultural research and the practical application of research outcomes.

To achieve these objectives, NICRA was initially implemented through 100 Krishi Vigyan Kendras (KVKs) located in climatically vulnerable districts across the country. Recognizing the growing need for climate adaptation interventions, the programme was subsequently expanded by including an additional 21 KVKs during the Twelfth Five-Year Plan, thereby extending its geographical coverage and impact. The programme addresses climate change adaptation and mitigation in agriculture through an integrated approach encompassing crops, livestock, fisheries, natural resource management, and institutional support systems.

NICRA is implemented through four major components that collectively contribute to building climate-resilient agricultural systems. The first component focuses on strategic research aimed at understanding climate change impacts and developing suitable adaptation and mitigation technologies. The second component involves technology demonstrations conducted directly on farmers' fields to validate and promote climate-resilient technologies under real farming situations. The third component supports sponsored and competitive research projects designed to address critical knowledge gaps related to climate change and agriculture. The fourth component emphasizes capacity building and skill development among scientists, extension workers, farmers, and other stakeholders to facilitate the effective dissemination and adoption of climate-resilient technologies.

Among these components, the Technology Demonstration Component (TDC) serves as one of the most important mechanisms for transferring climate-resilient technologies to farming communities. The TDC focuses on demonstrating proven, location-specific technologies in climate-vulnerable villages to reduce production risks and improve the adaptive capacity of farmers. Through participatory approaches, farmers are exposed to improved crop varieties, stress-tolerant cultivars, integrated farming systems, efficient water management practices, improved livestock breeds, and other climate-smart agricultural technologies. These demonstrations generate immediate benefits in terms of improved productivity and risk reduction while also contributing to long-term resilience and sustainability of agricultural systems.

The Technology Demonstration Component further serves as a platform for generating field-based evidence on the effectiveness of climate-resilient interventions. The outcomes provide valuable insights for policymakers, researchers, and development



agencies, thereby supporting evidence-based decision-making and climate-resilient agricultural planning at local, regional, and national levels.

The planning and implementation of NICRA interventions follow a systematic and participatory process. Initially, a comprehensive assessment of the selected village is undertaken to identify climate-related vulnerabilities and existing constraints. This includes the analysis of long-term weather and climate data, evaluation of natural resource status, assessment of prevailing farming systems, and examination of institutional arrangements and support mechanisms available within the village. Particular attention is given to identifying major production constraints arising from climatic stresses such as drought, floods, prolonged dry spells, erratic rainfall, heat stress, and other extreme weather events.

To ensure that interventions are relevant to local needs, participatory rural appraisal techniques and focus group discussions are conducted with farmers, community leaders, women's groups, and other stakeholders. These consultations help identify priority issues and facilitate the selection of appropriate climate-resilient technologies and interventions. Based on the findings, a village-specific action plan is prepared and implemented.

NICRA interventions are generally organized under four major modules:

1. The Natural Resource Management module focuses on conserving and efficiently utilizing resources such as water, soil, and energy through interventions like farm ponds, rainwater harvesting, conservation agriculture, and renewable energy technologies.
2. The Crop Production module promotes climate-resilient crop varieties, improved agronomic practices, integrated nutrient management, and crop diversification strategies. The Livestock and Fisheries module addresses climate-related challenges in animal husbandry and fisheries through improved breeds, health management practices, fodder production, and resilient aquaculture systems.
3. The Institutional Interventions module strengthens community-based institutions, custom hiring centres, seed and fodder banks, weather-based agro-advisories, and other support systems that enhance the adaptive capacity of farming communities.

Collectively, these interventions contribute to strengthening the resilience of farming systems by reducing vulnerability to climatic stresses, enhancing resource-use efficiency, stabilizing farm productivity, and improving livelihood security. By promoting sustainable agricultural practices and strengthening the adaptive capacity



of farmers, NICRA plays a significant role in advancing climate-resilient agriculture and ensuring long-term sustainability of agricultural production under changing climatic conditions.

The vulnerabilities of the respective KVK districts are mentioned here below:

Table 1.1: List of districts and KVKs with Climate vulnerability

State	District	Agro-Climate Zones	Vulnerability
Manipur	Chandel	Sub-Tropical Plain Zone	Drought/ Water stress
	Senapati	Sub-Tropical Plain Zone	
	Ukhrul	Sub-Tropical Plain Zone	Frost/ Soil Erosion
Meghalaya	Jaintia Hills	Sub-Tropical Plain Zone	Drought/ Cold wave
	Ri Bhoi	Mid-Tropical Hill Zone	Drought/ Water stress/ Frost/ Hailstorm
	South Garo Hills	Sub-Tropical Plain Zone	Drought/ Water stress/ Cold wave
	West Garo Hills	Sub-Tropical Plain Zone	Drought/ Water stress
Mizoram	Lawngtlai	Sub-Tropical Plain Zone	Drought/ Water stress/ Cold wave
	Lunglei	Sub-Tropical Plain Zone	Water stress
	Siaha	Sub-Tropical Plain Zone	Drought/ Water stress/ Cold wave
	Serchipp	Mid-Tropical Hill Zone	Drought
Nagaland	Phek	High Hill Zone	Drought/ Erratic rainfall/ Water stress
	Mon	Upper Brahmaputra Valley Zone	Drought/ Soil erosion
	Tuensang	High Hill Zone	Drought/ Cold wave/ Frost
Tripura	Sepahijala	Mid-Tropical Hill Zone	Flood/ Soil erosion

These districts are selected based on the following criteria besides the strength of the KVKs:

- Drought proneness based on 30 years rainfall data (Source: IMD)



- Cyclone proneness based on frequency as recorded by IMD/State Disaster Management agencies.
- Flood proneness based on IMD data and NDMA maps.
- Vulnerability to heat wave and cold wave based on IMD grid data on temperatures.
- Actual incidence of floods and drought as recorded by AICRPAM centres

Table 1.2: Villages adopted by NICRA implementing KVKs of Zone VII

Name of KVK	Name of Village
Chandel	Lambung, Chandel Christain.
Senapati	Hengbung, Mayangkhang, T.Khullen & Parengba
Ukhrul	Ramva, Lungsang, Kazipphung & Lungsang Chingthak
Jaintia Hills	Umjalasiew, Mukhnang, Namdong, Wahiajer & Niriang
Ri Bhoi	Thadnongiaw, Mawbri, Liarkhla, Liarbang & Kdonghulu
South Garo Hills	Asugre, Balwatgre
West Garo Hills	Bagugre, Marapara & Makalpara
Lawngtlai	Chawnhu & Ngengpuikai
Lunglei	Hnahthial, Thiltlang, Tuipui D & S.Vanlaiphai
Siaha	Tisopi, Chhaolo
Serchipp	N.Vanlaiphai, Lungchhuan, Chekawn, Sailulak & Leng
Phek	Thipuzu, K. Basa, Phusachodu, Kikruma & Pfutseromi
Mon	Ngangching, Sowa Changle, Langmeing & Totok Chingha
Tuensang	Chendang, K. Wongthu & Saoshou
Sepahijala	Golaghati

NICRA villages were selected based on the vulnerability of their agricultural systems to climate variability and extreme weather events. Multidisciplinary teams from Krishi Vigyan Kendras (KVKs) conducted detailed assessments using historical weather data, resource availability, farming systems, and crop yield records to identify key constraints and opportunities for intervention. The findings highlighted the need for technological support, capacity building, and community-based approaches to strengthen resilience



against climatic challenges such as droughts, erratic rainfall, floods, heatwaves, and cyclonic storms.

Based on these assessments, location-specific action plans were developed and implemented across fifteen KVK districts in Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. The interventions focused on crop production, natural resource management, livestock and fisheries development, water harvesting, and other climate-resilient agricultural practices. These technologies were demonstrated through participatory approaches involving farmers directly, ensuring their suitability and encouraging wider adoption. As a result, NICRA villages have evolved into important learning centres for showcasing and disseminating climate-resilient technologies, contributing to enhanced adaptive capacity, sustainable agricultural production, and the promotion of resilient farming practices across the region.



Fig 1.1: NICRA districts under ICAR-ATARI, Zone-VII, Umiam, Meghalaya



RAINFALL CHARECTERISTICS DURING 2025-2026

The monthly average rainfall recorded at the NICRA adopted villages during the month of April 2025 – March 2026 in mm is as under:

Table 2.1: Actual rainfall received during April 2025 – March 2026 in mm

KVK/ Months	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Chandel	55.8	248.2	237.8	268.7	239.6	234.6	143.4	16.3	0.0	0.0	0.0	124.0
Ukhrul	56.9	271.6	279.4	304.1	200.5	261	41.2	20.8	0	0	0	0
Senapati	46.1	353.6	298.3	268.7	391.5	117.7	164.6	32	0.3	0.0	0.0	112.3
Jaintia Hills	155.5	661.7	1219.6	1528.8	1695.1	956.3	363.1	24.4	3	8.7	23.4	212.3
Ri Bhoi	24.4	415.8	441.6	400	330	230	100	50	10	8.1	4.7	24.2
South Garo Hills	191.2	471.5	234.7	228.9	388.4	256.6	61.6	41.2	0	0	0	86.6
West Garo Hills	206.4	488.2	252.2	227.4	399.2	268.5	67.8	38.4	0	0	0	99.2
Lawngtlai	55.9	549.0	501.7	467.4	361	316.7	164.9	51	0.0	0.0	0.0	0.0
Serchhip	42.1	164	225.4	150.7	136.4	158.2	108.8	12.3	0	0	0	3.15
Lunglei	49	397	462.5	358.5	333	378.5	212	36	0	0	0	0
Siaha	85.0	573.0	539.4	539.7	348.0	424.6	154.8	64.4	0.0	0.0	0.0	0.0
Mon	229.8	132	537.6	329.6	280.8	224	123.3	9.2	0.2	14.7	20.1	23.7
Phek	23.2	208.0	256.2	277.8	261.4	62.2	147.6	25.4	0	0	10.8	20.8
Tuensang	92.0	343.8	219.9	240.7	358.5	409.5	145.2	53.9	0.0	0.0	2.9	0
Sepahijala	32.4	166.9	199.3	104.2	404.4	113.8	56.7	84	63	0.00	0.00	53.8

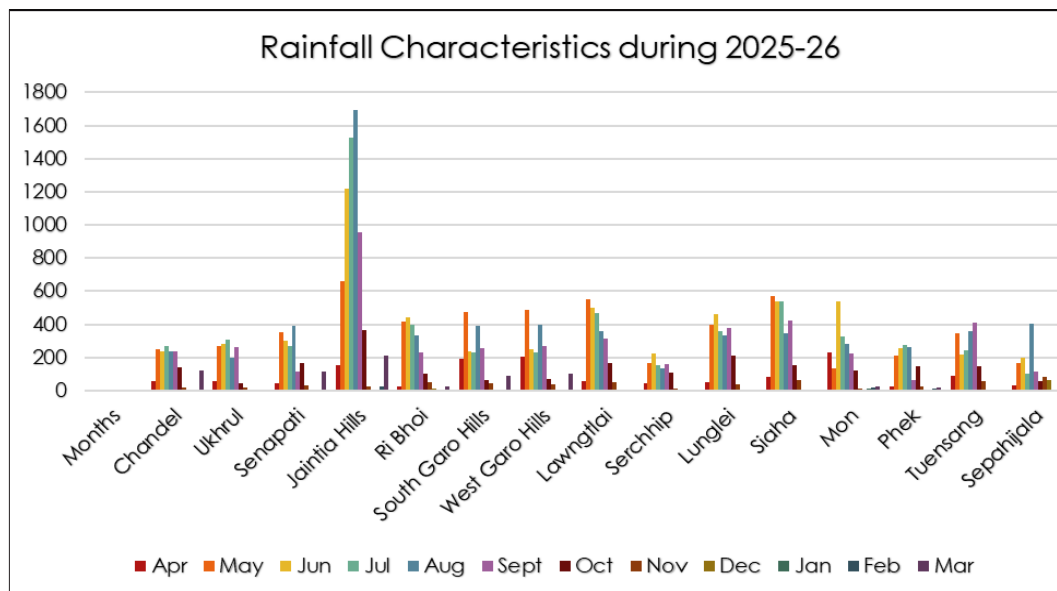


Fig 2.1: Rainfall Characteristics during 2025-26

The rainfall characteristics in Zone-VII, as observed during 2025-26, exhibit significant variability influenced by the monsoon and seasonal shifts. Data from districts such as Chandel, Ukhrul, Senapati, Jaintia Hills, Ri Bhoi, South Garo Hills, West Garo Hills, Lawngtlai, Serchhip, Lunglei, Siaha, Mon, Phek, Tuensang, and Sepahijala shows that the peak rainfall months are mostly May to August, suggesting a monsoon-driven pattern. Some districts receive minimal rainfall outside the monsoon season. Jaintia Hills receives the highest rainfall among all districts, peaking around 1500–1700 mm in July–August, significant rainfall compared to other months and districts. This heavy rainfall is critical for kharif crops but also leads to challenges such as flash floods, soil erosion and water logging which may impact agriculture. Siaha, Lunglei, Lawngtlai and South Garo Hills received moderate rainfall ranging 200–500 mm, mainly in monsoon months. Districts like Chandel, Phek, Sepahijala receive comparatively less rain often under 300–400 mm, with peak during May–July, indicating a more drought-prone condition. In contrast, the post-monsoon period from October to March shows a sharp decline, with minimal precipitation, resulting in moisture stress and dry spells that impact rabi season crops like vegetables and mustard. This seasonal pattern underscores the need for climate-resilient agricultural practices, such as flood-tolerant varieties and water harvesting techniques, to mitigate the effects of erratic rainfall and ensure sustainable farming in the region.



SEASONAL VULNERABILITIES AND CLIMATIC CHALLENGES IN NICRA VILLAGES

In Northeast India, agricultural production is highly vulnerable to climate variability, with the nature and intensity of risks differing across seasons, crops, and growth stages. During the Kharif season, farmers frequently face prolonged dry spells, erratic and heavy rainfall, intermittent waterlogging, floods, heat and moisture stress, hailstorms, soil erosion, and increased pest and disease incidence. These climatic stresses adversely affect critical crop growth stages such as seedling establishment, vegetative growth, tillering, flowering, booting, tasseling, pegging, milking, grain filling, fruit development, and maturity.

Major crops affected include rice, maize, groundnut, soybean, potato, French bean, king chilli, cucumber, and other vegetables. For example, in Serchhip district, excessive and erratic rainfall often causes intermittent waterlogging, adversely affecting the pre-flowering stage of French bean and maize, leading to poor crop growth and reduced yields. Similarly, in Tuensang district, inclement weather coupled with intensive and erratic rainfall during June–August affects the vegetative and grain-filling stages of rice and millets, maturity of maize, vegetative growth of soybean and tomato, harvesting of potato, and flowering and fruiting stages of chilli. These weather-related stresses result in yield losses, reduced crop quality, and increased production risks, highlighting the need for climate-resilient agricultural interventions and adaptive farming practices.



Drought affected



Erratic rainfall





High pest and diseases incidence

Table 3.1: Vulnerabilities in Kharif season and crop stage

KVK	Major vulnerabilities	Major vulne	Stage of crop affected	No. of days	Contingency measures adopted
Chandel	Dry spell & Erratic Rainfall	Kharif	Flowering & Milking -dough stage & grain filling in paddy	17	Mid duration paddy RC Maniphou-15
			Flowering & pegging in groundnut	11	Improved high yielding groundnut var. ICGS-76
			Tasseling stage in Maize	14	Intercropping of maize with groundnut
	Intense Rainfall	Kharif	Vegetative stage, Flowering	2	Shade nets
Senapati	Moisture stress	Kharif	Vegetative stage	8	Jalkund and Mulching
Ukhrul	Intensive rain	Kharif	Seedling stage in king chilli	2	Net house for seedling and intercropping system.
West Jaintia Hills	Flash floods	Kharif	Seedling to Vegetative stage	4	Ridge and furrow method of planting, drainage management
	Hailstorm	Kharif	Flowering to maturity stage	2	Walk-in tunnel for protected cultivation
Ri Bhoi	Drought & dry spell	Rabi and Kharif	Seedling and flowering	Variable	Jalkund, nursery raising, Crop diversification, intercropping, IFS, community seed banks
	High temp & RH & cold stress (hailstorm & frost).	Rabi and Kharif	Growth stage	Variable	IFS with low cost Raised Floor Poultry (Vanaraja) Housing with scientific feeding, IFS with pig breeds (Lumsniang)



South Garo Hills	Climate uncertainties	All growth and reproductive stages	Risk of occurrence of disease		Integrated Duck cum Fish Farming.
West Garo Hills	Flash flood	Kharif	Rice – Grain filling stage	3-5 days	Ranjit Sub 1 and Bahadur Sub 1
	Seasonal drought	Kharif	Less rainfall during rice transplanting	8 days	Ranjit Sub 1, Bahadur Sub 1 and Gitesh
Lwangtlai	Soil erosion and water stress	Kharif	vegetative	15-30	earthing up and growing cover crops
Lunglei	Water Stress, Heat Stress & Occurrence of frost	Rabi, Kharif	Seedling & Vegetative Stage	Kharif-18days Rabi-21days	Jalkund, Farm Pond renovation, Construction of Poly houses, Tunnel etc.
Serchhip	Excessive & Erratic Rainfall	Kharif	Pre flowering in french bean and maize	40 days	Ridge and furrow , broad bed and furrow method of cultivation
Mon	Intensive rain	Kharif	Tillering stage, Panicle initiation stage and grain filling stage.	5	Water management, Bund planting of Soybean in Paddy Field. Crop diversification.
Tuensang	Inclement weather	Kharif	Vegetative and grain filling of rice and millets	May-June	A resilient crop Pearl millet
		Kharif and Rabi			Backyard poultry Rainbow Rooster, Broiler duck White pekin, Mushroom cultivation using paddy straw
	Erratic rainfall	Kharif	Grain filling and maturity of maize	June- Aug	Use of high yielding variety HQPM-1
			Vegetative stage of soybean	June- Aug	Use of high yielding variety RVSM 1135.
	Intensive and erratic rainfall	Kharif	All stages of tomato	June- Aug	Use of Arka Samrat & late sowing in September
			Maturity and harvesting of Potato	June-Jul	Early planting in Feb of Kufri Jyoti.
			Flowering and fruiting in chilli	June-Jul	Use of improved var. Black beauty
Sepahijala	Flood	Kharif Season	Seedling Stage	15	Application of 1% KCL and proper drainage facility



During the Rabi season, agriculture in Northeast India is primarily affected by drought, prolonged dry spells, water scarcity, low temperatures, frost, cold waves, cold stress, and occasional heat stress. These climatic challenges impact critical crop growth stages such as germination, vegetative growth, head formation, flowering, reproductive development, fruit setting, fruit maturation, and grain filling in crops like mustard, pea, toria, French bean, cabbage, cauliflower, broccoli, garlic, tomato, and other winter vegetables.

For instance, in West Garo Hills, seasonal drought conditions from November to March reduce soil moisture availability and adversely affect head formation in cabbage as well as flowering and fruit development in tomato, leading to lower productivity and crop quality. Similarly, in Serchhip, prolonged water stress lasting up to 150 days affects vegetative growth, flowering, fruit maturation, and overall crop development, resulting in significant yield reductions. Across districts such as Lawngtlai, Mon, Phek, and Tuensang, recurring droughts and erratic rainfall patterns affect crops during both Kharif and Rabi seasons. The increasing frequency and intensity of such weather extremes highlight the importance of adopting climate-resilient technologies, efficient water management practices, stress-tolerant crop varieties, and other adaptive measures to sustain agricultural productivity under changing climatic conditions.

Table 3.2: Vulnerabilities in Rabi season and crop stage

KVK	Major vulnerabilities	Season (Kharif/ Rabi/ Both)	Stage of crop affected	No. of days	Contingency measures adopted
Chandel		Rabi	Germination, Vegetative and reproductive stage of winter vegetables and Mustard	125	Mulching, Jalkund, Mushroom cultivation
Ukhrul	Moisture stress Rice fallow	Rabi	Flowering, Fallow land	110	Field Pea Aman after paddy
West Jaintia hills	Dry Spell	Rabi	Vegetative to flowering stage	32	Mulching, drip irrigation from jalkund
	frost	Rabi	Flowering to maturity stage	9	Protected cultivation
	Cold waves	Rabi	Germination to early Vegetative stage	16	Mulching, Nursery protection, use of cover crops, pig pen model with saw dust as a flooring material



South Garo Hills	Drought	Rabi	Head formation and filling stage	124 days	Jalkund Supplemental irrigation in Cabbage
	Low temperature stress	Rabi	Flowering and fruiting in cucumber		Cultivation under Naturally Ventilated polyhouse
West Garo Hills	Drought	Rabi	Cabbage – Head formation stage Tomato – Flowering and fruit development stage	Nov. to March	Jalkund and paddy straw mulching
Lawngtlai	Moisture stress	Rabi	Germination, early seedling stage, Flowering & Fruiting stages in Watermelon	30	Plastic mulching, Use of resistant varieties, Crop rotation, Soil solarization
	Erratic rainfall, Moisture stress, prolong dry spell, heat & Cold stress Pests & Diseases outbreak	Rabi	Seedling and reproductive stage in Garden pea	40-50	Seed treatment, Weed management. Use of resistant varieties
	Soil erosion and water stress	Rabi	Seedling and Fruiting stage in Tomato	Seedling- 28 days Fruiting-49 days	Nursery & seedling, Seed treatment, Soil sterilization, Use of resistant varieties
	Heat & Cold stress, Moisture stress	Rabi	Seedling and Head formation stage in Cabbage	42 days	Nursery, Seed treatment, Crop rotation. Use of resistant varieties Intercropping
Siaha	Dry Spell	Rabi	Tomato- Vegetative to early flowering stage French bean- Poor seed germination and uneven plant stand	71 52	Community Nursery Broad-bed and furrows
			Broccoli- Seedling stage, vegetative stage and weak root development	72	Mulching
Serchhip	Water stress	Rabi	vegetative stage, fruit maturation, flowering and reduce crop yields	150 days	Jalkund, Piggery & Backyard poultry



Phek	Drought	Rabi	Vegetative stage, pre mature flowering, pod formation; heading, seed formation	62	Drought tolerant variety, Straw mulching, early sowing
Mon	Drought	Rabi	Germination and Pod development stage in Pea, bulb formation in garlic. Flowering & pod filling stage in Toria.	113	Early planting of pea, Zero tillage. Paddy straw mulch. And Jalkund.
Tuensang	Drought & dry spell	Rabi	Vegetative stage & head formation of Broccoli	Nov-Feb	Polymulching, & drought tolerant variety Green Magic.
	Cold stress	Rabi	Flowering & pod filling stage of Garden pea	39 days	Use of short duration early variety KSP 110 to escape drought
			Vegetative & head formation stage of Cabbage		Polymulch and improved variety Wonder Ball

Table 3.3: Key Climatic and Resource Challenges in Major Farming System Typologies of NICRA Villages.

KVK	Farming System Typologies	Climate Constraints	Resource/ crop/ Animal constraints	Other Constraints
Chandel	Rainfed upland without animal-I	Long dry spells erratic rainfall, Rise in temperature	Soil Erosion, Low soil moisture and fertility	Jhum cultivation, water scarcity during rabi, and increasing pest and disease pressures.
	Rainfed midland without animal-II		Non utilized rice fallow, Low soil moisture and fertility	Monocropping, long-duration crops, rabi water scarcity, increasing pests, diseases, weeds, and stray cattle problems.
	Rainfed midland with animal-III		Low soil moisture and fertility Low availability of good breed of livestock	Water scarcity during rabi season. Disease. Paddy straw burning
Senapati	Rainfed Upland (Hills with steep slopes)	Soil erosion	Low soil fertility	Low soil depth due to draining of top soil.
	Rainfed Upland without animal(Hills with mild slopes)	Temperature stress, Erratic rainfall, cold wave	Lack of suitable crop	Prolonged dry spell & cold wave in winter



	Rainfed Upland with animal (Hills with mild slopes)	Temperature stress, soil erosion	Degradation of grazing ground	Moisture stress, shallow soils, and limited fodder cultivation
	Hill and rainfed terrace rice cultivation	Temperature stress, excessive rainfall	Loss of plant nutrients non availability of Drought resistant var.	Low soil fertility, moisture stress
Ukhrul	Rainfed Upland without animal (Hills with mild slopes), Rainfed Upland with animal (Hills with mild slopes) Rainfed Upland (Hills with steep slopes)	Change in rainfall pattern, Terminal drought and Increase in Temperature	Soil Erosion, Jhuming, Low soil fertility, Moisture stress, Unavailability of quality breed & feeds for Animals --Poor quality seed storage and insect infestation	Rice fallow, Paddy straw burning, Improper and unhygienic shelter for pigs and other livestock Ineffective resource utilization of farm
West Jaintia Hills	FS-1: Rainfed with animals	Erratic rainfall, prolong dry spell during rabi season, cold waves	Low soil fertility due to wash away of top soil during rainfall, fodder scarcity during lean period, low productivity of local livestock	Poor market access, small land holding, limited access to inputs and technologies
	FS-2: Plains in the valleys with animals	Water logging and flash floods during kharif, frost during rabi	Pest and disease incidence especially in vegetables, limited drainage system, livestock disease	Labour shortage during season, poor storage facilities
Ri Bhoi	Rainfed without animal (FST-1)	Water scarcity in Rabi season. Soil & water runoff. High intensity rainfall, frost and cold wave	Paddy, vegetables, Pigs, poultry	
	Rainfed with animal (FST-2)	Low output due to aberrant weather, poor resource utilization. Increased mortality due to high temp & cold stress	Poultry, pigs, fish, duck	
South Garo Hills	FST-II; Rainfed Midland with animal	Drought and low temperature (<i>rabi</i>) High temperature & Relative Humidity (Climate uncertainty)	High parasitic infestation in livestock. Low productive performance of livestock	Soil erosion Poor soil fertility Limited availability of feeds and fodder



	FST-III: Rainfed Lowland with animal	Erratic rainfall (pre-rabi). High relative humidity, Flash Flood	Long duration of local paddy and Toria. High parasitic infestation	Soil moisture stress Poor soil fertility Limited availability of feeds and fodder
	FST-IV: Irrigated Lowland with animal	Flash Flood, Drought during Rabi season High relative humidity	High infestation of pest and diseases in crops Thermal stress in pig. High parasitic infestation in livestock	Soil moisture stress, Poor soil fertility, Limited availability of feeds and fodder
West Garo Hills	Rainfed Midland with Animal FST-1	Erratic rainfall, Flash flood, Occasional drought	Low mechanization, limited irrigation infrastructure, limited access to quality seeds, low-yielding indigenous crops and livestock and veterinary care	Remoteness, market inaccessibility, low extension reach
	Rainfed Lowland with Animal FST-2 and FST-3	Erratic rainfall, Flash flood, Occasional drought	Limited irrigation infrastructure, low-yielding indigenous crops and livestock, input scarcity, poor fodder availability	Remoteness, lack of organized farmer groups, inadequate storage facilities
Lawngtlai	Rainfed Upland without Animal	Erratic rainfall, soil erosion, high temperature, windstorm, soil acidity, moisture stress during the growing season	Less availability of inputs supply (Seeds, Seedlings, feeds etc), unutilized rice fallow, low soil fertility	Pest and disease outbreaks (Crops & livestock), problem on weeds
	Rainfed Upland with Animal	Erratic rainfall, soil erosion, high temperature, windstorm, soil acidity, moisture stress during the growing season	Less availability of inputs supply (Seeds, Seedlings, feeds etc), unutilized rice fallow, low soil fertility	Pest and disease outbreaks (Crops & livestock), problem on weeds
	Rainfed Lowland without Animal	Erratic rainfall, high temperature, moisture stress, prolong dry spell, heat & Cold stress	Less availability of inputs supply (Seeds, Seedlings etc),	Pest and disease outbreaks (Crops & Livestock), Problem on weeds
	Irrigated Lowland with Animal	Erratic rainfall, high temperature, heat & cold stress, moisture deficiency, long dry spells	Less availability of inputs supply (Seeds, seedlings, animal feeds etc), poor hygiene of animal shelter	Pest and disease outbreaks (Crops & Livestock), Problem on weeds



Lunglei	Rainfed upland without animal. Rainfed upland with animal. Plain in the valley without animal.	Water stress, Moisture stress, Occurrence of frost	Resource, Crops, Animal	
Siaha	Rainfed Upland with animal (Hills with steep slopes)	Water stress, Erratic rain fall, Heat stress, High run-off, Moisture stress in rabi, Soil & Water erosion	Crop pest and diseases, scarcity of water storage structure, High mortality in Poultry	-
	Rainfed Upland with animal (Hills with mild slopes)	Water stress, Erratic rainfall, Moisture stress High humidity	Scarcity of water storage structure, Prone to pest and diseases	-
Serchhip	Rainfed Upland (Hills with steep slopes)	Excessive & Erratic Rainfall, High velocity of Runoff resulting top soil & nutrient loss, profuse & heavy weed infestation	Less compatible component in Cropping system, Low availability & adoption of suitable HYV, low nutrient status, pest & disease	Pest infestation due to improper/poor storage.
	Rainfed Upland without animal (Hills with mild slopes)	Erratic rainfall, intermittent waterlogging and drought, soil erosion and nutrient loss, severe weed infestation, frost, moisture stress, and water scarcity.	Less compatible component in Cropping system, Low availability & adoption of suitable HYV, low nutrient status, pest & disease, acid soil, rainfed with no means of irrigation during Rabi & Summer.	Pest infestation due to improper/poor storage.
	Rainfed Upland with animal (Hills with mild slopes)	Erratic rainfall, intermittent waterlogging and drought, soil erosion and nutrient loss, severe weed infestation, frost, moisture stress, and water scarcity. Mortality and morbidity losses due to biotic & abiotic stresses in animal,	Less compatible component in Cropping system, Low availability & adoption of suitable HYV, low nutrient status due to runoff losses & low average nutrient consumption, acid soil, rainfed with no means of irrigation during Rabi & Summer, pest & disease Non rearing of dual purpose poultry bird, Green Fodder scarcity during winter	Pest infestation due to improper/poor storage.



	Plains in the valleys without animals	Moisture stress , high rate of evapotranspiration due to low humidity during rabi season.	Water scarcity during winter, Late sown & low average nutrient consumption, acid soil, pest & disease	Pest infestation due to improper/poor storage.
Phek	FST 1 and FST 2	Heavy rainfall during Kharif and drought during Rabi and hailstones	Crop - wilting/damping/ Plant nutrient loss/moisture stress Animal - Respiratory infections/viral disease	Soil erosion, mud slide, run off, Farm mechanization, high input cost
Mon	Rainfed Upland with animal (Hills with steep slopes)	Erratic rainfall- Heavy rains and long dry spells. High intensity rainfall causing soil erosion and nutrient leaching. Temperature variability.	<u>Resource</u> Limited access to quality inputs, mechanization, market infrastructure, and extension services. <u>2. Crop</u> Soil fertility depletion, pest and disease incidence and low adoption of improved crop varieties. <u>3. Animal</u> Low livestock productivity	Loss in soil fertility and productivity. Socio economic constraints like high labour and input cost, limited access to credit, subsistence farming, Reluctance to adopt new technologies.
Tuensang	Rainfed Upland with Animal (FST 1) Rainfed Upland without Animal (FST 2)	Drought & dry spell Cold stress Intensive & erratic rainfall	Less availability of improved varieties & livestock breeds	Logistic transportation and marketing problems in remote villages.
Sepahijala	Rainfed with animal	Flood	Paddy	Water stress during Rabi season



ADOPTION OF SUCCESSFUL INTERVENTIONS

List of successful interventions adopted in the NICRA villages is as follows:

4.1 Natural Resources Management

KVKs across the North Eastern Region successfully implemented a range of climate-resilient Natural Resource Management (NRM) technologies to strengthen agricultural resilience against climate variability and resource degradation. During the reporting period, 523 demonstrations were conducted covering 172.26 hectares and 46 units, benefiting 767 farmers across multiple districts.

The interventions focused on improving soil health, conserving moisture, enhancing water-use efficiency, managing acid soils, reducing waterlogging, and minimizing pest and disease incidence. Key technologies demonstrated included mulching, intercropping, Jalkund-based rainwater harvesting, vermicomposting, minimum tillage, gravitational drip irrigation, ridge and furrow cultivation systems, and Integrated Farming Systems (IFS).

A notable success was observed in Chandel district, where 51 demonstrations covering 9.5 hectares and 18 units enabled farmers to adopt water conservation and intercropping practices, leading to improved crop productivity and efficient utilization of natural resources. In Ukhrul district, 108 demonstrations benefited 156 farmers over 34.8 hectares through soil management practices, enhancing crop performance under erratic rainfall conditions. Similarly, West Garo Hills implemented 66 demonstrations covering 10.3 hectares, while Sepahijala conducted 65 demonstrations over 15.4 hectares benefiting 125 farmers. In Mon district, 55 demonstrations covering 26.5 hectares promoted climate-resilient cultivation practices and efficient water management among 100 farmers.

The interventions have demonstrated the potential of sustainable resource management practices in improving productivity, conserving natural resources, and supporting climate-resilient agriculture in the region.



Table 4.1.1: Successful interventions under NRM module

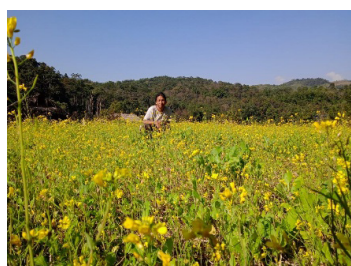
KVK	Climate Resilient Technology	No. of Demonstration	No. of farmers covered	Area covered (ha)
Chandel	Mulching in cabbage	7	7	1.5
	Rain water harvesting Jalkund	5	5	6 units
	Intercropping of groundnut with maize	12	12	3
	Low cost shade net	6	6	6 units
	Vermicomposting	6	6	6 units
	Growing of mustard var. PM-27 after paddy	15	15	5
Senapati	Rain water harvesting Jalkund	5	5	0.1
	Construction of farm pond	3	3	0.5
	Mulching in winter vegetables	8	8	2
	INM in cole crops	16	16	2
	Drip irrigation in fruit crops	1	1	1
Ukhrul	Escaping moisture stress by early planting in pea – Vr. England	39	39	16.5
	Intercropping of Groundnut and maize	27	27	10
	Mushroom production	8	56	8 units
	Mulching in King Chilli	12	12	2.3
	Cover crops – French bean	10	10	3.5
	Millets as drought –resistant and hardy crops	12	12	2.5
Jaintia Hills	Jalkund	4	4	5.5
	Vermicomposting unit	10	16	10.4
	Mulching with paddy straw	10	10	7.6
	Paddy-Ridge and furrow system of planting potato	10	10	6.2
	Paddy- Vegetables in furrow raised beds	10	10	3.8
	Paddy- Pea in furrow raised beds	10	10	1.6
Ri Bhoi	Rain water harvesting through Jalkund	10	10	1.0



South Garo Hills	Gravitational Drip irrigation through harvested water in Jalkund	5	5	0.25
	Vermi-composting	20	20	20 units
West Garo Hills	Jalkund	5	5	2.60
	Vermicomposting	15	15	-
	Paddy straw mushroom production	20	20	-
	Winter vegetable production using paddy straw mulch	18	18	4.20
	IFS (Fish + Duck + Hort. Crops)	8	8	3.50
Lwangtlai	Black Polymulching of Water Melon	5	5	2.5
	Cabbage	5	5	2.0
Lunglei	Low cost Rain water harvesting	3	3	0.75
	RCTs	8	13	2.0
	Low cost RWHs/Renovation of farm pond	5	15	3.5
	Renovation and recharging of farm pond/	2	5	5
Siaha	Farm pond renovation		10	NA
	Broad bed & Furrows		40	10
	Mulching technology (Broccoli)		5	2
Serchhip	Jalkund	6	6	0.9
	Mulching to increase productivity (tomato)	3	3	0.1
Phek	Straw mulching in Broccoli for In-situ moisture conservation	10	10	1
	Minimum tillage in Field Pea	8	2	2
	Integrated Farming System	1	1	0.5
Mon	Paddy straw mulch in Pea. (Arka Apoorva)	27	45	13.0
	Zero tillage in late sown and drought tolerant Toria (TS-67).	13	26	6.0
	Paddy straw mulch in Garlic.	14	28	7.0
Tuensang	Polymulching in Broccoli var. Green Magic)	4	4	2
	Oyster Mushroom Cultivation	1 unit	10	0.005
	Polyhouse for year round production of vegetables.	1 unit	5	0.056



Sepahijala	Intervention on mustard under minimum tillage	10	10	2.1
	Intervention on Potato Variety Kufri Jyoti under paddy straw mulching	10	30	3.3
	Intervention on slurry method of phosphorus management in paddy	20	60	6.8
	Demonstration on Garden pea under rice fallow	10	10	1.1
	Intervention on Tomato (Variety: Arka Rakshak) under paddy straw mulching	5	10	1.5
	Intervention on Bitter gourd under paddy straw mulching	5	5	0.6



Zero Tillage in Toria TS-67



Paddy Straw mulch in Garlic



Winter vegetables production using straw mulch



Low cost water harvesting unit



Paddy straw mushroom production



Zorin bean cultivation

4.2 Crop Production

To enhance climate resilience and sustain agricultural productivity under changing climatic conditions, KVKs across the North Eastern Region implemented climate-resilient crop production technologies through 699 demonstrations covering 370.7 hectares and 69 units, benefiting 1,022 farmers.



The interventions focused on the promotion of improved and stress-tolerant crop varieties, crop diversification, intercropping systems, protected cultivation, community nurseries, mushroom cultivation, and climate-smart agronomic practices. These technologies helped farmers mitigate the impacts of erratic rainfall, moisture stress, flooding, and changing weather patterns while improving crop productivity and income opportunities.

In Chandel district, improved varieties of soybean, paddy, groundnut, and mushroom cultivation were demonstrated over 41.5 hectares, Ukhrul district successfully introduced paddy-field pea cropping systems, mushroom cultivation, and early planting of garden pea to overcome moisture stress and optimize land use during the rabi season covering 56 hectares. Jaintia Hills promoted climate-resilient agricultural practices through cultivation of mushrooms, local millets, protected vegetable production, and submergence-tolerant paddy varieties, benefitting 104 farmers and thereby reducing crop losses from excessive rainfall. In West Garo Hills, climate-resilient paddy and winter crop cultivation strengthened farmers' adaptive capacity to climatic variability. The districts of Lawngtlai and Lunglei promoted intercropping systems and stress-tolerant crop varieties across 61.5 hectares and 117 farmers. In Siaha, early planting of cabbage and establishment of community nurseries enabled timely crop establishment and increased access to quality planting materials for 180 farmers. Tuensang demonstrated improved varieties of potato, maize, pea, millets, tomato, chilli, cabbage, and soybean over 76.5 hectares, contributing to higher productivity and crop diversification. Similarly, Mon and Sepahijala districts promoted composting and short-duration varieties of cabbage, tomato, paddy, and mushroom, helping 312 farmers adapt to shortened growing seasons and variable weather conditions.

Table 4.2.1: Successful interventions under Crop Production module

KVK	Climate Resilient Technology	No. of Demonstrations	No. of farmers covered	Area covered (ha)
Chandel	Cover crops using improved varieties of soybean (DSb-19)	14	14	4.5
	Cultivation of mid-duration paddy (RCM-13 & 15)	22	22	13
	Crop diversification through climate resilient oil crop (Groundnut-ICGS-76)	12	12	24
	Mushroom cultivation (<i>Pleurotus spp</i>)	15	15	15 unit



Senapati	Nutritional garden with climate coping vegetables	20	20	0.2
	Year round mushroom cultivation	10	10	-
	Cultivation of King chilli	16	16	2
	Polytunnel for vegetable production	3	3	0.1
Ukhrul	Sequential cropping of Field Pea - Aman after paddy RC Maniphou 13	10	10	8
	Mid duration varieties of paddy RC Maniphou 16	24	24	16
	Black rice	10	10	8
	Set Net house	6	6	6 units
	Paddy cum fish culture	26	26	20
	Escaping moisture stress in Garden pea by early planting	10	10	4
	Mushroom production	4	18	4 units
Jaintia Hills	Oyster mushroom production	12	12	12 units
	Maize based cropping system	8	8	6.2
	Walk in tunnel for protected cultivation of vegetables	4	4	1.2
	Popularization of Millets (Local Kreso)	22	22	2.3
	Cultivation of submergence tolerant Paddy variety CAU R1	10	10	1.3
Ri Bhoi	Nursery raising and Polyhouse	10	10	1.0
South Garo Hills	Cultivation of cucumber under low cost Naturally ventilated polyhouse	5	5	0.05
	Oyster Mushroom Cultivation	10	10	0.05
	Sequential cropping of paddy cultivation with RCM Maniphou 15 - Zero Tillage in Toria (TS-38)	10	10	5
	Ridge and furrow method cultivation in Maize	10	10	0.5
West Garo Hills	Climate resilient Paddy varieties (Ranjit Sub-1 and Bahadur Sub-1)	32	32	16.55
	Winter vegetable production using paddy straw mulch	8	8	4.0



Lwangtlai	Garden pea var. Arka apoorva	5	5	5.0
	Intercropping of Maize (Sweet corn) with Groundnut (Girnar-4)	5	5	5.0
	Tomato var. Arka vikas	5	5	5.0
	Improved rice var. RC Maniphou 12 & 13	5	5	5.0
Lunglei	Inter cropping system	10	29	13.5
	Stress tolerant crops	6	8	5.5
	Vermicompost and Mushroom Production	5	20	
	Short duration paddy	5	25	18
	Cropping sequence	5	15	4.5
Siaha	Community nursery		160	24
	Early planting of cabbage var. Sona Solid		20	8
Serchhip	Cultivation of climate resilient soybean var VLS 89	10	10	4
	Cultivation of multiple resistant groundnut var K1812	10	10	4
Phek	Short duration Maize variety HQPM 5	4	4	2
	Cold tolerant Cauliflower variety Pusa Snowball	10	10	0.9
	Drought tolerant Garden Pea variety Lincoln	10	10	0.5
	Short duration Cabbage variety Golden Acre	10	10	0.5
	Optimizing Kiwi cultivation through trellis system	2	2	1
Mon	Direct seeded rice (RCM-14 and 15)	18	18	18
	Jalkund for life saving irrigation in potato.	5	5	5
	Year-round production of oyster mushroom	22	22	22 units
	Cultivating of drought resistant variety Tomato- Arka meghali	7	7	3.5
	Construction of Walk-in-Tunnel for off season tomato cultivation	4	8	0.60



Tuensang	Cultivation of Potato var. Kufri Jyoti	10	10	10
	Cultivation of improved variety of Soybean RVSM 1135	25	25	12.5
	Cultivation of Pearl Millet var. ICTP 8203 and rice	17	17	10
	Cultivation of improved variety of Maize HQPM – 1	20	20	10
	Cultivation of Garden pea var. KSP 110	20	20	10.0
	Cultivation of Maize var. ISP 178	15	15	10
	Cultivation of Cabbage var. Wonder Ball	8	8	5
	Cultivation of Tomato var. Arka Samrat	8	8	4
	Cultivation of Chilli var. Black Beauty	10	10	5
Sepahijala	Flood tolerant paddy variety Ranjit Sub 1.	10	20	2.2
	Cauliflower variety SAVAC-7209 F1 hybrid under paddy straw mulching	10	25	4.2
	Cabbage variety Wonder ball F1 hybrid	10	12	2.6
	Watermelon under poly mulching	5	12	3.0
	Tomato under paddy straw mulching	5	10	2.0
	Oyster mushroom cultivation	5	5	10 unit
	Chilli (Arka Gagan) under poly mulching	10	10	3.25
	Dolichos bean to improve soil fertility.	5	25	5.5



Demonstration on HQPM-5



Intercropping of maize and groundnut



RC Maniphou 15 demonstration



**Demonstration on Walk
in Tunnel**



**Planting of Cabbage Sona
Solid**



Soybean Demonstration

4.3 Livestock and Fisheries

KVKs across the North Eastern Region successfully promoted climate-resilient livestock, poultry, fisheries, and integrated farming technologies through 371 demonstrations, benefiting 940 farmers and covering multiple production units and farm enterprises. The interventions focused on enhancing livelihood security, improving animal health, diversifying farm income, and strengthening resilience to climate-related challenges.

Integrated farming systems emerged as a key intervention for sustainable resource utilization and risk reduction. In Chandel and Ukhrul districts, integrated Paddy-Pig-Fish and Paddy-Duck-Fish farming systems were demonstrated through 60 demonstrations involving 60 farmers. These models facilitated efficient recycling of farm resources, improved nutrient utilization, and generated multiple sources of income from the same land unit. In Senapati district, promotion of backyard poultry and goat rearing provided smallholder farmers with low-cost livelihood options and enhanced household nutritional security. Jaintia Hills demonstrated backyard poultry farming using improved Vanaraja birds, silage preparation for livestock feeding, and Integrated Farming Systems comprising Fish-Pig-Vegetable enterprises. These interventions benefited 23 farmers and demonstrated the potential of integrated approaches for increasing farm profitability and resilience. South Garo Hills implemented preventive animal healthcare measures, including vaccination, deworming, and mineral mixture supplementation for cattle, alongside Integrated Composite Fish Culture. These interventions benefited large number of farmers and contributed to improved livestock productivity, reduced disease incidence, and enhanced fish production. In West Garo Hills, backyard poultry farming and scientific fish culture involving Rohu, Catla, and Grass Carp were promoted to diversify income opportunities and improve nutritional security. Similarly, the districts of Lawngtlai, Siaha, Mon, and Tuensang encouraged backyard poultry rearing using the



improved Rainbow Rooster breed, benefiting 210 farmers through enhanced egg and meat production under low-input production systems. Lunglei district focused on improving pig housing through scientific pig sty construction, which enhanced animal welfare, reduced disease risks, and improved management efficiency. In Serchhip, Azolla cultivation was introduced as a low-cost and nutrient-rich feed supplement for poultry, reducing feed costs while improving productivity. Sepahijala district promoted dual-purpose duckery and crossbred piggery models, providing farmers with climate-resilient and income-generating livestock enterprises.

Table 4.3.1: Successful interventions under Livestock and Fisheries module

KVK	Climate Resilient Technology	No. of Demos	No. of farmers covered	Area covered (ha)
Chandel	Backyard duck rearing	10	10	10 units
	Empowering farmers through climate smart Goat rearing (<i>Black Bengal</i>)	3	3	3 units
	Integrated paddy-pig-fish farming system	8	8	8 units
	Integrated paddy-duck-fish farming system	8	8	8 units
Senapati	Backyard poultry rearing	24	24	
	IFS	10	10	
	Goat rearing for enhancing climate adaptation	5	5	
	Silage making using HDP drum	9	9	
Ukhrul	IFS – Pig cum Fish	8	8	8 units
	IFS – Duck cum Fish culture	8	8	8 units
	Artificial Breeding of common carp	3	3	3 units
	Rejuvenation of farm pond under Composite fish farming	2	2	2 units
	Composite fish culture	10	10	10 units
Jaintia Hills	Backyard poultry farming with Vanaraja chicken	9	9	9 units
	Silage preparation	11	11	11 units
	Affinitive pigpen model	3	3	3 units
	Composite fish culture	2	2	0.5
	Integrated Farming systems	2	2	0.23
	Ric fish integration	6	6	6 units
Ri Bhoi	Fish-poultry- horticulture crops – vermicomposting- IFS	5	5	2.5



	Integrated Farming System with Climate Resilient pig breeds (Lumsniang)	5	5	1.25
South Garo Hills	Khaki Campbell under IFS model	5	5	0.35
	Vaccination of poultry chicken against Ranikhet Disease	2	100 birds	1000
	Mineral mixture supplementation in cow	6	180	317
	Vaccination against HS & BQ in cattle	2	72	169
	Introduction of HDK-75 breed of pig (heat stress tolerant & well adapted to NE Region)	10	10	10 units (1 boar and 1 sow)
	Silage preparation using locally available materials	2	40	200 Nos
	Composite culture of ICM fish Farming under IFS model	5	5	0.35
West Garo Hills	Backyard poultry Farming	-	82	
	Rahu, Catla and Grass carp	5	5	0.62
Lwangtlai	Rearing of climate resilient broiler strain-Vencobb 430Y	10	10	-
	Rearing of Rainbow rooster (heat & cold stress tolerant) under backyard system	5	5	-
Lunglei	Breed introduction Poultry	5	40	
	Improve Housing in Pig sty	5	5	
Siaha	Backyard Poultry farming (Rainbow Rooster)		60	NA
	Low-cost deep litter housing for pig (Local & Crossbreed)		5	NA
Serchhip	Backyard farming of Tokbari poultry	5	10	
	Azolla as feed ingredients for poultry	3	5	
Mon	Rearing of Improved climate resilient Dual-purpose poultry (Rainbow rooster)	34	34	34 units
	Beekeeping	10	10	10 units
	Rearing of Improved climate resilient Dual-purpose poultry (Kuroiler) for egg and meat purpose.	55	55	55 units



Tuensang	Backyard rearing of poultry breed Rainbow Rooster	21	21	-
	Popularization of broiler duck White Pekins under backyard system	10	10	-
Sepahijala	Intervention on Dual purpose Duckery "White Pekin".	10	10	4
	Intervention on cross breed piggery (Hempshire X Yorkshire)	10	20	100



Demonstration on HQPM-5



Intercropping of maize and groundnut



RC Maniphou 15 demonstration



Demonstration on HQPM-5



Intercropping of maize and groundnut



RC Maniphou 15 demonstration



TECHNOLOGIES ADOPTED BY FARMERS FOLLOWING THE SUCCESS OF NICRA DEMONSTRATIONS

The climate-resilient technologies demonstrated under NICRA have shown significant success in promoting large-scale adoption among farming communities. The proven benefits of these interventions encouraged farmers to expand the technologies beyond the demonstration sites through farmer-to-farmer extension, training programmes, field days, method demonstrations, and exposure visits. As a result, several climate-resilient practices witnessed substantial horizontal spread across NICRA villages and adjoining areas.

In Chandel district, the cultivation of improved varieties of paddy, groundnut, and soybean expanded from 7 hectares under demonstration to 39 hectares through farmer adoption, benefiting 72 farmers. In Senapati, mulching technology for winter vegetable cultivation spread to 5 hectares covering 24 farmers, contributing to improved soil moisture conservation and crop productivity. Ukhrul recorded remarkable adoption of garden pea cultivation and mushroom production, which expanded to 40 hectares and 8 production units, respectively, benefiting 200 farmers through field observations and farmer interactions. In Jaintia Hills, climate-resilient interventions such as scientific pig housing and vermicomposting expanded from 1.2 hectares to 2.8 hectares and reached 47 units, benefiting 45 farmers. Integrated Farming Systems promoted under NICRA in Ri Bhoi expanded to 2.5 hectares. In South Garo Hills, method demonstrations on oyster mushroom cultivation resulted in the establishment of 14 production units by 14 farmers. West Garo Hills witnessed substantial adoption of Integrated Farming Systems, Jalkund rainwater harvesting structures, and oyster mushroom cultivation, covering 19.13 hectares and benefiting 113 farmers. In Lawngtlai, the cultivation of disease-resistant high-yielding varieties of tomato and cabbage expanded from 4.5 hectares to 20.5 hectares, reaching 80 farmers and reducing crop losses due to diseases and climatic stresses. Similarly, in Lunglei, climate-resilient technologies such as Jalkund, intercropping systems, and dual-purpose poultry birds expanded from 10 hectares to 49 hectares through farmer-led dissemination. In Siaha, community nurseries for winter vegetables



ensured the availability of quality seedlings during water-stress periods and improved vegetable productivity from 356 q/ha to 483 q/ha, benefiting 170 farmers. Awareness programmes, trainings, and demonstrations on minimum tillage and climate-tolerant crop varieties in Phek resulted in the expansion of these technologies from 5.5 hectares to 31.5 hectares, covering 230 farmers. In Mon district, rearing of dual-purpose Kuroiler poultry birds for meat and egg production spread across 29 hectares and 37 units, benefiting nearly 80 farmers. Likewise, Tuensang recorded the expansion of improved soybean and garden pea cultivation to 40 hectares involving 70 farmers.

The widespread adoption of these climate-resilient technologies demonstrates the effectiveness of NICRA interventions in enhancing farmers' adaptive capacity to climate variability.

Table 5.1: Technologies adopted by farmers following the success of NICRA demonstrations

KVK Name	Name of Technology	Area (ha)		Farmers (No.)	Mode of spread (Process)
		Before NICRA	After NICRA		
Chandel	Mid duration RC Maniphou-13	3	9	12	Method demonstration and from farmer to farmer
	Mid duration RC Maniphou-15	-	10	16	
	Crop diversification using Groundnut ICGS-76	2	7	15	
	Cover crop using Soybean Dsb-19	1	4	12	
	Integrated farming system	1	7	7	
	Mulching using paddy straw	-	2	10	
Senapati	Mulching in winter vegetables	NIL	5ha	24	Trainings, field day, Demonstration etc
Ukhrul	Escaping moisture stress in Garden pea	2	30	90	Field observation
	Field pea after paddy	Nil	10	30	
	Oyster mushroom cultivation	Nil	8 units	80	
Jaintia Hills	Climate resilient affinitive pig pen mode	0	25 units	25	Training and awareness programme
	Vermicomposting unit	0	22 units	12	
	Mulching using paddy straw	1.2	2.8 ha	8	



Ri Bhoi	Integrated Farming System	Only Fishery: 0.5	2.5	5	Training, Demonstration
South Garo Hills	Oyster Mushroom cultivation	0	3 units	3	Method demonstration
	Low cost vermicomposting	0	11 units	11	
West Garo Hills	IFS	-	4.14	8	Farmers to farmer horizontal spread
	Jalkund	-	3.52	5	
	Climate resilient varieties of paddy (Gitesh, Ranjit Sub 1 and Bahadur Sub 1)	-	7.20	42	
	Paddy Straw Mulching	-	4.27	20	
	Oyster Mushroom Production	-	-	38	
Lwangtlai	Cultivation of multiple disease resistant HYV of tomato (Arka abhed)	2.5	12.5	25	Method Demonstration, Media, Training & Field Day
	Heat & Cold tolerant variety of Cabbage (Ryozeki)	2.0	8.0	20	
	Backyard Poultry (Rainbow rooster)	NA	NA	35	
Lunglei	Jalkund	5Ha	14 ha	8	Scaling up
	Inter cropping	5 ha	15 ha	20	
	Dual purpose birds	Nil	20	20	
Siaha	Community nursery (Broccoli var. Green Magic)	84	118	80	Training ,demonstration and through farmer to farmer
	Community nursery (Tomato var. Arka Abhed,)	141	184	80	
	Farm pond renovation (30x15x4ft)	131	181	10	
	Backyard poultry farming (Rainbow Rooster)	84kg meat & 2500 eggs	178 kg meat & 3000 eggs	60	



Phek	Minimum tillage	1.5	10	50	Awareness, Training and demonstrations
	Short duration maize	2	14	80	
	Drought tolerant Garden Pea	1	2.5	50	
	Short duration Cabbage	1	5	50	
Mon	Rearing of dual-purpose poultry-Kuroiler	0 units	37 units	37	Through VCRMC members and Demonstration unit
	Paddy straw mulch in Garlic	0	12	18	
	Paddy straw mulch in Pea	0	9.5	12.5	
	Zero tillage in rapeseed	0	7.5	12	
Tuensang	Improved var. of Soybean RVSM-1135	5	20	30	Horizontal



Paddy straw Mulching



Vermicomposting unit



Renovation of farm pond



Backyard poultry farming (Rainbow rooster)



PERFORMANCE OF CUSTOM HIRING CENTRES

The Custom Hiring Centres (CHCs) continued to play a vital role in promoting farm mechanization and improving access to agricultural machinery among small and marginal farmers during 2025–26. Through the provision of need-based farm implements on a rental basis, CHCs helped reduce labour shortages, lower cultivation costs, improve timeliness of farm operations, and enhance agricultural productivity.

During the reporting year, CHCs collectively facilitated mechanization over 438.08 hectares, benefiting 2,687 farmers and generating a total revenue of ₹6,98,226. The centres provided access to a range of agricultural implements, including power tillers, rice mills, drum seeders, grass cutters, water pumps, knapsack sprayers, cono weeders, maize shellers, moisture meters, and weighing machines.

Among the KVKs, Senapati and Mon recorded as the best performances, serving 124 and 924 farmers and generating the highest revenue of ₹2,12,073 and ₹1,70,950 respectively, through the efficient utilization of farm machinery, indicating strong demand for mechanization services among farming communities. Tuensang achieved the highest area coverage of 113 hectares, benefiting 369 farmers through the use of water pumps, sprayers, and power tillers. Ri Bhoi also performed well, with 250 farmers utilizing CHC services and generating revenue of ₹56,000. Other notable contributions came from Ukhrlul, Chandel, Lawngtlai, Lunglei, Siaha, and Sepahijala, where CHCs facilitated timely farm operations through the provision of essential agricultural machinery and equipment. These centres collectively supported hundreds of farmers and generated substantial revenues, reflecting the increasing acceptance of mechanized farming practices in the region.

The growing utilization of CHC services highlights their effectiveness in addressing labour shortages, improving operational efficiency, and enhancing farm productivity. By making modern agricultural machinery accessible and affordable, the CHCs have contributed significantly to climate-resilient agriculture, improved resource-use efficiency, and sustainable livelihood enhancement among smallholder farmers.



Table 6.1: Performance of CHCs at KVKs under Zone-VII

KVK	Name of implements	Area (ha)	No. of farmers utilized the equipment during 2025-26	Amount generated as revenue (₹)
Chandel	Power tiller, brush cutter, 5 HP water pump, digital moisture meter, weighing balance, crane hook scale	16	77	33,200.00
Senapati	Power tiller, maize sheller, seed bank, mini rice mill, drum seeder, brush cutter, feed machine	3.5, 55q, 1200 kgs & 15 days	124	2,12,073.00
Ukhrul	Power tiller, Post hole digger, Sprayer, Water pump, Ricker sprayer, Long ridge pruner, Paddy harvester	31	145	35,000.00
Jaintia Hills	Power tiller, Brush cutter	3	6	4,000.00
Ri Bhoi	Power tiller, crane hook weighing balances, electronic weighing balance, adjustable row maker, conoweeder, fruit harvesters, garden rake, hand grass slasher, multipurpose "U" and "V" blade weeder, maize shellers, SRI marker, rain gauge	4.5	250	56,000.00
South Garo Hills	Power operated chaff cutter, Power Tiller.	20	47	18,900.00
West Garo Hills	Power Tiller, Water Pump.	4.38	14	10,700.00
Lawngtlai	Garden rakes, mini oil expeller, Makita brush cutter, mini power tillers, power tiller cum cultivator, 4-stroke water pump, multi weeder, digital weighing balance, chainsaw, mini digital weight scale, earth auger, Knapsack sprayer, garden rake, fertilizer broadcaster, 12-ft pruner, dao, digital grain moisture meter	33.5	129	14,550.00



Lunglei	Mini Power tiller, Power weeder, Knapsack sprayer, Diesel water pump, weighing balance, HDPE pipe Auger, brass cutter, maize grinder, auger machine	87	207	32,650.00
Siaha	Water pump set, Chain saw, brush cutter, power tiller, weighing scale, crane hook weighing scale, knapsack sprayer, maize grinder, mustard oil expeller, banana fibre extractor, maize sheller, egg incubator, cultivator, rice milling machine, earth auger machine, rice mill	50	320	39,600.00
Mon	Rice mill, knapsack sprayers, Sintex water tank, chair, rubber pipe, grass cutters, manual seed drill, paddle thresher, wheel hoe	47.2	924	1,70,950.00
Phek	Chaff cutter, peg type dryland, Cono weeder, manual rice transplanter, thresher manual	-	-	6993.00
Tuensang	Brush Cutter, Water pump, Platform balance, Knapsack sprayer, solar nano pump, mini power tiller	113	369	38,610.00
Sepahijala	Nipha PTO paddy tresher, digital weighing balance, moisture meter, rain gauge, crane hook, post hole digger, paddy reaper, power tiller, knapsack sprayer, drum seeder	25	75	25,000.00



Distribution of Farm Equipments for CHC at Lunglei



SEED PRODUCTION IN NICRA VILLAGES

The Seed Production Programme played a significant role in strengthening climate-resilient agriculture, enhancing village-level seed security, and promoting farmer-led seed enterprises. The programme focused on the production of quality seeds of climate-resilient and location-specific crop varieties to ensure timely availability of quality planting materials and reduce dependence on external seed sources.

During the year, a total of 129.87 hectares were brought under seed production involving 353 farmers across NICRA villages. The programme generated a cumulative income of ₹49.12 lakh, demonstrating the economic potential of decentralized seed production systems while contributing to climate adaptation and livelihood enhancement. Lambung village of Chandel district emerged as a successful model of community-based seed production, where 27 farmers produced 148.08 tonnes of paddy, soybean, maize, and groundnut seeds, including improved varieties such as RC Maniphou-13, RC Maniphou-15, DSB-19, and ICGS-76. The initiative covered 15.5 hectares and generated an income of ₹1.24 lakh while ensuring local availability of quality seeds. In Ri Bhoi district, farmers successfully produced 549.2 quintals of turmeric, ginger, maize, and potato planting materials over 7.6 hectares, generating an income of ₹15.28 lakh. This demonstrated the potential of diversified seed and planting material enterprises in improving farm income and reducing dependency on external sources. A notable success was recorded in Tisopi village of Siaha district, where 55 farmers cultivated rice and maize seed crops over 45 hectares and produced 618 quintals of quality seed. The collective effort generated an income of ₹27.69 lakh, highlighting the effectiveness of community-led seed production and local entrepreneurship. In Senapati district, farmers of Hengbung village engaged in quality seed production of King Chilli over 2 hectares, producing 0.8 quintals of seed and generating additional income. Similarly, Golaghati village of Sepahijala district produced 100 quintals of paddy and toria seeds over 3 hectares involving 28 farmers, generating an income of ₹3.26 lakh.

The seed production programme significantly enhanced local seed availability, facilitated timely access to quality seeds during critical cropping seasons, and promoted farmer-to-farmer seed exchange mechanisms. Capacity-building programmes on



scientific seed production, processing, storage, and quality maintenance further strengthened the sustainability of village seed systems. By promoting climate-resilient crop varieties and community-based seed enterprises, the initiative contributed to increased agricultural resilience, improved livelihoods, and greater self-reliance among farming communities, making it a successful model of climate-smart agriculture under NICRA.

Table 7.1: Seed Production systems in NICRA Villages under Zone-VII

KVK Name	Crop name	Variety	Area covered (ha)	Farmers covered (no.)	Seed produced (tons)	Quantity of seed retained for next season	Amount mobilised (₹)
Chandel	Paddy	RC Maniphou-15	5	7	51.22	5.8 q	8000
	Paddy	RC Maniphou-13	4	5	52.32	3.2 q	22000
	Soybean	Soybean (DsB-19)	2	5	18.44	2 q	28500
	Maize	RC M 1-76	0.5	5	11.9	1.5 q	16000
	Groundnut	Groundnut (ICGS-76)	4	5	15.20	3 q	49500
Senapati	King chilli	Local	2	16	0.08 tons	2 kgs	12000.00
Jaintia Hills	French bean	Jaintia local & Naga local	2.2	10	0.2	0.3 t	1200
	Paddy	CAUR1	10.5	20	0.8	0.3 t	2000
	Maize	DA-61	5.6	18	0.5	0.3 t	2600
Ri Bhoi	Turmeric	lakadong	3	7	150	150	4,50,000
	Ginger	local	2	6	160	160	4,80,000
	Maize	local	0.5	4	46	46	1,15,000
	Potato	Kufri Frysona	2.1	10	193.2	193.2	4,83,000
South Garo Hills	Toria	TS - 38	1.0	10	0.92	0.10	7,000
	Paddy	RCM Maniphou -15	5.0	10	22.55	0.5	15,000
	Ginger	Bhaisey	0.27	10	1.83	0	0
	Turmeric	Lakadong	0.25	10	3.10	0.5	19,500
Lwangtlai	French Bean	Zorin	0.5	8	0.1	0.05	6,000
	Ginger	Thinglaidum	0.5	8	0.25	0.2	10,000
	Groundnut	Girnar 4	0.5	5	0.3	0.25	20,000
	Rice	RCM - 13	0.8	3	0.32	0.2	3,200
	Turmeric	Lakadong	0.4	4	0.3	0.2	4,500



Lunglei	Paddy	Maniphou 12	2.3	5	75q	2.5 q	10000
	Soybean	Local;kangsin	1.5	3	42q	1.8	12000
	Maize	RCM-76	0.75	2	26q	0.5	3000
Siaha	Rice	Local	25	31	321q	-	1,284,000
	Maize	Local	20	24	297q	-	1,485,000
Serchhip	Groundnut	K1812	4	10	1	200 q	10000
Mon	Paddy	Local, RC Maniphou-15	4	16	3.2	1.5	9,800
	Garlic	Local	0.70	9	1.26	0.70	15,900
	Toria	TS-67	0.50	6	0.3	0.2	2,500
	Paddy	RCM-14	3.00	8	2.0	2.0	8,000
Tuensang	Foxtail millet	Local germplasm "China"	5	10	10	-	-
	Potato	Kufri Jyoti	7.5	15	20	-	-
Sepahijala	Paddy	Ranjit sub-1 and CR Dhan 801	2.2	16	92	8q	276000
	Toria	TS 67	0.8	12	8	3	50000



Distribution of Farm Equipments for CHC at Lunglei



DRONE TECHNOLOGY DEMONSTRATED

KVK	Technology	Area covered (ha)	Input saved(I)	No. of labour saved	Cost saved (Rs)	Impact	Efficiency (%)
Sepahijala, CAU (I)	Foliar application of pesticide in paddy field.	7.8	Labour and Pesticide	28	16700	Saved number of labour, reduced the amount of pesticide and time affective.	95



FUNDS MOBILIZED (RS.) VIA INTER-DEPARTMENTAL CONVERGENCE FOR RESILIENT TECHNOLOGY ADOPTION

Table 9.1: Convergence established with Centre/ State departments

KVK	Intervention	Climate Resilient Technology	Convergence established with centre/ state (Name of the programme or department)	Coverage [No. of farmers/ Area (ha)]	Approx. amount (Rs.) mobilized
Chandel	Crop	Groundnut (DSb-19)	DSSS	7/5ha	-
	Livestock	Composite fishery	PMMY	3	-
	NRM	Paddy straw mulching in cabbage	DSSS	6/1.5ha	-
	Livestock	Cross breed hampshire	DSSS	3 units	-
Ukhrul	Stress tolerant crop-Millet	Cover crop for Soil Erosion control	Department of Agriculture	16 farmers 6 ha	22000
Ri Bhoi	Seed production	Quality seed production of potato (Kufri frysona)	ICAR-CPRS	5	150000
	Protected cultivation	Cultivation for winter vegetable under protected condition	ATMA/Dept of Hort	5	300000
	IFS	Fish based IFS	ATMA/Dept. of Fishery/AH & Vety	5	200000



South Garo Hills	Awareness, training, supply of inputs, method demonstration	Integrated Duck Cum Fish Farming	IOFS Funded By NABARD	5 (0.25 ha)	42,500
		Vermicomposting	NABARD	5	20,000
West Garo Hills	Demonstration of climate resilient paddy varieties	Bahadur Sub 1 and Ranjit Sub-1	DoA, West Garo Hills	27	-
Lawngtlai	Distribution of rainbow rooster chicks, poultry feeds, waterer and feeder	Backyard Poultry (Rainbow rooster)	A.H. & Vety., Lawngtlai, ICAR Mizoram Centre, Kolasib	30	2,80,000.00
	Distribution of seeds, micro-sprinkler irrigation	Cultivation of Cabbage using micro-sprinkler irrigation system	ATMA & Horticulture Department	5	7,05,000.00
Lunglei	Low cost Water Harvesting structure	Jalkund	MNREGS	5 farmers	425000
		Renovation of Old farm pond	MNREGS	5 farmers	560000
Siaha	NRM	Broad bed & Furrows- French bean	MNREGA, DRDO	40	-
	Crop	Community nursery (Tomato var. Arka Abhed, Broccoli var. Green Magic)	MIDH, Horticulture Department	160	
	Crop	Early planting of cabbage var. Sona Solid	MIDH, Horticulture Department	60	
	Livestock	Backyard Poultry Farming (Rainbow Rooster)	AH & Vety Dept	10	
	NRM	Farm pond renovation (30x15x4ft)	MNREGA, DRDO	5	



	NRM	Mulching technology-Broccoli	MIDH, Horticulture Department		
Serchhip	Crop Production	Field day,capacity building and method demonstration on Climate Resilient Groundnut	ICAR-IIGR,MzSrLM, DAO Serchhip	40	50000
Mon	Climate resilient crop-based intervention.	Paddy straw mulch in Garlic (Yamuna Purple-10 and Local cultivar).	Agri. Dept.	12 farmers and 4.8 ha	96,000
	Climate resilient crop-based intervention.	Paddy straw mulch in Pea (Aman & Arka Apoorva)	Agri. Dept.	16 farmers and 5.6 ha	70,000
Sepahijala	Slurry method of phosphorus management in Paddy.	Intervention on Flood tolerant paddy variety Ranjit Sub 1.	MICPM	46	65000



CAPACITY BUILDING PROGRAMMES TAKEN UP IN 2025-2026

Capacity building is one of the key components of NICRA aimed at enhancing the knowledge and skills of farmers for adopting climate-resilient agricultural technologies and practices. During 2025-26, a total of 160 training programmes and 32 training courses were conducted across the NICRA villages. The programmes covered various aspects of climate-resilient agriculture, including mulching, water harvesting, Nursery raising and vegetable production under low cost protected poly tunnel, mushroom cultivation, improved crop production technologies, Climate-resilient diversified cropping system approaches, integrated farming systems, soil and water conservation, climate-resilient livestock and poultry management, resource conservation technologies, and sustainable natural resource management.

A total of 4,674 beneficiaries participated in these capacity-building activities, comprising 1,933 male and 2,737 female participants. The significant participation of women highlights the inclusive approach adopted under NICRA in strengthening the adaptive capacity of farming communities. These programmes enhanced farmers' awareness, technical knowledge, and practical skills, thereby promoting the adoption of climate-resilient technologies and improving livelihood resilience against climate variability and change.

Table 10.1: Capacity Building Programmes taken up in 2025-26

KVK	Topic of training	No. of programs	No. of beneficiaries		
			Male	Female	Total
Chandel	Capacity building cum input distribution programme		10	25	35
	Integrated rice cum fish farming		7	18	25
	Training on Custom hiring centre		12	22	32
	Integrated weed management in rice and maize		8	40	48
	Security measures for livestock and poultry		10	27	37
	Empowerment of tribal farmers		5	24	29



	Capacity building programme on vermicomposting		8	24	32
	Capacity building cum input distribution programme for winter vegetable seeds		10	29	39
	IFS and input distribution		12	34	44
Ukhrul	Sustainable management through oyster mushroom production	1	14	8	22
	IFS an approach for low external input system	1	15	18	23
	Livestock based integrated farming system	1	17	14	31
	Climate change and its impact on Hill Agriculture	1	18	10	28
Senapati	INM in cole crops	1	16	24	40
	Cultivation of king chilli as climate resilient crop	1	11	29	40
	Role of backyard poultry rearing	1	22	18	40
	Importance of rain water harvesting structure Jalkund	1	25	15	40
	Care and management of poultry birds	1	23	17	40
	Mulching in winter vegetables	1	12	28	40
	Year round Mushroom production	1	28	12	40
	Training cum animal health camp	1	30	10	40
	Nursery raising and vegetable production under low cost poly tunnel	1	26	14	40
Jaintia Hills	Strategizing climate resilient agriculture for improved livelihood security of tribal farmers	32 courses	12	10	22
	Rice-fish integrated farming techniques.	1	9	22	31
	Adaptive Maize-based cropping system under changing climatic conditions	1	5	12	17
	Resilient vegetable cultivation using low-cost technologies	1	12	32	44
	Paddy straw mulching for moisture retention and temperature regulation	1	12	32	44



	Climate-resilient livestock and poultry production strategies	1	15	27	42
	Eco-friendly mushroom cultivation	1	15	27	42
	Low-cost soil moisture conservation strategies for rainfed areas	1	4	12	16
	Climate-resilient soil health enhancement techniques	1	7	15	22
	Organic waste management through vermicomposting	1	5	32	37
	In-situ moisture retention practices	1	5	18	23
	Off-season cultivation under naturally ventilated polyhouse systems	1	5	18	23
	IFS approach for farm diversification and climate resilience	1	7	33	40
	Conservation tillage practices for resource optimization.	1	15	45	60
	Scientific post-harvest handling and storage of climate-sensitive crops like paddy and ginger	1	2	12	14
	Multi-species fish farming for enhanced water use and stress resilience	1	9	22	31
	Climate-resilient diversified cropping system approaches	1	14	46	60
	Sustainable silage making for fodder security during climate stress periods	1	5	26	31
	On-farm practices for enhancing soil carbon sequestration	1	7	23	30
	Integrated disease management strategies in tomato (Arka abhed/Arka samrat) under climate variability	1	7	23	30
	Hands-on training on Azolla cultivation for climate-resilient livestock feeding	1	11	34	45
Ri Bhoi	Integrated Farming System (Fish cum Poultry)	1	2	15	17
	Nursery management in polyhouse	1	3	17	20
	Cultivation management in polyhouse	1	1	19	20



	Bio security measures in livestock & poultry farm	1	5	15	20
South Garo Hills	Scientific management of poultry birds	1	16	18	34
	Silage Preparation from Maize	1	10	15	25
	Package of practices for Maize Var. RCM-176	1	15	17	32
	Preparation of water harvesting structure using Jalkund	1	10	15	25
	Protected structure under adverse climate condition	1	14	21	35
	Importance of soil testing	1	15	18	33
	Broad Furrow bed (Vegetable cultivation)	1	16	19	35
	Zero Tillage Toria/pea in rice fallow	1	14	16	30
	Mulching in Cole Crops	1	15	20	35
	Management of Deficiency & parasitic diseases in livestock	1	21	30	51
West Garo Hills	Scientific production technology of Black Pepper under TDC NICRS	1	9	8	17
	Soil and water conservation under TDC-NICRA	1	10	20	30
	Agricultural Extension under TDC NICRA	1	7	58	65
	Management of insect, pest and disease in summer vegetables	1	5	42	47
	IPM and IDM in Paddy	1	6	43	47
	IPM in Rabi vegetables	1	6	39	45
	Soil sampling techniques under TDC NICRA	1	15	14	29
	Establishment of Community nursery raising of vegetables	1	17	12	29
	Natural farming and preparation of Jeevamrit and Beejamrit	1	16	35	51
	Intensification of rice fallow under NICRA	1	4	14	18
Lwangtlai	INM under changing climate	1	16	12	28
	Heat & cold stress management in livestock and poultry	1	12	16	28



	Pest and disease management under climate variability	1	18	14	32
	Soil fertility management under rainfed condition	1	21	10	31
	Different mulching technologies for moisture conservation and weeds suppression	1	16	14	30
	Rainwater harvesting and in-situ moisture conservation techniques	1	15	14	29
	IPM in Vegetables	1	20	13	33
	Disease prevention, vaccination, and biosecurity measures of livestock & poultry	1	15	16	31
	Protected cultivation (polyhouse/ shade net) for off-season vegetable production	1	12	18	30
Lunglei	Training on RCTs	1	22	18	40
	Training on RWHs	1	26	12	48
	Training on stress tolerant crops – Dragon fruit	1	10	8	18
	Training and awareness on inter cropping system	1	25	17	42
	Training on Short duration paddy	1	17	10	27
	Training on improve Jhum cultivation practices	1	25	36	61
	Training on Heat stress management in Livestock	1	20	34	54
Siaha	Soil & water conservation in agriculture	2	22	18	40
	Disease and Pest Management for Jhum chilli cultivation	1	17	3	30
	Pest and disease management in Rice	1	21	4	25
	Integrated farming system	2	34	6	40
	Importance and benefits of Mulching Technology	1	18	2	20
	Cultural practices for management of pest & diseases	2	22	18	40



	Management of Nursery for Rabi crops	2	18	22	40
	Broad bed & Furrows	2	42	10	52
	Prevention of control of poultry diseases	2	22	48	70
	Care and management of Piglets	1	6	19	25
	Importance of formation of Self Help Group	2	10	28	38
Serchhip	Soil conservation	1	16	7	23
	Azolla as feed ingredients as poultry	1	10	12	22
	Mulching techniques in vegetable during rabi	1	15	19	34
	Climate resilient technologies for climate smart agriculture in hilly areas	1	18	12	30
Phek	Package and practice on foxtail millet	2	12	24	36
	Soil moisture conservation and soil health	1	6	9	15
	Aerobic rice cultivation	1	8	13	21
	Livestock waste management	1	3	17	20
	Importance of climate resilient technologies	1	5	20	25
	Soil amendment	2	18	19	37
	Short duration maize cultivation	3	14	44	58
	Water harvesting	1	0	15	15
	Package and practice on Short duration soybean cultivation	1	8	12	20
	Integrated farming system	1	6	15	21
	Organic cultivation of cauliflower and broccoli	5	0	53	53
	Soil health management	1	4	6	10
	Importance of short duration rabi crops	1	6	12	18
	Straw mulching in broccoli	5	5	95	100
	Importance of crop diversification	1	8	12	20
	Short duration Cabbage variety Golden Acre	3	27	45	72
	Drought tolerant Garden Pea variety Lincoln	3	27	45	72



	Importance of short duration rabi crops	1	9	11	20
	Importance of natural farming	1	6	14	20
	Water Harvesting for Improving Soil Health and Moisture Conservation	1	6	4	10
	Organic mulching in broccoli	1	0	9	9
	Importance of natural farming	1	5	10	15
Mon	Intercropping	1	15	6	21
	Rainwater harvesting.	1	17	12	29
	Management and application of fertilizers.	1	14	12	26
	Improved backyard poultry (Kuroiler) Langmeing	1	17	18	35
	Improved backyard poultry (Rainbow Rooster)	1	11	18	29
	Production technology of winter crops	3	27	18	45
	Paddy straw mulch at Langmeing	1	7	10	17
	Year-round production of Oyster Mushroom	1	5	14	19
	Scientific Bee-keeping	1	13	5	18
Tuensang	Climate resilient Potato farming	1	16	4	20
	Scientific cultivation of Soybean	1	15	5	20
	Climate resilient vegetable farming	2	26	14	40
	Cultivation practices of rabi vegetables	1	17	3	20
	Scientific cultivation of Potato var. Kufri Jyoti	1	14	6	20
	Backyard poultry farming	1	16	12	28
	Training on Mushroom Cultivation	1	13	7	20
Sepahijala	Agricultural waste management through mushroom cultivation.	2	7	41	48
	Disease and pests management under aberrant climatic condition.	1	32	2	34
	Bio-security measures and health management of livestock.	1	25	3	28
	Soil Health Management through legumes	1	24	01	25



	Slurry method demonstration of phosphorus management in paddy.	1	26	03	29
	Mustard production in rice fallow	1	13	4	17
	Care and Management of winter crops under changing climate situation.	1	25	4	29



Training on different methods on soil and water conservation in agriculture



Training program on Paddy Straw Mulching



Hands on training on Mushroom production



Demonstration on Cross-Breed Hampshire Pig



Vermicomposting training



Capacity building-cum-input distribution programme.



EXTENSION ACTIVITIES

Extension activities are an integral component of NICRA programme, aimed at creating awareness and facilitating the dissemination of climate-resilient technologies among farming communities. During 2025–26, a total of 252 extension activities were organized across the NICRA villages and operational areas of KVKs under Zone-VII, benefiting 8,297 farmers, including 4,656 male and 3,661 female participants.

The extension programmes included field days, farmers' fairs, awareness campaigns, mobile advisory services, agro-advisory programmes, exposure visits, vaccination and animal health camps, method demonstrations, and farmer-scientist interactions. These activities provided a platform for farmers to gain first-hand knowledge of climate-resilient agricultural practices and technologies.

Several KVKs actively organized extension programmes focusing on sustainable crop production, integrated farming systems, natural resource management, climate-resilient crop varieties, livestock and poultry management, soil and water conservation, and integrated pest and disease management. Field days conducted on climate-resilient crop varieties and improved production technologies enabled farmers to observe and evaluate the performance of recommended practices under local conditions. Mobile advisory services and awareness programmes helped disseminate timely information on weather-based farm operations, risk management strategies, and adaptation measures to climate variability.

Overall, the extension interventions under NICRA played a vital role in enhancing awareness, technology dissemination, and adoption of climate-resilient agricultural practices, thereby contributing to improved farm productivity, livelihood security, and resilience against climate change.



Table 11.1: Extension activities taken up in 2025-26

KVK	Name of the activity	No. of program	No. of beneficiaries		
			Male	Female	Total
Chandel	Field day on RC Maniphou-15	1	6	20	26
	Visits to crop and animal farmers	2	4	17	21
	Animal Health camp	2	8	16	24
Senapati	Finger backyard poultry rearing	1	12	18	30
	INM in cole crops	1	11	16	27
	Mulching of winter vegetables	1	15	13	28
	Care and management of poultry birds	3	26	32	58
Ukhrul	Exposure visit to ICAR RC Manipur Centre, KVK Imphal West and progressive farmers.	1	12	18	30
Jaintia Hills	Organised by ICAR-ATARI and ICAR-RC for NE region	10 days training	12	15	27
	Inputs were distribute to the farmers	1	22	46	66
	Piggery feeds were distribute to the farmers	1	4	15	19
	Awareness programme on climate resilient agriculture	1	12	37	49
	Celebration of poshan pakwada	1	12	23	35
	School nutrition Garden Day 2025	1	25	32	55
	NICRA Workshop in hyderabad	1	-	-	-
	Harvesting of different crops	18	34	67	101
Ri Bhoi	Viksit Krishi Sankalp Abhiyan	1	205	402	607
	Krishi Swarna Samriddhi Week	1	385	502	887
South Garo Hills	Distributions of input	5	43	66	109
	Climate resilient technology	10	189	114	302
	Vaccination in Cattle	2	40	32	72
	Vaccination against Ranikhet in poultry	2	37	63	100
	Interaction programme	5	153	48	201
	Interaction and maintenance of register	2	48	33	81



	Field Day on Paddy	1	13	28	41
	Distribution of inputs seeds,planting material	4	63	79	142
	Distribution of mineral mixture	3	150	30	180
Lwangtlai	Pest & Disease problems of Rice, vegetables and Livestock/ Poultry	6	5	7	12
	Tomato & Cabbage field	2	18	16	34
	Harvesting of Watermelon, Rice, Cabbage etc.	3	16	14	30
	Distribution of medicines and anti-rabies vaccine for free under NICRA	1	82	92	174
	Inputs- Sprayer, PP chemical, Fertilizers etc	1	16	13	29
Lunglei	Health check up,distribution of medicine,Vaccination	2	180	107	287
	Agro clinic	2	115	83	198
	Visit Centre of Excellence.Haulawng	2	20	10	30
	Field day	4	75	18	93
	World environment day	1	48	21	69
	Green Mizoram day	1	55	42	97
Siaha	Protected cultivation of vegetables through low -cost poly house	2	17	24	41
	Integrated Pest Management in crops	1	13	15	28
	Deep litter housing system in piggery and backyard poultry farming	2	17	34	51
	Harvesting of cabbage	2	19	14	33
	Diagnostic visit, Farmer-scientist interaction	7	95	49	144
	Intercropping of Maize with Soybean	1	14	11	25
	Pest and Disease incidence of major crops of the NICRA Village	1	21	9	30
	Natural Farming	1	17	8	25
	Handling of farm machineries	2	38	22	60



	Integrated approach of improved package of practices for cultivation of Rabi crops	2	42	12	54
	Custom Hiring Centre and monitoring of VCRMC	2	38	14	52
	Broad bed & Furrows	1	20	5	25
	Progressive Farmers field within the state	1	15	5	20
	Vaccination and treatment of livestock	1	43	22	65
Phek	Mobile advisory service	58	1441	529	1950
	Field day	16	116	289	405
	KISAN GOSTHI Cum World Soil Day; NICRA Krishi Mela	2	101	135	236
Mon	Training cum Awareness programme for Rainwater Harvesting and Its Efficient use	1	17	14	31
	Group discussions.	7	27	18	45
	Field day	6	21	16	37
	Field visit	12	34	25	59
	VCRMC meetings	11	40	58	98
Tuensang	Vaccination Camp	1	27	25	52
	Field Day on Potato	1	21	9	30
	Field Day on Maize	2	28	17	45
	Field Day on Pearl Millet	2	30	11	41
	Field day on Soybean	2	29	14	43
Sepahijala	Slurry method of phosphorus management in paddy	1	26	03	29
	Field Day on Paddy	1	20	0	20
	Climate Resilient Agricultural Practices	1	2	32	34
	Field Day on Garden Pea	1	20	4	24
	Field Day on Potato	1	22	3	25
	VCRMC Meeting	1	26	3	29
	Drone demonstration	1	28	7	35



**Training on
Empowerment of Tribal
Farmers**



Animal health Camp



Workshop on seed saving



**Seeds distribution
programme**



**Interaction of farmers
with Scientist**



VCRMC meetings



AWARDS RECEIVED

Table12.1: Awards received during the year 2024-25

KVK	Name of the award	Given by whom	When the award was given
Chandel	Most promising farmer Award	ICAR Research Complex for NEH Region, Manipur Centre	9 th January, 2025
West Garo Hills	Best Innovative Farmer Award	ICAR-ATARI, Zone VII	24 th June 2025
Phek	Best Innovative Farmer Award 2025- Shri. Weto Medo Pfutseromi Village	ICAR-CRIDA	12 th April 2025
Sepahijala	1 st Prize for exhibition stall	CAU (I)	19 th November 2025



Shri. Weto Medo - Best Innovative Farmer Award ICAR-CRIDA



PUBLICATIONS

Table 13.1: Publications in 2025-26 under Zone-VII

KVK	Title	Type of publications
Chandel	Enhancing Farmers Livelihood in Lambung village, Chandel through Climate Resilient Technoloies: Impact of NICRA	Bulletin
	Scope and Potential of Conservation Agriculture in Millet-based Farming Systems	Bulletin
	Constraints faced by vegetable Growers in Chandel District, Manipur	Research Paper
	Enhancement of Farm Income through crop diversifacation in Chandel district of Manipur	Research Article
	Enhancing Rice Productivity in Lambung village through Climate Resilient Farming	Research Article
	Ancient Super food Millet as a Sustainable olution to India's Agrarian and Nutritional Challenges	Bulletin
Senapati	Residual impact of zero tillage and conventional tillage on the productivity of field pea variety Aman (IPF-5-19) and Prakash (IPFD 1-10) under rice fallow system. Legume Research, 1-7.doi: 10.18805/LR-5577.	Research Paper
	Optimizing minimum tillage technique and economic evaluation for field pea production in rice fallow lands in Manipur. International Journal of Research in Agronomy.vol.8 (9):418-422.	Research Paper
	Integrated Livestock and crop production systems.The future farming: cuttting-Edge techniques in agricultural published by Agri Root Publication House, Jaipur. E.d Paramveer Singh, Er. Prajwal R.2025,pp:168-181	Research Paper



	Climate Smart Agriculture: Transforming Agricultural Systems for a changing Climate Agronomy: Fundamentals, systems and technological Innovations published by Agritech publication, Karnataka. E.d manjunatha and N. Venkata lakshmi. 2025, pp: 305-326	Research Paper
	Climate adaptive cropping strategies for enhanced farm productivity The future farming: cutting-Edge techniques in agricultural published by Agri Root Publication House, Jaipur. E.d Paramveer Singh, Er. Prajwal R. 2025, pp: 11-22	Research Paper
Ri Bhoi	Optimizing farm productivity with IFS in Ri-Bhoi, Meghalaya, India	Research Paper
	Entrepreneurship Development Through Commercial Duck Farming	Training Manual
South Garo Hills	Assessment of Vanaraja, Rainbow Rooster, and desi chicken birds under backyard poultry systems in South Garo Hills, Meghalaya	Research Article
West Garo Hills	Adaptive performance of resilient rice varieties under climate stress condition in West Garo Hills, Meghalaya – A NICRA based assessment. Plant Archives	Research Paper
Lawngtlai	Badam chin leh enkawl dan	Folder
	Vaimim chin dan	Folder
	Thlai chin leh enkawl dan	Folder
	Tomato chin leh enkawl dan	Folder
	Zikhlum chin leh enkawl dan	Folder
	Backyard poultry farming of Rainbow Rooster	Folder
	Care and management of broiler Vencobb 430Y	Folder
Siaha	Prevention and control of Poultry diseases	Folder/ Leaflets
	Diseases and Pest management of major crops	Folder/ Leaflets
	Different Method of Soil & Water Conservation in Agriculture	Folder/ Leaflets
	Mushroom Cultivation	Folder/ Leaflets



	Climate Resilient Technologies	Folder/ Leaflets
	Management of Nursery for Rabi crops	Folder/ Leaflets
	Vermicompost (Changpat Leitha)	Folder/ Leaflets
	Integrated Farming System- Piggery cum Fish Culture	Folder/ Leaflets
	Natural Farming	Folder/ Leaflets
Phek	Offseason vegetable cultivation in low-cost polyhouse	Folder
	Telhakhu-u khalieketuothedo (Rice Yellow Stem Borer)	Folder
	Alu Ciecükecü (Potato Cultivation)	Folder
	TeirüDzüdiepieSekecü (Jalkund)	Folder
	Kevü (Mepfhi) Perikecü Do (Beekeeping)	Folder
	Shüko Khu Khalie Ketuo Thedo (Fall Armyworm Organic Management Practices)	Folder
Mon	Newsletter on NICRA 2024-25	Newsletter
	Package of Practices of Broccoli.	Extension literature
	Care and Management in Beekeeping (Apis cerena)	Extension literature
	Animal Health Care Camp (Nagaland Page)	Newspaper clipping
Sepahijala	Campendium of Climate Resilient Success stories of NICRA adopted village.	Research paper
	Impact study of Mustard Cultivation through Cluster Frontline Demonstration from Sepahijala District of Tripura, India.	Research paper



SIGNIFICANT ACHIEVEMENTS

Table 14.1 Significant achievements during the year 2025-26

KVK	Description	No. of farmers covered	Impact
Chandel	Mulching in cabbage	7	Beneficial
	Rain water harvesting Jalkund	5	
	Intercropping of groundnut (ICGS-76) with maize (RCM1-76)	12	
	Demonstration on Growing of mustard var. PM-27 after paddy	15	
	Vermicomposting	6	
	Cultivation of mid-duration paddy RC Maniphou-15	16	
	Cultivation of mid-duration paddy RC Maniphou-13	6	
	Cover crops using improved varieties of Soybean var. DsB-19	13	
	Crop diversification through climate resilient oil crop (Groundnut-ICGS-76)	12	
	Low cost shade net	5	
	Mushroom cultivation (<i>Pleurotus spp</i>) for additional income generation	15	
	Integrated paddy-pig-fish farming system	5	
	Integrated paddy-duck-fish farming system	4	
	Backyard duck rearing	15	
	Goat rearing (<i>Black Bengal</i>)	3	
Ukhrul	Mushroom farming as a secondary agriculture	56	Proper and systematic Crop residue management
	Introduction of millets	12	Used as a cover crops for soil conservation



Senapati	Rain water harvesting Jalkund	5	Shows significant positive impact on farm income for NICRA farmers and productivity increases significantly for NICRA farmers as compare to NON NICRA farmers
	Construction of farm pond	3	
	Mulching in winter vegetables	8	
	INM in cole crops	16	
	Drip irrigation in fruit crops	1	
	Nutritional garden with climate coping vegetables	20	
	Year round mushroom cultivation	10	
	Cultivation of King chilli	16	
	Polytunnel for year round vegetable production	3	
	Backyard poultry rearing	24	
	IFS	10	
	Goat rearing for enhancing climate adaptation	5	
	Silage making using HDP drum	9	
South Garo Hills	FTS-II module (Rainfed Midland with animal): Jalkund + Off-season cultivation of cucumber under Naturally Ventilated Low-cost polyhouse + Duck Cum Fish Farming	5	FTS-II shows 0.13% higher productivity than non-NICRA villages under normal conditions, increasing to 0.19% during stress years, indicating greater resilience
	FTS-III module (Rainfed Lowland with animal): Vermicomposting + Paddy – Toria sequence cropping systems + Mineral mixture supplementation in cow	10	FTS-III shows 0.26% higher productivity among NICRA farmers in normal years, while productivity in non-NICRA farmers drops to 64% during stress years, indicating lower resilience.



	FTS-IV module (Irrigated lowland with livestock): Ridge and furrow method of cultivation in Maize + Introduction of HDK-75 breed of pig	10	FTS-IV records 0.43% higher productivity among NICRA farmers in normal years, while non-NICRA farmers' productivity drops to 69.70% during stress years, indicating lower resilience.
West Garo Hills	Integrated farming System	8	Diversified income sources, improved resource use efficiency, and year-round livelihood support
	Climate resilient paddy varieties (Ranjit Sub 1, Bahadur Sub 1 and Gitesh)	42	Stable yields under erratic rainfall, reduced crop loss, and enhanced food security
	Jalkund (Low-cost water harvesting structure)	5	Improved water availability for crops during dry spells
	Paddy straw mulching	18	Better soil moisture retention, weed suppression, and higher crop yields
	Oyster Mushroom production	20	Enhanced household nutrition and additional income from mushroom sales
Lawngtlai	Black Polymuch cultivation of hybrid watermelon	10	Under the NICRA project, 10 farmers covering ~4 ha have adopted the technology



	Cultivation of heat & cold tolerant cabbage variety Ryozeke using micro-sprinkler irrigation system	5	Significantly enhanced farm economics through reduced drudgery, quality seeds, and better crop management, increased net income from Rs. 2.34 lakh to Rs. 5.61 lakh, while the B:C ratio improved from 3.6:1 to 4.9:1.
	Intercropping of Maize-Groundnut	20	The innovation gradually spread among village around 2.6 ha farmers due to higher yields, short-duration production, and improved soil health from legume intercropping
	Backyard poultry farming of Rainbow rooster	5	involving five farmers, resulting in better growth, higher survivability, increased egg and meat production, improved income and nutritional security, and wider adoption of improved poultry practices.
Lunglei	Low cost RWHs inconvergence with MNREGS	10	Increased yield and net return by 65% and 145 %
	Low cost poly House	5	Increased additional income by 70 %
	Short duration paddy-Maniphou 12	15	Increased 38.5% higher yield and 130 % higher net income



Siaha	Stress tolerant crops-Dragon fruit	10	Increased yield and income by 55% and 125 %
	Improved pig sty	5	Higher productivity in return higher net return
	Mulching technology (Black Polythene Mulch 30 microns) (Broccoli)- (400x 1m)	5	Black polythene mulch in broccoli significantly increased yield and improved crop quality. Overall, the technology enhanced farmer income and proved highly effective for adoption.
	Early planting of cabbage var. <i>Sona Solid</i>	20	Resulted in earlier harvest, higher yield and better quality heads. Overall, it increased returns and proved beneficial for adoption.
	Backyard Poultry Farming (Rainbow Rooster)	60	Improved egg and meat production, providing regular income and nutrition to farmers.



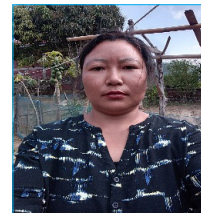
CASE STUDIES (SUCCESS STORIES) OF SUCCESSFUL NICRA FARMERS REPORTED BY THE NICRA KVKs UNDER ZONE- VII

Success Story 1: From Subsistence to Prosperity: Transforming Livelihoods through Integrated Paddy-Piggery-Fishery Farming

KVK Chandel, Manipur

Farmer profile

- Name: Nl. Huimila
- Age: 45 years
- Mobile: 9612219460
- Address: Chandel Christain village, Chandel, Manipur-795127
- Land Holdings: 1.5 ha



Challenges Faced:

Initially, the farmer struggled to utilize her land efficiently due to erratic rainfall during paddy cultivation and prolonged winter dry spells. Long-duration paddy varieties resulted in lower productivity and delayed harvesting, leaving the land fallow until the next season and preventing secondary cropping. Fish monoculture also limited the efficient use of natural pond resources. These challenges restricted year-round cultivation and resulted in low and unstable household income.

Climate-Resilient Technology Adopted:

The Integrated Paddy-Piggery-Fishery Farming System combines paddy cultivation (RC Maniphou-15), Crossbred Hampshire piggery, and composite fish culture consisting of Catla, Rohu, and Common Carp stocked in the ratio of 30:30:40. This climate-resilient farming model promotes efficient utilization and recycling of farm resources, where pig manure serves as an organic nutrient source for fish ponds, enhancing fish productivity while reducing input costs.



Impact of Interventions

With the intervention of the NICRA project through KVK staff mobilization, the farmer became aware of improved and climate-resilient farming practices. She actively participated in training programmes and gradually adopted an **Integrated Paddy-Piggery-Fishery Farming System**.

She replaced traditional long-duration paddy with a mid-duration variety, RC Maniphou-15, which enabled earlier harvesting. This created an opportunity for secondary cropping, and she successfully introduced an oilseed crop (mustard) after paddy. In the fishery component, she shifted from monoculture to composite fish culture by stocking Catla, Rohu, and Common carp in the ratio of 30:30:40, ensuring efficient utilization of pond resources and improved fish production.

Furthermore, she introduced piggery by rearing crossbred Hampshire pigs, which reproduced within a short period (around 10 months), providing a regular source of income. To cope with severe dry spells during winter, she also adopted mushroom cultivation, which served as an additional and reliable income source during the lean season.

Overall, these interventions significantly improved resource utilization, diversified income sources, enhanced resilience to climate variability, and increased the farmer's overall livelihood security.

Yield and Economic Outcomes

The adoption of improved practices led to a significant increase in the farmer's productivity and income. The yield of RC Maniphou-15 paddy reached about **51.21 q/ha**, generating an approximate gross return of **Rs.99,500**. From a single harvest of the fish pond, she obtained around **120 kg of fish**, with a gross return of **Rs.32,600**.

In the livestock component, piggery contributed substantially to her income. She earned approximately **Rs.47,000** from the sale of pigs and an additional **Rs.49,000** from the sale of **7 piglets**. Mushroom cultivation (100 bags) provided an extra income of about **Rs.42,000**, especially during the lean winter period. Furthermore, the introduction of a secondary crop, mustard, resulted in an income of approximately **Rs.36,000**.

Overall, by integrating multiple farming components, the farmer achieved a total gross income of around **Rs.3,06,100**, demonstrating the effectiveness of the integrated farming system in enhancing livelihood security and resource utilization.



Conclusions

The adoption of an Integrated Paddy-Piggery-Fishery Farming System under the NICRA project significantly improved the farmer's livelihood. By replacing traditional practices with climate-resilient and diversified enterprises, she was able to utilize her resources more efficiently, reduce vulnerability to dry spells, and generate multiple sources of income. Overall, the interventions enhanced productivity, increased household income, and strengthened her resilience to climatic uncertainties, ensuring sustainable farming and livelihood security.



Composite fish culture (Catla, Rohu, and Common carp)



Mid duration paddy (RC Maniphou-15)



Rearing of crossbred Hampshire pigs



Mushroom cultivation during the lean season



Success Story 2: Sowing Resilience: Enhancing Rice Productivity through Direct-Seeded Rice Technology

KVK Senapati, Manipur

Farmer profile

- Name of farmer: Mr. Jameskelly
- Age: 34
- Mobile: 8131069150
- Address: T. Khullen, Kangpokpi District, Manipur
- Land holdings in ha (Rainfed & Irrigated): 1ha
- Livestock: Poultry and piggery



Challenges Faced

Water management issues and weed management is a major constraint. Irregular rainfall, prolonged dry spells, and inadequate irrigation facilities often lead to water scarcity or excess moisture, adversely affecting crop growth and yield. Similarly, weeds compete with crops for water, nutrients, sunlight, and space, resulting in significant yield losses and increased production costs.

Climate-Resilient Technology Adopted

Direct Seeded Rice (DSR) is a climate-resilient rice cultivation technique in which rice seeds are sown directly into the field rather than first raising seedlings in a nursery and then transplanting them into puddled soil. Seeds are drilled directly into the mail field. DSR can be practiced under both rainfed and irrigated conditions.

Impact of Interventions

This method eliminates the need for continuous flooding during the early stages of crop growth. The technique also lowers labor requirements, enables timely sowing, reduces cultivation costs, and minimizes methane emissions compared to conventional transplanted rice. DSR helps farmers cope with labour shortages and water scarcity by requiring 15–30% less water and fewer labour inputs compared to conventional transplanted rice

Yield and Economic Outcomes

Yield		Economics		Net income		Gross income		BCR ratio	
Demo	Local	Cost of cultivation (Demo)	Cost of cultivation (Local)	Demo	Local	Demo	Local	Demo	Local
38.25 q/ ha	33.02 q/ha	45000	44000	31500	22000	13500	22000	1.7:1	1.5:1



Conclusions

As compared to transplantation of Rice it Requires 30% less water requirement, it also lower the cost of cultivation of a farmer and also weed management is very easy in this technology.

The successful demonstration of DSR under the NICRA programme has encouraged wider adoption among farmers. So far, the technology has been adopted by 44 farmers across three NICRA villages, indicating its acceptance as a viable climate-resilient practice. The demonstrations and farmer-to-farmer interactions have helped disseminate information on the benefits of DSR, promoting awareness and encouraging neighbouring farmers to adopt the technology for improved water-use efficiency and reduced cultivation costs.

Problem faced by the farmer to adopt the climate resilient technology:

1. Every farmer has no easy access to seed drill machine
2. Difficulty in water management
3. Weed management is more critical than in transplanted rice.
4. Requires good land leveling and proper moisture management.

Suggestions of the farmer:

1. Ensure availability of suitable DSR varieties that are drought-tolerant, early maturing, and suitable for local agro-climatic conditions.
2. Increase the number of seed drill machines
3. Facilitate availability of quality seeds and inputs
4. Strengthen weed management support



Puddling/ levelling in the paddy field



Demonstration of Direct seeded rice



Ready to harvest rice field



Success Story 3: A Symbiotic Success: Boosting Farm Income through Integrated Fish-cum-Duck Farming

KVK Ukhrul, Manipur

Farmer profile

- Name: Shailenphy Elu
- Age: 25
- Mobile: 9863081798
- Address: Kaziphung Ukhrul
- Land Holdings: 0.5 ha



Challenges Faced

Some of the major challenges faced by farmers in the village included low fish productivity due to inadequate pond nutrient management, which resulted in poor growth of natural fish food organisms and reduced fish growth rates. In addition, irregular rainfall patterns affected pond water levels and water quality, creating an unfavorable environment for fish culture. During periods of heavy rainfall, pond dykes were often breached, leading to the escape of stocked fish and significant economic losses to farmers. These climate-related challenges not only reduced fish production and income but also increased the vulnerability of farming households dependent on aquaculture for their livelihoods.

Climate-Resilient Technology Adopted

The Integrated Fish-cum-Duck Farming System is a climate-resilient and resource-efficient farming practice in which 50 ducklings are reared over a 0.2 ha fish pond stocked with a composite fish culture for a period of one year. In this system, the ducks are raised on or around the pond, and their droppings fall directly into the water. The duck droppings serve as a natural fertilizer, enriching the pond with nutrients that promote the growth of plankton, which forms a natural food source for fish. The droppings also act as a supplementary fish feed, reducing the need for external feed and lowering production costs.

Impact of Interventions

The Integrated Fish-cum-Duck Farming System ensures year-round productivity and income generation, making it highly suitable under conditions of erratic rainfall and changing weather patterns. The system remains productive throughout the year because ducks continuously provide nutrient-rich droppings directly into the pond,



which act as a natural fertilizer and stimulate the growth of plankton and other natural fish food organisms.

This continuous nutrient input enhances fish growth and increases fish yield, while significantly reducing dependence on external feed resources. Farmers can save up to 40% of the cost of supplementary fish feed, thereby lowering production costs and improving profitability. This integrated approach enhances fish productivity, improves nutrient recycling, generates additional income from duck meat and eggs, and makes efficient use of available farm resources. As a result, the system increases overall farm profitability and sustainability while reducing environmental impacts.

Yield and Economic Outcomes

The Integrated Fish-cum-Duck Farming System demonstrated excellent performance and proved to be a highly profitable and sustainable climate-resilient intervention. Under the NICRA intervention, the system produced 17.5 quintals of fish, generating a gross return of ₹4,37,500. In addition, the ducks produced approximately 1,400 eggs and 100 kg of meat, contributing an additional gross return of ₹44,000. Thus, the integrated system generated a total gross return of ₹4,81,500, significantly enhancing farm income.

When evaluated in terms of Fish Equivalent Yield (FEY), the NICRA intervention recorded a production of 19.2 quintals, compared to 14.2 quintals under the existing farmer practice. The system also achieved a higher Benefit-Cost Ratio (B:C ratio) of 3.10, compared to 2.22 under conventional practice, indicating greater economic efficiency and profitability. The results clearly demonstrate that integrating duck rearing with fish culture improves resource utilization, increases productivity, diversifies income sources, and strengthens the resilience of farming systems to climatic uncertainties.

Conclusions

The Integrated Fish-cum-Duck Farming System proved to be a climate-resilient, low-cost, and sustainable farming model that effectively addressed key challenges faced by farmers, including feed scarcity, poor water management, and unstable farm income. The integration of ducks with fish culture ensured a continuous supply of natural nutrients to the pond through duck droppings, reducing dependence on external feed and lowering production costs.

The system enhanced overall farm productivity by improving fish growth and providing additional income from duck eggs and meat. It also diversified livelihood opportunities, ensuring a more stable and year-round source of income. By combining two complementary enterprises, the system reduced the risk of crop or enterprise



failure due to adverse weather conditions, thereby increasing the resilience and sustainability of farming households under changing climatic conditions.

Efficient use of farm waste

Here the main resource is duck droppings that fall directly into the pond and promote plankton growth moreover the leftover duck feed is used as supplementary feed there by reducing the need for artificial fish feed. Thus duck droppings and leftover feed are effectively recycled thus creates a zero-waste farming system.



Integrated Fish cum Duck farming System



Success Story 4: Farming Beyond Climate Stress: Building Resilience through Integrated Climate-Smart Farming Systems

KVK South Garo Hills, Meghalaya

Farmer profile

- Name: Kenedy D Momin
- Age: 58
- Mobile: 9863869026
- Address: Asugre, Chokpot C&RD Block, South Garo Hills, Meghalaya
- Land Holdings: 1 ha



Challenges Faced

The farming system in the area is highly vulnerable to climate variability and extreme weather events. Heavy dependence on rainfall limits crop production during the rabi season, as prolonged dry spells and drought conditions lead to inadequate soil moisture and water scarcity. This particularly affects cole crops such as cabbage, resulting in poor growth, reduced head formation, and lower yields.

During the rabi season, low temperatures also adversely affect the growth and productivity of cucurbit crops such as cucumber, causing delayed growth, poor flowering, and reduced fruit set.

Over the last one to two decades, the region has experienced increasing climate variability, characterized by erratic rainfall patterns, flash floods, and rising minimum temperatures coupled with high relative humidity during the kharif season. These changing climatic conditions have created a favorable environment for the proliferation of pests and diseases, leading to increased infestations and outbreaks in both crops and livestock. Consequently, farmers face higher production risks, increased management costs, and reduced farm productivity, highlighting the need for climate-resilient agricultural practices and adaptive management strategies.

Climate-Resilient Technology Adopted

To address the prevailing climatic and production challenges, a set of integrated climate-resilient interventions were implemented to improve water availability, enhance crop productivity, and diversify farm income.



- **Jalkund (Water Harvesting Structure):** Jalkunds were established to harvest and store rainwater for use as supplemental irrigation during dry periods. This intervention helped overcome moisture stress in cabbage cultivation, ensuring better crop growth, head formation, and yield during the rabi season.
- **Off-season Cucumber Cultivation under Low-Cost Polyhouse:** A naturally ventilated low-cost polyhouse (100 m²/unit) was introduced for off-season cucumber cultivation. The protected structure helped moderate temperature fluctuations, reduce cold stress, and create a favorable microclimate for crop growth, resulting in improved productivity and quality of cucumbers during the off-season.
- **Integrated Farming System (IFS): Duck-cum-Fish Farming:** Under FST-II in rainfed midland conditions, a duck-cum-fish farming system was established in a 0.05 ha area and integrated with livestock enterprises. The system promoted efficient recycling of farm resources, where duck droppings served as a natural nutrient source for fish culture. This integration enhanced fish production, reduced feed costs, diversified farm enterprises, and provided a regular source of income throughout the year, thereby improving the resilience and sustainability of the farming system.

Impact of Interventions

Farming System Trial (FST)–II demonstrated higher system productivity compared to farming systems in non-NICRA villages under both normal and adverse climatic conditions. Under normal years, FST–II recorded 0.13% higher system productivity, while during stress years characterized by drought, erratic rainfall, or other climatic extremes, the productivity advantage increased to 0.19%. This improvement indicates that the climate-resilient interventions adopted under NICRA enhanced the capacity of the farming system to withstand climatic stresses, maintain production levels, and reduce yield losses. The results highlight the greater resilience, stability, and sustainability of FST–II compared to conventional farming practices.



Yield and Economic Outcomes

Farmer	Technology demonstrated	Area (ha)	Productivity (q ha ⁻¹)	Crop equivalent yield (q ha ⁻¹) (System productivity)	Net returns (₹ ha ⁻¹ or animal ⁻¹)
Normal year (2025-26)					
NICRA Farmers	Jalkund Supplemental irrigation in Cabbage	0.025	221.6	221.6	3,18,200
	Off-season cultivation of cucumber under Naturally Ventilated Low-cost polyhouse	0.01	887.52	887.52	16,276
	IFS (Duck cum Fish farming)	0.05	Duck:45 kg/unit/year Fish:112.3 kg/unit	Duck:45 kg/unit/year Fish:112.3 kg/unit	25,410
Total System productivity					3,59,886
Non-NICRA Farmers	Pump water	0.025	184.9	184.9	2,99,800
	Open field	0.01	347.46	347.46	8,873
	Composite culture of IMC (300 fish fingerlings/0.025 ha)	0.05	Fish:84.2 kg/unit	Fish:84.2 kg/unit	9,740
Total System productivity					3,18,413

Conclusions

The adoption of climate-resilient technologies has significantly improved the ability of farming systems to cope with challenges arising from rainfall dependency, drought, temperature fluctuations, and increasing climate variability. Interventions such as Jalkund-based supplemental irrigation ensured water availability during critical crop growth stages, while low-cost polyhouses provided a protected environment for off-season vegetable cultivation, reducing the adverse effects of temperature stress. The integrated duck-cum-fish farming system further enhanced resource-use efficiency, diversified income sources, and provided year-round livelihood support.



The improved system productivity observed under both normal and climatic stress conditions demonstrates the effectiveness of these interventions in enhancing the resilience and stability of farming systems. By reducing production risks, improving water and nutrient management, and generating multiple sources of income, the integrated approach has helped farmers adapt to changing climatic conditions. Overall, these interventions promote sustainable agricultural development, strengthen livelihood security, and serve as a practical model for long-term climate change adaptation in vulnerable farming communities.



Off-season cultivation of cucumber under low-cost polyhouse



Duck cum Fish Farming



Duck cum Fish Farming



Integrated Duck cum Fish Farming System Model



Jalkund-Supplemented Irrigation in Cabbage during Dry Spells



Success Story 5: Harvesting Every Drop: Transforming Rainfed Farming through Jalkund-Based Irrigation

KVK West Jaintia Hills, Meghalaya

Farmer profile

- Name: Blossom Nongrum
- Age: 48
- Mobile: 9774411834
- Address: Niriang, West Jaintia Hills, Meghalaya-793151
- Land Holdings: 17.3 acres



Challenges Faced:

The farmer faced acute water scarcity during dry spells and winter due to inadequate water conservation and irrigation facilities. Heavy dependence on erratic rainfall restricted crop diversification, multiple cropping, and dry-season vegetable cultivation. Prolonged moisture stress often caused poor crop growth, reduced yields, and occasional crop failure, resulting in low and unstable farm income. These challenges highlighted the need for rainwater harvesting and climate-resilient farming practices to enhance productivity and livelihood security.

Climate-Resilient Technology Adopted:

A Jalkund is a simple, low-cost water harvesting structure designed to collect and store rainwater or surface runoff for use during dry periods. The stored water is used for supplemental irrigation during critical crop growth stages, particularly in areas dependent on rainfall and prone to dry spells. Jalkunds help ensure water availability for vegetable cultivation, nursery raising, and other farm activities during the rabi season. The technology reduces the impact of moisture stress, supports crop diversification and multiple cropping, improves water-use efficiency, and enhances farm productivity and income. As a climate-resilient intervention, Jalkund provides an effective and affordable solution for small and marginal farmers facing water scarcity and erratic rainfall conditions.

Impact of Interventions:

1. The installation of a Jalkund significantly improved the farmer's ability to harvest and store rainwater, ensuring a reliable source of water during dry spells and periods of water scarcity.



2. The availability of stored water enabled the farmer to provide life-saving irrigation at critical crop growth stages, thereby reducing moisture stress and minimizing crop losses.
3. With improved access to irrigation, the farmer was able to increase cropping intensity, adopt crop diversification, and undertake off-season vegetable cultivation, which were previously difficult under rainfed conditions.
4. Timely irrigation and better crop management practices resulted in higher crop yields and improved produce quality.
5. The intervention also contributed to increased farm income and strengthened livelihood security by supporting year-round agricultural activities. In addition, the availability of water facilitated kitchen gardening and other income-generating activities, improving household nutrition and earnings. Overall, the Jalkund enhanced the farmer's resilience to drought and climate variability, making the farming system more productive and sustainable.

Yield and Economic Outcomes:

Before the construction of the Jalkund, agricultural production was largely dependent on rainfall, resulting in low crop yields and limited cropping opportunities, especially during the dry season. The lack of assured irrigation restricted the cultivation of vegetables and other high-value crops, leading to lower farm income and productivity.

Following the intervention, the availability of stored rainwater enabled the farmer to expand vegetable cultivation, including beans and leafy vegetables, and undertake off-season vegetable production, which attracted higher market prices and increased profitability. Assured irrigation also facilitated a shift from single cropping to double cropping, thereby increasing cropping intensity and improving overall farm productivity.

As a result, the farmer's annual income increased substantially from approximately ₹1.5–2.0 lakh, reflecting a significant improvement in livelihood and economic well-being. The reduced risk of crop failure due to timely irrigation provided greater income stability and reliability throughout the year. Furthermore, the improved water availability supported a range of complementary enterprises such as fruit cultivation, kitchen gardening, livestock rearing, fisheries, and small-scale vegetable sales, creating additional income sources and enhancing the sustainability and resilience of the farming system.



Climate Resilient Technology (CRT)	Before NICRA intervention on her field	Yield (q/ha)		Economics of CRT			
		After NICRA intervention	Before NICRA intervention	Gross cost (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B:C Ratio
Low-cost water Harvesting Structure (jalkund). 1.Cabbage (var. Wonder ball) 2. Tomato- (var. Rocky)	Tomato (var. Rocky)	Tomato-272.5 Cabbage- 262	Tomato-221	188200	586900	398700	3.12:1

Before the **NICRA intervention**, the farmer cultivated **tomato (var. Rocky)** under rainfed conditions, achieving a yield of **221 q/ha**. However, crop productivity was constrained by irregular rainfall and inadequate water availability, limiting the scope for crop diversification and efficient crop management.

Following the construction of the **Jalkund**, the farmer gained access to assured irrigation, which enabled the cultivation of both **tomato and cabbage (var. Wonder Ball)**. The availability of water for timely irrigation and improved crop management practices resulted in a substantial increase in productivity. Tomato yield increased from **221 q/ha to 272.5 q/ha**, while cabbage achieved a yield of **262 q/ha**. The intervention also encouraged crop diversification, allowing the farmer to cultivate high-value crops and utilize land more efficiently.

The economic benefits of the intervention were significant. The cultivation system recorded a **gross cost of ₹1,88,200 per hectare** and generated a **gross return of ₹5,86,900 per hectare**, resulting in a **net return of ₹3,98,700 per hectare**. The **Benefit-Cost (B:C) ratio of 3.12:1**, demonstrating the high profitability and economic viability of the intervention. Overall, the Jalkund improved water security, enhanced crop productivity, increased farm income, and strengthened the farmer's resilience to climate variability.

Conclusions

The construction of the Jalkund under NICRA proved to be an effective and sustainable climate-resilient intervention, particularly in addressing water scarcity during dry spells. By harvesting and storing rainwater, the Jalkund ensured a dependable source of irrigation, enabling the farmer to provide timely water to crops during critical growth stages.



The availability of assured irrigation facilitated better crop planning, crop diversification, and adoption of improved crop management practices, leading to higher productivity and improved crop quality. The intervention also reduced the risk of crop failure caused by moisture stress and erratic rainfall, resulting in more stable and reliable farm income.

Overall, the Jalkund significantly enhanced livelihood security, farm profitability, and resilience to climate variability. Its success demonstrates the potential of rainwater harvesting structures as a practical and scalable solution for improving agricultural sustainability and climate adaptation in West Jaintia Hills District and other similar rainfed areas.



**Low-cost water harvesting structure
(Jalkund)**



**Cultivation of Cabbage through
Jalkund water**



Success Story 6: Growing Together: Enhancing Farm Productivity through Integrated Fish-Poultry-Duck Farming

KVK Ri Bhoi, Meghalaya

Farmer profile

- Name: Elbertroni Ramde
- Age: 31
- Mobile: 8132917198/ 6009842380
- Address: Liarkhla, Ri Bhoi district, Meghalaya
- Land Holdings: 2 Ha



Challenges Faced

- Low out put from individual farming system
- Less utilization of land area

Climate-Resilient Technology Adopted

1. The Integrated Fish-cum-Raised Floor Poultry Farming System is a climate-resilient and resource-efficient farming model that combines fish culture with poultry rearing in a mutually beneficial manner. In this system, a poultry shed is constructed on raised platforms either over or adjacent to a fish pond. The shed is generally built using locally available materials such as bamboo, wood, and thatch, making it affordable and suitable for rural farming conditions. The raised floor, often made of split bamboo, allows poultry droppings to fall directly into the pond or be collected and applied periodically. The poultry droppings and deep litter materials act as a valuable source of organic nutrients for the pond ecosystem. These nutrients stimulate the growth of phytoplankton, zooplankton, bacteria, and other aquatic organisms, which serve as natural food for fish. As a result, the need for external fertilizers and supplementary fish feed is substantially reduced, lowering production costs and improving resource-use efficiency. The raised-floor design also helps maintain a clean and dry environment for the birds, reducing disease incidence and improving bird health. Overall, the integration of poultry and fish farming creates a sustainable production system that enhances productivity, profitability, and environmental sustainability.
2. The Integrated Fish-cum-Raised Floor Duck Farming System is a sustainable and economically viable farming model that integrates duck rearing with fish culture. In this system, ducks are reared in a raised-floor shed constructed near or over a



fish pond and are allowed to move freely in and around the water body during the day. The system establishes a natural symbiotic relationship between ducks and fish, resulting in efficient nutrient recycling and enhanced biological productivity. Ducks feed on a variety of natural food sources available in and around the pond, including insects, larvae, snails, aquatic weeds, and other small organisms. This feeding behavior helps control pests and unwanted vegetation, reducing the need for chemical inputs. Simultaneously, duck droppings are deposited directly into the pond, where they act as organic manure and enrich the water with nutrients. The organic matter supplied through duck droppings promotes the growth of phytoplankton and zooplankton, which form the natural food base for fish. Consequently, fish species such as catla, rohu, mrigal, common carp, and grass carp benefit from improved pond productivity and achieve better growth rates. The continuous nutrient input also reduces the requirement for commercial fish feed and inorganic fertilizers, thereby lowering production costs.

Impact of Interventions

The adoption of Integrated Fish-cum-Raised Floor Poultry Farming and Integrated Fish-cum-Duck Farming Systems has emerged as an effective climate-resilient farming strategy, particularly in regions experiencing increasing climate variability, erratic rainfall, floods, droughts, and rising temperatures. These integrated systems strengthen the resilience of farming households by diversifying farm enterprises, promoting efficient resource recycling, reducing production costs, and ensuring stable income generation throughout the year.

The raised-floor poultry housing system provides additional protection against climate-related risks. Poultry sheds constructed on elevated platforms protect birds from waterlogging, flooding, excess moisture, and poor sanitation during periods of heavy rainfall. The raised floor allows droppings to pass through while keeping the birds dry and comfortable, thereby reducing the incidence of diseases, mortality, and production losses. This contributes to improved poultry health, higher egg and meat production, and greater overall farm stability.

In the fish-cum-duck farming system, ducks continue to perform efficiently even during periods of high rainfall and fluctuating temperatures. Their ability to forage on insects, larvae, aquatic weeds, snails, and other natural food sources reduces feed costs while helping control pests and unwanted aquatic vegetation. Ducks also contribute to pond aeration and nutrient circulation through their movement in the water, which helps maintain pond health and ecological balance.



The integration of fish, poultry, and duck enterprises also provides multiple and diversified income streams, which is critical for reducing vulnerability to climate-related shocks. If one enterprise experiences reduced productivity due to adverse weather conditions, income from the other components can help compensate for the loss. Farmers benefit from the sale of fish, poultry meat, eggs, duck meat, and duck eggs, ensuring a more regular and stable cash flow throughout the year. This diversification significantly reduces the risk of complete livelihood failure during extreme climatic events such as droughts, floods, storms, or disease outbreaks.

Overall, the Integrated Fish-cum-Raised Floor Poultry Farming and Integrated Fish-cum-Duck Farming Systems represent sustainable and climate-smart agricultural models. By improving resource-use efficiency, enhancing ecological balance, reducing dependence on external inputs, diversifying income sources, and strengthening adaptive capacity, these systems help farmers cope with increasing climate variability and build more resilient farming systems. Their successful implementation demonstrates considerable potential for scaling up in climate-vulnerable regions to improve productivity, profitability, and long-term livelihood

Yield and Economic Outcomes

The economic performance of the Integrated Fish-cum-Raised Floor Poultry Farming and Integrated Fish-cum-Duck Farming Systems demonstrated their profitability and suitability as climate-resilient livelihood options.

The integrated system recorded an average fish yield of about 650 kg per year from two ponds, generating a gross income of approximately ₹1,50,000 annually. The continuous supply of nutrients from poultry litter and duck droppings enhanced pond productivity and supported sustained fish growth with reduced feed and fertilizer costs.

In the Fish-cum-Duck Farming System, farmers earned an average net return of ₹45,000 per hectare per year, with a Benefit-Cost (B:C) ratio of 2.5, indicating that the enterprise generated ₹2.50 for every rupee invested. Income was derived from both fish production and the sale of duck eggs and meat, providing a stable source of revenue throughout the year.

Similarly, the Fish-cum-Raised Floor Poultry Farming System generated an average net return of ₹45,000 per hectare per year with a higher B:C ratio of 2.8, reflecting better economic efficiency and profitability. The integration of poultry with fish culture reduced production costs through efficient nutrient recycling while generating additional income from poultry meat and eggs.



Overall, both integrated farming systems proved to be economically viable, resource-efficient, and climate-resilient interventions that enhanced farm productivity, increased profitability, diversified income sources, and strengthened livelihood security for farming households.

Conclusions

In conclusion, the demonstration of Integrated Fish-cum-Raised Floor Poultry Farming and Integrated Fish-cum-Duck Farming Systems highlights the effectiveness of integrated, low-input farming approaches in improving productivity, profitability, and climate resilience in Meghalaya. By efficiently recycling farm wastes such as poultry litter and duck droppings into valuable inputs for fish production, these systems reduce dependency on external feeds and fertilizers while enhancing natural pond productivity. The raised floor design ensures better hygiene and protection of poultry during adverse weather, while ducks contribute directly to pond ecology through natural manuring and pest control. Together, these technologies promote sustainable resource utilization, diversify income through fish, meat, and egg production, and provide a buffer against climate variability and market uncertainties. Their adaptability to local conditions, use of locally available materials, and suitability for small landholdings make them highly relevant and scalable interventions for improving the livelihoods of farmers in the region



Integrated Fish cum Poultry farming system



Success Story 7: Every Drop Counts: Combating Dry Spells through Rainwater Harvesting and Paddy Straw Mulching

KVK West Garo Hills, Meghalaya

Farmer profile

- Name: Tengseng Sangma
- Age: 38
- Mobile: 8798583864
- Address: Vill: Bagugre, Dalu Block, West Garo Hills dist. Meghalaya
- Land Holdings: 2.5 ha



Challenges Faced

Short-term drought during the Rabi season (November–March) is a major constraint in the production of winter vegetables due to inadequate rainfall and limited soil moisture availability. The moisture stress experienced during critical growth stages such as germination, vegetative growth, flowering, head formation, and fruit development adversely affects crops like cabbage, cauliflower, broccoli, tomato, pea, French bean, and other winter vegetables.

The lack of adequate water results in poor crop establishment, reduced plant growth, lower yield, and deterioration in produce quality. In severe cases, prolonged dry spells may lead to partial crop failure and increased production costs due to the need for supplemental irrigation. Consequently, farmers face reduced productivity and income, highlighting the importance of water harvesting structures, efficient irrigation systems, and other climate-resilient technologies to mitigate the impact of short-term droughts during the Rabi season.

Climate vulnerability:

The area is highly vulnerable to climatic extremes, experiencing flash floods during the rainy (Kharif) season and short-term droughts during the Rabi season. During the monsoon period, intense and erratic rainfall often leads to flash floods, causing waterlogging, soil erosion, nutrient loss, crop damage, and destruction of farm infrastructure. These conditions adversely affect crop growth and reduce agricultural productivity.

In contrast, during the Rabi season, prolonged dry spells and inadequate rainfall result in short-term drought conditions, leading to moisture stress and limited water availability for irrigation. This particularly affects winter crops and vegetables by



reducing germination, growth, flowering, and yield. The combination of flood risks in the rainy season and drought stress in the dry season makes farming highly challenging and increases production uncertainty.

These recurring climatic stresses highlight the need for climate-resilient interventions improved drainage systems, drought-tolerant crop varieties, protected cultivation, and integrated farming systems to enhance productivity, reduce risks, and strengthen farmers' resilience to climate variability.

Crop stage affected

1. **Tomato:** The **flowering, fruit development, and ripening stages** are highly sensitive to climatic variations. Moisture stress or extreme weather during flowering can lead to poor pollination and flower drop, while stress during fruit development reduces fruit size, quality, and yield. Unfavourable conditions during ripening can affect fruit colour, marketability, and overall production.
2. **Cabbage:** The **head formation stage** is the most critical growth period. Insufficient soil moisture, drought, or temperature stress during this stage can result in poor head development, smaller head size, reduced compactness, and significant yield loss.

Climate-Resilient Technology Adopted

1. Low-Cost Water Harvesting Structure (Jalkund)

The Jalkund is a low-cost rainwater harvesting structure designed to collect and store runoff water for use during dry periods. It provides a reliable source of supplemental irrigation for winter vegetables during the Rabi season, when water scarcity and prolonged dry spells are common. The stored water helps farmers irrigate crops at critical growth stages, reducing moisture stress and preventing yield losses. Jalkunds improve water-use efficiency, support crop diversification, increase cropping intensity, and enhance farm productivity and income, making them an effective climate-resilient intervention for rainfed areas.

2. Winter Vegetable Production Using Paddy Straw Mulch

Paddy straw mulching is a climate-smart moisture conservation practice in which paddy straw is spread around vegetable crops to cover the soil surface. The mulch helps conserve soil moisture by reducing evaporation, suppressing weed growth, and moderating soil temperature. It also protects the soil from erosion and improves soil health through the gradual addition of organic matter. During the Rabi season, paddy straw mulch helps winter vegetables withstand short-term drought and moisture stress, resulting in better crop growth, improved yields, and reduced irrigation



requirements. This low-cost technology enhances water-use efficiency and promotes sustainable vegetable production under changing climatic conditions

Impact of Interventions

The establishment of low-cost water harvesting structures (Jalkund; 5 × 4 × 1.5 m with 30,000 L capacity) ensured the availability of supplemental irrigation during short-term drought periods in the Rabi season, thereby sustaining soil moisture and meeting the water requirements of crops. The adoption of paddy straw mulching further enhanced soil moisture retention, moderated soil temperature, and reduced evaporation losses and acted as an effective natural insulator, conserving soil moisture, suppressing weed growth and gradually enriching soil organic matter through decomposition, thereby improving soil health and microbial activity. Together, these interventions minimized the adverse effects of climate variability during the drought period.

Yield and Economic Outcomes

Crop	Pdty (q/ha)	GR (Rs.ha)	CoC (Rs./ha)	NR (Rs./ha)	BCR
Tomato	111.60	279000	110000	169000	2.53
Cabbage	122.58	245160	115000	130160	2.13

Conclusions

The interventions implemented by KVK West Garo Hills demonstrated that simple and low-cost climate-resilient technologies such as Jalkund (rainwater harvesting structure) and paddy straw mulching can effectively address water scarcity and short-term drought stress during the Rabi season. These interventions maintained adequate moisture during critical crop growth stages, resulting in improved crop growth, stable yields, and better soil health. The economic analysis further highlighted their profitability, with tomato recording a Benefit-Cost (B:C) ratio of 2.53 and cabbage a B:C ratio of 2.13, demonstrating their economic viability and potential to enhance farmers' income.

Overall, the integrated use of water harvesting and moisture conservation practices proved to be a practical, sustainable, and cost-effective approach for improving agricultural productivity and resilience. The success of these interventions indicates their strong potential for wider adoption in climate-vulnerable and rainfed regions to support long-term climate adaptation, livelihood security, and sustainable agricultural.



Establishment of low-cost water harvesting structures and paddy straw mulch in Tomato and Cabbage cultivation



Success Story 8: Backyard Poultry, Better Livelihoods: Empowering Farmers through Rainbow Rooster Rearing

KVK Lawngtlai, Mizoram

Farmer profile

- Name: Mr. Laldawhtheia
- Age: 40 yrs
- Mobile: 8798168229
- Address: Chawnhu, Lawngtlai-796891, Mizoram
- Land Holdings: 1 ha



Challenges Faced:

Initially, Mr. Laldawhtheia faced several challenges such as low productivity of local birds, high chick mortality due to disease outbreaks, lack of scientific management practices, and poor access to quality inputs. Additionally, climate variability, especially erratic rainfall and temperature fluctuations, affected bird health and feed availability. Limited knowledge on vaccination and housing further constrained production. These challenges resulted in low income and discouraged the farmer from expanding poultry activities.

Climate-Resilient Technology Adopted:

Mr. Laldawhtheia adopted climate-resilient backyard rearing of Rainbow rooster birds introduced by KVK Lawngtlai under the NICRA project. This improved strain (dual purpose variety) is hardy, disease-resistant, and well-adapted to local climatic conditions. Scientific practices such as proper vaccination, balanced feeding using locally available resources, and low-cost night shelter were implemented to reduce mortality and stress. The birds were allowed to scavenge during the day, minimizing feed costs while enhancing nutrition. This system ensured regular income through the sale of eggs and meat, even under climatic stress. The technology improved productivity, reduced risk, and enhanced livelihood security in a sustainable manner.

Impact of Interventions:

The intervention of backyard rearing of Rainbow rooster birds under the NICRA project by KVK Lawngtlai had a significant positive impact on the farmer's livelihood. Mortality rate was reduced due to timely vaccination and improved management practices, leading to better survival and growth of birds. The farmer experienced increased egg and meat production, resulting in higher income and improved nutritional security for the household. The low-input system reduced dependency on external feed and minimized costs. Additionally, the farmer gained confidence and



technical knowledge, encouraging expansion of poultry activities and motivating other farmers in the village to adopt this climate-resilient technology.

Yield and Economic Outcomes:

The adoption of rearing rainbow rooster under backyard system resulted in noticeable improvement in yield and economic returns. The farmer reared around 100 birds with a survival rate of over 85%. Adult bird attained an average body weight of 3.53 kg, and hens produced about 160–165 eggs annually. The farmer earned an additional income (net return) of ₹1,39,100/- per cycle through the sale of eggs and birds with a benefit cost ratio of 2.4:1. The low-cost management and use of locally available feed resources further enhanced profitability, making the enterprise economically viable and sustainable under changing climatic conditions.

Conclusions:

The backyard rearing of Rainbow rooster under the NICRA project by KVK Lawngtlai proved to be an effective climate-resilient intervention for enhancing farmers' livelihoods. The improved strain, coupled with scientific management practices, resulted in higher productivity, reduced mortality, and better income generation. The intervention not only strengthened the farmer's economic condition but also improved nutritional security and resilience to climatic stresses. Its success demonstrates the potential for wider adoption among small and marginal farmers in Lawngtlai district, contributing to sustainable poultry development and overall rural livelihood improvement.



Demonstration on Backyard Poultry farming (Rainbow Rooster)



Success Story 9: From Rainwater to Riches: Scaling Up Jalkund-Based Irrigation for Year-Round Farming

KVK Lunglei, Mizoram

Farmer profile

- Name: F lalhmingzuala
- Age: 65
- Mobile: 9366806926
- Address: Tuipui D
- Land Holdings: 2.5 ha



Challenges Faced :

Before the implementation of the NICRA intervention, the farmer's crop production was relatively low due to dependence on erratic rainfall, inadequate irrigation facilities, and the cultivation of less stress-tolerant crop varieties. Frequent moisture stress during critical crop growth stages often resulted in reduced yields and limited farm income.

With the adoption of the Jalkund for rainwater harvesting and the use of improved, high-yielding crop varieties, the farmer gained access to assured irrigation and better-performing crops. This enabled timely irrigation, improved crop management, and enhanced productivity, leading to a substantial increase in farm income. In contrast, during previous years, uncertainty in rainfall, lack of water availability, and lower crop resilience resulted in only marginal returns from farming.

Climate-Resilient Technology Adopted :

Mr. F. Lalhmingzuala, a 67-year-old farmer from Tuipui D village, successfully adopted a low-cost rainwater harvesting structure (Jalkund) under the NICRA Project implemented by the Krishi Vigyan Kendra Lunglei. With technical guidance from KVK Lunglei and support through convergence with the (NREGA), he constructed a Jalkund in the upper portion of his farmland to harvest and store rainwater.

The structure was strategically located to collect runoff water from nearby village streams and surrounding catchment areas. The harvested water was efficiently utilized as life-saving irrigation for Rabi crops during periods of water scarcity and prolonged dry spells. This intervention ensured the availability of water during critical crop growth stages, reduced moisture stress, improved crop productivity, and enabled the cultivation of vegetables and other crops during the dry season. As a result, the farmer achieved better yields, increased farm income, and enhanced resilience to climate variability and erratic rainfall patterns.

Impact of Intervention:

The availability of water through the Jalkund for life-saving irrigation, coupled with the adoption of improved crop varieties, encouraged Mr. F. Lalhmingzuala to diversify his cropping system and cultivate a wider range of high-value crops. The efficient and



judicious use of stored rainwater through micro-irrigation systems further enhanced water-use efficiency, leading to higher crop productivity and increased profitability.

The success of this intervention served as a model for other farmers in the village. Observing the benefits of rainwater harvesting and improved crop production, many farmers adopted similar technologies on their own farms. As a result, a total of 85 Rainwater Harvesting (RWH) structures were constructed, covering approximately 20 hectares of agricultural land. The technology not only spread within Tuipui D village but was also adopted in several neighbouring villages, demonstrating its effectiveness, scalability, and potential for enhancing climate resilience, water security, and farm income in the region.

Yield and Economic Outcomes :

Crops	Area	Production (in Kg)	Gross Income
Cabbage	0.5	9500	190000
Tomato	0.2	1950	78000
Bean	0.2	1850	37000

Conclusions :

The successful adoption of the **Jalkund rainwater harvesting technology by Mr. F. Lalhmingzuala** served as a catalyst for its wider dissemination in the area. Observing the benefits of assured irrigation, improved crop production, and increased farm income, many farmers in the village were motivated to adopt similar rainwater harvesting structures on their own farms.

As a result, the technology spread rapidly through farmer-to-farmer learning and community participation. A total of **85 Rainwater Harvesting (RWH) structures** were subsequently constructed, covering approximately **20 hectares** of agricultural land. The impact extended beyond Mr. Lalhmingzuala's village, with farmers from neighbouring villages also adopting the technology. This horizontal spread demonstrates the effectiveness, acceptability, and scalability of the intervention in improving water availability, enhancing crop productivity, and strengthening resilience to climate variability across the region.



Low-cost rainwater harvesting structure (Jalkund) as lifesaving irrigation for Rabi crops



Success Story 10: Early Cabbage, Greater Returns: Enhancing Productivity through Climate-Smart Cultivation

KVK Siaha, Mizoram

Farmer profile

- Name: LC Thangbuaia
- Age: 51
- Mobile: 7005466802
- Address: Chhaolo
- Land Holdings: 2 ha



Challenges Faced

Farmers face several challenges in planting of cabbage, including unpredictable weather conditions such as high temperature and irregular rainfall, which can affect seedling establishment and growth. There is also a higher risk of pest and disease incidence during the late season. Seedling mortality due to heat stress or heavy rain is common, along with difficulties in nursery management. Limited availability of suitable early-maturing varieties, increased need for careful irrigation and plant protection, and uncertainty in market prices further add the constraints.

Climate-Resilient Technology Adopted

Climate-resilient practices adopted in early planting of cabbage help farmers reduce risks from weather variability and improve crop performance. These include the use of early-maturing and heat-tolerant varieties, raising healthy seedlings in protected nurseries (such as shade nets or polyhouses), and adjusting planting time based on local weather forecasts. Farmers also adopt mulching to conserve soil moisture and regulate temperature, along with efficient irrigation methods like drip irrigation to manage water stress. Integrated pest and disease management (IPM) is used to control early-season infestations, while proper nutrient management strengthens plant growth. Additionally, practices like raised bed planting and ensuring good drainage help protect crops from excess rainfall and water-logging, making early cabbage cultivation more resilient to climate uncertainties.

Impact of Interventions

The interventions in early planting of cabbage have led to significant positive impacts for farmers. Adoption of improved practices such as use of early-maturing varieties, protected nursery raising, mulching and better nutrient and water management has



resulted in higher yield and better crop quality. Farmers are able to harvest earlier, which often helps them capture better market prices. These practices also reduce crop losses due to adverse weather, pest and diseases, thereby increasing overall profitability and income stability. Additionally, improved management practices enhance resource use efficiency and built climate resilience in cabbage cultivation.

Yield and Economic Outcomes

Early planting of cabbage results in improved yield and better economic outcomes when appropriate practices are followed. Farmers generally obtain 20-30% higher yields due to better crop establishment, efficient input use, and reduce stress during critical growth stages. Early harvesting enables farmers to reach the market ahead of peak supply, often securing higher prices for their produce. Although the cost of cultivation may increased slightly due to inputs like quality seedlings, mulching and plant protection, the net returns and benefit-cost ratio improve significantly. Overall, early planting enhances productivity and income stability for farmers.

Impact of intercropping on yield and economics:

Technology demonstrated	Area (ha)	Yield (q ha ⁻¹)	Cost of cultivation (Rs/ha)	Gross cost (Rs/ha)	Net returns (Rs/ha)	B C ratio
Early planting of cabbage var. <i>Sona Solid</i>	0.25	185	99800	296000	196200	2.96
Normal planting		141	88000	225600	137600	2.56

Conclusions

Early planting of cabbage is a beneficial practice that can significantly improve yield, crop quality, and farmers' income when supported with proper management. Despite challenges such as weather variability, pest incidence, and higher initial care, the adoption of suitable varieties, improved nursery techniques, and efficient resource management helps minimize risks. Overall, early planting enables timely harvest, better market opportunities, and enhanced climate resilience, making it a promising approach for increasing productivity and profitability in cabbage cultivation.



Early planting of cabbage var. *Sona Solid*, improve yield, crop quality, and farmers' income



Success Story 11: Turning Farm Waste into Wealth: Improving Vegetable Production through Composting

KVK Serchhip, Mizoram

Farmer profile

- Name: Lalhmingchama
- Age: 49
- Mobile: 9862018332
- Address: Lungchhuan, Serchhip, District Mizoram
- Land Holdings: 0.8 (Rainfed)



Challenges Faced

Water scarcity during stress months is a major challenge in rainfed farming systems, particularly during prolonged dry spells and the Rabi season when rainfall is limited. Insufficient water availability leads to moisture stress in crops, affecting their growth, yield, and overall productivity. Farmers often face difficulties in providing timely irrigation during critical crop growth stages, resulting in reduced farm income and increased vulnerability to climate variability.

Poor renovation and maintenance of soil and water conservation structures further aggravate the problem. Ineffective conservation measures lead to high runoff, soil erosion, nutrient loss, and poor groundwater recharge. Consequently, rainwater is not adequately conserved for use during dry periods, reducing soil moisture availability and limiting agricultural production. Strengthening soil and water conservation practices is therefore essential for improving water availability, sustaining crop productivity, and enhancing climate resilience.

Climate-Resilient Technology Adopted

Composting combined with the cultivation of improved varieties such as Tomato (Arka Abhed), French Bean (Zorin Bean), and Cabbage (Ryozeki) is a sustainable and climate-resilient farming practice. Compost prepared from farm wastes and organic materials enriches the soil with essential nutrients, improves soil structure, enhances water-holding capacity, and promotes beneficial microbial activity.

The application of compost provides a balanced and gradual supply of nutrients, supporting healthy crop growth and improving resilience to moisture stress. When used with high-yielding and improved varieties, it results in better plant vigor, higher yields, improved produce quality, and reduced dependence on chemical fertilizers.



This integrated approach enhances soil health, lowers cultivation costs, increases farm productivity, and contributes to sustainable agricultural production.

Impact of Interventions

Composting using locally available organic resources such as crop residues, weeds, farmyard manure, and household organic waste helps improve soil fertility by increasing organic matter content and enhancing nutrient availability. It also improves soil structure, water-holding capacity, and microbial activity, which directly contribute to better crop growth, higher productivity, and improved soil health.

The cultivation of improved varieties such as Tomato (Arka Abhed), French Bean (Zorin Bean), and Cabbage (Ryozeki) enables farmers to achieve higher yields, better-quality produce, and increased resistance to environmental stresses. With the technical guidance and support provided by KVK, farmers can adopt improved production practices and cultivate these crops throughout the year. This not only ensures a continuous supply of vegetables but also provides stable and additional income,

enhancing livelihood security and the overall sustainability of the farming system.

Yield and Economic Outcomes

Composting Technology

Pit size	Production/ Pit	Cost of cultivation	Gross monetary return	B:C
4*2*1 ft 250 kg		3600	12500	3.4
Crop	Yield	Gross Cost	Gross Return	B:C
Tomato	281 q/ha	132140 Rs/ha	388492 Rs/ha	2.94
Cabbage	32.2 t/ha	92375 Rs/ha	297447 Rs/ha	3.2

Conclusions

The adoption of this technology provides additional and stable income to farmers through the year-round cultivation of high-value vegetables. By integrating composting and improved crop varieties, farmers can achieve better yields and improved produce quality, leading to higher market returns.

At the same time, the use of organic compost helps maintain and improve soil health by enhancing soil fertility, increasing organic matter content, improving soil



structure, and promoting beneficial microbial activity. This contributes to sustainable crop production while reducing dependence on chemical fertilizers. The technology also ensures a continuous supply of fresh vegetables throughout the year, improving household nutrition, food security, and livelihood resilience under changing climatic conditions.



Composting using locally available resources, improves the production of Tomato, French bean and Cabbage



Success Story 12: Growing Without Soil: Empowering Farmers through Low-Cost Hydroponic Cultivation

KVK Phek, Nagaland

Farmer profile

- Name: Mr. Weto Medo
- Age: 39
- Mobile: 8974173056
- Address: Pfutseromi village
- Land Holdings: 3 acre



Challenges Faced:

Farmers in the area face several challenges that adversely affect agricultural productivity and livelihood security. Climate vulnerability, characterized by erratic rainfall, prolonged dry spells, and extreme weather events, increases the risk of crop losses and reduces the stability of farm production. Drought-like conditions during critical crop growth stages often lead to moisture stress, poor crop performance, and in severe cases, partial or complete crop failure.

Additionally, the limited availability of agricultural land restricts opportunities for expanding cultivation and adopting diversified farming systems. Small and fragmented landholdings further constrain crop production and income generation. These challenges collectively reduce farm productivity, increase economic risks, and highlight the need for climate-resilient technologies and sustainable land-use practices to improve farmers' livelihoods and resilience.

Climate-Resilient Technology Adopted:

Mr. Weto adopted a low-cost hydroponic cultivation system under the NICRA programme as a climate-resilient technology to overcome challenges such as climate variability, drought-like conditions, and limited agricultural land. The system enables crop cultivation without soil, thereby reducing dependence on rainfall and minimizing the adverse effects of changing weather conditions.

The hydroponic unit, covering an area of 60 ft², was constructed using locally available PVC pipes installed within a shade-net structure. This setup provides protection from heavy rainfall, excessive sunlight, and high temperatures while making efficient use of limited space. A nutrient solution prepared from water and decomposed cow dung in a 3:1 ratio is circulated through the system using a water pump, ensuring a continuous



supply of nutrients and moisture to the plants.

The technology significantly improves water-use efficiency, requires less water than conventional cultivation, and promotes better nutrient utilization. It enables the year-round production of high-value crops such as lettuce, Chinese cabbage, and king chilli, ensuring stable yields and income even under adverse climatic conditions. Furthermore, the integration of hydroponics with a polyhouse nursery for raising crops like broccoli, capsicum, and *Zanthoxylum* strengthened farm resilience through crop diversification and continuous production. Overall, the intervention enhanced productivity, reduced climate-related risks, and improved livelihood security for the farmer.

Impact of Interventions:

The adoption of the low-cost hydroponic system enabled Mr. Weto to make efficient use of limited land and water resources while maintaining year-round crop production. The controlled growing environment ensured faster plant growth, higher productivity, and better-quality produce, particularly in crops such as lettuce. The use of locally available organic inputs, including decomposed cow dung-based nutrient solutions, reduced dependence on expensive chemical fertilizers and lowered production costs, making the system economically sustainable over time.

The integration of hydroponic cultivation with a polyhouse nursery further enhanced farm productivity by enabling the production of seedlings and diversified crops such as broccoli, capsicum, and *Zanthoxylum* species. This diversification provided multiple income sources and reduced the risks associated with climate variability and market fluctuations. Overall, the intervention improved resource-use efficiency, increased farm income, and demonstrated a practical and climate-resilient farming model that can be successfully adopted by small and marginal farmers facing constraints of land, water, and changing climatic conditions.

Yield and Economic Outcomes:

During the first year of adoption, Mr. Weto was able to cultivate **6–7 crop cycles annually** in his **60 ft² hydroponic unit**, demonstrating the potential of the technology for continuous and year-round production. From each production cycle, he earned an income of approximately **₹1,500–2,000**, providing an additional source of revenue to the household.

As this was the initial year of implementation, the system was still in the learning and establishment phase, and therefore the income generated was relatively modest. However, the successful performance of the unit has encouraged the farmer to



further invest in the technology. Recognizing its potential for higher productivity and profitability, Mr. Weto plans to **expand the size of the hydroponic unit in the near future**, which is expected to increase production capacity, improve income generation, and further strengthen the resilience and sustainability of his farming enterprise.

Conclusions:

The low-cost hydroponic system adopted by Mr. Weto demonstrates the potential of innovative and climate-resilient farming technologies to improve agricultural productivity and income, particularly in situations where land and water resources are limited. The successful implementation of this intervention highlights its suitability for small and marginal farmers seeking alternative and sustainable production systems. With continued technical guidance, capacity building, access to quality inputs, and improved market linkages, the technology can be scaled up and replicated across the region. Wider adoption of such systems has the potential to enhance farm income, strengthen livelihood security, promote resource-use efficiency, and improve the resilience of farming communities to changing climatic conditions.



Low-cost hydroponic cultivation system allows for year round cultivation of high value crops like lettuce, chinese cabbage, and king chilli



Success Story 13: Mulching for Moisture, Harvesting Prosperity: Transforming Garlic Cultivation through Paddy Straw Mulching

KVK Mon, Nagaland

Farmer profile

- Name: Angpa Konyak
- Age: 30
- Mobile: 8132854204
- Address: House No 835, Langmeing Village, Aboi, Mon, Nagaland. 798603
- Land Holdings: 1.8 ha



Challenges Faced

Angpa faces several interrelated challenges that limit productivity and income. The high cost of inputs, combined with low financial capacity and limited access to credit, restricts investment in quality seeds, fertilizers, and improved technologies. The farm is vulnerable to crop failure due to erratic rainfall and moisture stress under rainfed conditions. Soil degradation, including declining fertility, further reduces crop performance. Additionally, limited access to inputs, irrigation, and basic infrastructure affects timely operations and marketing, while low exposure to improved practices constrains overall farm efficiency.

Climate-Resilient Technology Adopted

1. Paddy straw mulch in Garlic (Yamuna Purple-10)

Paddy straw mulching in Garlic (Yamuna Purple-10) is a simple and effective climate-resilient practice used to conserve soil moisture and improve crop productivity. In this method, paddy straw is spread over the soil surface around garlic plants after planting. The mulch acts as a protective cover, reducing evaporation losses, suppressing weed growth, and regulating soil temperature. As a result, garlic plants exhibit better growth, bulb development, and yield. The practice lowers irrigation requirements, reduces production costs associated with weeding, and contributes to sustainable and climate-resilient crop production.

Impact of Interventions

Paddy straw mulching in Garlic (Yamuna Purple-10) has proven to be an effective climate-resilient technology, particularly under rainfed conditions. The mulch conserves soil moisture by reducing evaporation, resulting in 20–30% higher soil moisture retention compared to non-mulched fields. It also suppresses weed growth,



reducing weed incidence by 50–70% and minimizing the need for frequent weeding operations.

The practice further enhances water-use efficiency by reducing irrigation requirements by 25–40% and moderating soil temperature fluctuations by approximately 2–4°C, creating a more favorable environment for crop growth. These improved growing conditions promote better plant development and bulb formation, leading to a 15–25% increase in garlic yield.

In addition, reduced weeding and irrigation requirements lower labour and cultivation costs by 20–30%, resulting in an overall increase in net returns of about 20–35%. Thus, paddy straw mulching is a low-cost, sustainable, and economically viable intervention that improves productivity, conserves resources, and enhances the resilience of garlic cultivation under changing climatic conditions.

Yield and Economic Outcomes

Yield /hectare	1690 kg/ha
Cost of Cultivation/hectare	₹ 60,500/ha
Gross Returns/ hectare	₹ 180,000/ha
Net Returns/ hectare	₹ 1,19,500/ha
B:C Ratio	2.97

Conclusions

The adoption of paddy straw mulching in garlic cultivation by Mr. Angpa proved to be an effective, low-cost, and climate-resilient technology suitable for the rainfed conditions of Mon district. The use of locally available paddy straw helped conserve soil moisture, suppress weed growth, regulate soil temperature, and improve soil health, creating favorable conditions for crop growth and resulting in a garlic yield of 1,690 kg/ha.

By reducing moisture loss and weed infestation, the technology lowered the need for frequent irrigation and weeding, thereby reducing cultivation costs. The total cost of cultivation was ₹60,500/ha, while the crop generated a gross return of ₹1,80,000/ha and a net return of ₹1,19,500/ha. The intervention achieved a Benefit-Cost (B:C) ratio of 2.97, indicating high economic viability and profitability.

Overall, paddy straw mulching enhanced both productivity and farm income while promoting efficient use of locally available resources. The success of the intervention demonstrates its potential as a sustainable, farmer-friendly, and climate-resilient



practice for improving livelihoods and strengthening the resilience of rainfed farming systems in Mon district and similar agro-ecological regions.



Paddy straw mulching in garlic cultivation



Success Story 14: Seeds of Resilience: Enhancing Maize Productivity through High-Yielding HQPM-1

KVK Tuensang, Nagaland

Farmer profile

- Name: Namangyongo
- Age: Mosha Yemjong
- Mobile: 8974287229
- Address: Chendang Village, Tuensang, Nagaland
- Land Holdings: 1.5 ha



Challenges Faced

Farmers face several constraints that limit agricultural productivity and profitability. One of the major challenges is the limited availability of quality seeds of improved varieties, which affects crop performance, yield potential, and resistance to pests, diseases, and climatic stresses. The use of poor-quality or traditional seeds often results in lower productivity and reduced farm income.

Another important constraint is the limited access to farm machinery and equipment, which hampers timely field operations such as land preparation, sowing, irrigation, and harvesting. This leads to increased labour requirements, higher production costs, and reduced efficiency in farm management.

Additionally, many farmers have limited knowledge of scientific crop production practices, including proper nutrient management, pest and disease control, water management, and improved cultivation techniques. The lack of awareness and technical guidance often results in suboptimal use of inputs and lower crop yields. Addressing these challenges through the provision of quality seeds, improved access to farm equipment, and regular training and extension support can significantly enhance agricultural productivity, profitability, and climate resilience.

Climate-Resilient Technology Adopted

The adoption of the high-yielding maize variety HQPM-1 proved to be an effective climate-resilient intervention for farmers facing erratic weather conditions during the monsoon season. Compared to local maize cultivars, HQPM-1 has a shorter plant stature, which significantly reduces the risk of lodging and crop damage caused by heavy rainfall, strong winds, and peak monsoon showers.



Another important advantage of HQPM-1 is its shorter crop duration, which enables the crop to mature earlier and escape adverse weather conditions that often occur later in the season. This characteristic minimizes yield losses due to prolonged rainfall, waterlogging, and other climatic stresses. In addition, the variety offers higher yield potential and better grain quality, contributing to increased farm productivity and income.

Overall, the adoption of HQPM-1 enhances crop stability, reduces the risk of crop failure under changing climatic conditions, and provides farmers with a more reliable and profitable maize production system.

Impact of Interventions

The adoption of the improved maize variety HQPM-1 resulted in several agronomic and economic benefits. Due to its short and sturdy plant stature, the crop exhibited no lodging, even under conditions of heavy rainfall and strong winds during the monsoon season. This helped maintain plant health and ensured better grain development.

The variety also showed minimal incidence of pests and diseases, reducing crop losses and lowering the need for plant protection measures. As a result, farmers incurred lower production costs while obtaining healthier crops.

These advantages collectively contributed to higher yields and superior grain quality compared to local cultivars. The improved productivity and quality enhanced market value and farm income, making HQPM-1 a reliable, profitable, and climate-resilient option for maize cultivation in areas prone to adverse weather conditions.

Yield and Economic Outcomes

He obtained a yield of 43.2 q/ha as compared to 23.2 q/ha of local variety of Maize.

Yield (q/ha)	Cost of cultivation (₹/ha)	Gross income (₹/ha)	Net income (₹/ha)	B:C ratio
NICRA				
43.2	25,200	86,400	61,200	3.42
Non NICRA				
23.2	21,500	46,400	24,900	2.1

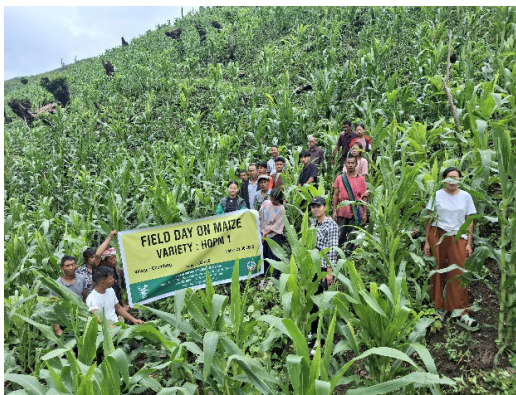
Conclusions

The farmer expressed a high level of satisfaction with the performance of the improved maize variety and showed strong enthusiasm to continue its cultivation in the coming seasons. The higher yield, better grain quality, resistance to lodging, and lower pest



and disease incidence contributed significantly to his positive experience with the technology.

Since maize serves as a major source of feed for livestock in the village, the increased production not only improved farm income but also ensured a reliable supply of feed for cattle, pigs, poultry, and other livestock. Encouraged by the successful results, the farmer also expressed keen interest in adopting other climate-resilient and improved agricultural technologies in the future to further enhance productivity, profitability, and the sustainability of his farming system.



High yielding improved variety of Maize HQPM-1



Success Story 15: Turning Climate Challenges into Opportunities: Enhancing Farm Productivity through Integrated Climate-Resilient Technologies

KVK Sepahijala, CAU (I), Latiacherra, Tripura

Farmer profile

- Name: Animesh Sarkar
- Age: 35
- Mobile: 8837080968
- Address: Vill+ P.o-Golaghati, Sepahijala, Tripura
- Land Holdings: 0.8 ha



Challenges Faced

Mr. Animesh Sarkar, a progressive farmer from Golaghati, primarily cultivates seasonal vegetables and paddy as his main agricultural enterprises. However, his farming activities are frequently affected by climatic stresses. During the Kharif season, he faces flooding and waterlogging, particularly during the tillering stage of paddy, which adversely affects crop growth, reduces tiller formation, and ultimately lowers grain yield. Excess water also causes nutrient loss and increases the risk of pest and disease incidence.

During the Rabi season, the farmer experiences water scarcity and prolonged dry spells, resulting in inadequate moisture for vegetable cultivation and other crops. The lack of assured irrigation limits crop diversification, reduces productivity, and affects farm income. These recurring challenges of flood during Kharif and water scarcity during Rabi highlight the vulnerability of the farming system to climate variability and the need for suitable climate-resilient interventions to improve productivity and livelihood security.

Climate-Resilient Technology Adopted

To overcome the challenges of flood during the Kharif season and water scarcity during the Rabi season, **Mr. Animesh Sarkar** adopted several **climate-resilient technologies** promoted by the **Krishi Vigyan Kendra Sepahijala** under climate adaptation initiatives.

1. Slurry Method of Phosphorus Application in Paddy

In paddy cultivation, Mr. Sarkar adopted the **slurry method of phosphorus application**, wherein phosphorus fertilizer is mixed with water and applied as a



slurry before transplanting or during crop establishment. This method ensures better contact between the fertilizer and plant roots, resulting in improved phosphorus availability and uptake by the crop.

The technology promotes stronger root development, better tillering, and improved plant vigor. It also minimizes nutrient losses caused by runoff and waterlogging, which are common during heavy monsoon rains. As a result, the paddy crop shows better growth, higher nutrient-use efficiency, and increased grain yield compared to conventional fertilizer application methods.

2. Potato Cultivation under Paddy Straw Mulching

To cope with moisture stress during the Rabi season, Mr. Sarkar adopted **potato cultivation under paddy straw mulching**. In this practice, paddy straw is spread over the soil surface after planting potatoes, creating a protective layer that conserves soil moisture and reduces evaporation losses.

The mulch helps maintain a favorable soil environment by regulating soil temperature, suppressing weed growth, and reducing soil erosion. It also improves soil organic matter content as the straw gradually decomposes. The availability of conserved moisture is particularly beneficial during dry spells, leading to better tuber development, higher yields, and reduced irrigation requirements. Additionally, the reduced need for weeding lowers labour costs and enhances profitability.

3. Cultivation of Brinjal and Chilli under Plastic Mulching

Mr. Sarkar also adopted the cultivation of **brinjal and chilli under plastic mulching (polymulching)**. In this technology, plastic mulch sheets are laid over the soil surface around the crop rows. The mulch acts as a barrier that reduces soil moisture loss, suppresses weeds, and improves soil temperature conditions for plant growth.

Plastic mulching significantly enhances water-use efficiency and helps crops withstand dry periods. It also reduces soil-borne diseases, prevents nutrient leaching, and keeps fruits clean by avoiding direct contact with the soil. The improved microclimate created by the mulch promotes better flowering, fruit set, and fruit development, resulting in increased yield and superior-quality produce. Furthermore, reduced weed growth lowers labour requirements and production costs.

Impact of Interventions

The successful adoption of climate-resilient technologies by Mr. Animesh Sarkar served as an inspiration to other farmers in the village and surrounding areas. Observing the improvements in crop productivity, efficient water and nutrient management, and increased farm income, many neighbouring



farmers became interested in adopting similar interventions on their own farms.

The visible benefits of practices such as the slurry method of phosphorus application in paddy, potato cultivation under paddy straw mulching, and brinjal and chilli cultivation under polymulching encouraged farmer-to-farmer learning and technology dissemination. As a result, these interventions are gradually gaining popularity and acceptance within the village and nearby communities. The growing adoption of these climate-resilient technologies is contributing to enhanced agricultural productivity, improved livelihood security, and greater resilience to climate variability across the region.

Yield and Economic Outcomes

Crop	Before Intervention			After Intervention		
	Yield (q/ha)	Cost of Cultivation (Rs)	Gross Income (Rs)	Yield (q/ha)	Cost of Cultivation (Rs)	Gross Income (Rs)
Paddy	48.8	69780	1,15,607	56.2	68400	1,33,137
Brinjal	71.05	92345	2,84,200	112.8	1,22,365	4,50,320
Potato	143.13	116765	2,31,195	202.5	1,20,435	3,03,750
Chilli	115	1,85,500	5,75,000	87.5	1,65,000	4,37,500

Conclusions

Mr. Animesh Sarkar is gradually emerging as a role model farmer in his area due to the successful adoption of various climate-resilient technologies promoted by KVK Sepahijala. His ability to achieve higher crop productivity, better resource-use efficiency, and increased farm income despite climatic challenges has inspired many fellow farmers to follow his example.

The adoption of technologies such as the slurry method of phosphorus application, paddy straw mulching, and polymulching has demonstrated clear economic and agronomic benefits. By reducing production costs, conserving soil moisture, improving nutrient utilization, and increasing yields, these interventions have enabled farmers to obtain higher returns on their investments. The visible success of Mr. Sarkar's farm has encouraged wider acceptance of climate-resilient practices in the community, contributing to improved livelihoods, sustainable agriculture, and enhanced resilience to climate variability.



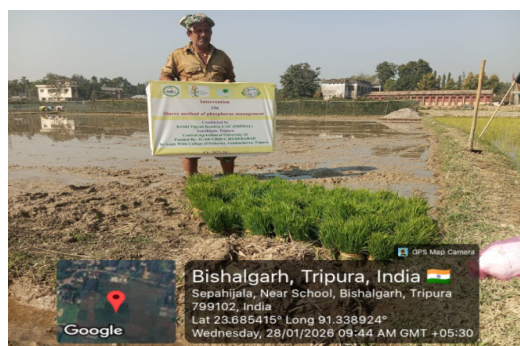
Grafted Brinjal (variety: VNR 212) under polymulching



Intervention on Chili under polymulching



Intervention on Potato under paddy straw mulching



Intervention on Potato under paddy straw mulching



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