STRENGTHENING LIVELIHOODS THROUGH CLIMATE-RESILIENT FARMING

ANNUAL REPORT 2024-25

NICRA-TDC

A.K. Mohanty
P.K. Pathak
Amrutha T.
A.K. Singha
Mainak Ghosh
Ricky Ronghang
Sutanu Majumdar

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

STRENTHENING LIVELIHOODS THROUGH CLIMATE-RESILIENT FARMING
ANNUAL REPORT 2024-25
(NICRA-TDC)

Chief Editor

A. K. Mohanty

Compiled and Edited by

P. K. Pathak

Amrutha T

A. K. Singha

Mainak Ghosh

Ricky Ronghang

Sutanu Majumdar

ICAR-Agricultural Technology Application Research Institute, Zone-VII

Umiam, Meghalaya-793103

(An ISO 9001:2015 Certified Organization)

STRENTHENING LIVELIHOODS THROUGH CLIMATE-RESILIENT FARMING ANNUAL REPORT 2024-25 (NICRA-TDC)

Citation:

Mohanty, A.K., Pathak, P.K., T, Amrutha., Singha, A.K., Ghosh, M., Ronghang, R., Majumdar, S. 2025. Strenthening Livelihoods through Climate-Resilient Farming. ICAR- Agricultural Technology Application Research Institute, Umiam-793103, Meghalaya, India

Chief Editor

A. K. Mohanty

Compiled and Edited by

P. K. Pathak
Amrutha T
A. K. Singha
Mainak Ghosh
Ricky Ronghang
Sutanu Majumdar

Published by:

The Director
ICAR-ATARI, Zone VII
Umroi Road, Umiam- 793103, Meghalaya, India
Phone: 0361-2570483
Fax: 0364: 2570396, 2570483
E-mail: icarzcu3@gmail.com

Printed at

Rumi-Jumi Enterprise, G. S. Road, Six Mile, Guwahati-22
Ph. No. 98640 75734

PREFACE

Greetings from Team ICAR-ATARI, Zone-VII!

It is with great pride and optimism that I present ***Strenthening Livelihoods through Climate-Resilient Farming***, the Annual Report for 2024-25, reflecting the remarkable strides made under the National Innovations in Climate Resilient Agriculture (NICRA) program. This document encapsulates the collective efforts of dedicated teams and farmers across the Northeastern Hill Region, showcasing how science and community collaboration can transform agriculture in the face of climate variability.

Launched in 2011, NICRA has been a beacon of hope, addressing the urgent challenges posed by erratic weather patterns, heavy rains, floods, landslides that threaten the livelihoods of our farming communities. The Technology Demonstration Component (TDC), executed through 15 Krishi Vigyan Kendras (KVKs) under ICAR-ATARI, Zone-VII, Umiam has been instrumental in translating research into actionable, site-specific solutions. This report highlights the resilience building interventions ranging from water harvesting and stress-tolerant crops to integrated livestock systems that have empowered farmers and enhanced food security in Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

I extend my heartfelt gratitude to the Heads and the dedicated NICRA staff of the 15 KVKs for their unwavering commitment and tireless efforts in implementing these transformative technologies on the ground. Their leadership and hands-on support have been the backbone of this success. Special thanks are due to Dr. P.K. Pathak, Senior Scientist and PI of NICRA, and Dr. Amrutha T., Scientist and Co-PI, whose visionary guidance and expertise have steered the program with remarkable precision. I also deeply appreciate the contributions of Mr. Ricky Ronghang and Mr. Sutanu Majumdar, SRFs, whose diligent efforts and meticulous work have been pivotal in compiling and shaping this document.

This report stands as a testament to the power of collaboration, innovation, and resilience. As we move forward, I am confident that the insights and achievements documented here will inspire further advancements, ensuring a sustainable agricultural future for the Northeast and beyond.

Place: Umiam, Meghalaya
Date: 24 October 2025

Dr. A. K. Mohanty
Director

ACKNOWLEDGEMENT

We, the authors of ***Strenthening Livelihoods through Climate-Resilient Farming***, extend our deepest gratitude and appreciation to the individuals and teams whose guidance, support, and collaboration have made this annual report a reality. This document is a testament to the collective dedication of numerous stakeholders who have worked tirelessly to advance climate-resilient agriculture in the Northeastern Hill Region.

We are immensely thankful to **Dr. Vinod Kumar Singh**, Director, ICAR-CRIDA, Hyderabad, for his visionary leadership and unwavering support, which have been instrumental in shaping the NICRA program's success. Our heartfelt appreciation goes to **Dr. G. Pratibha**, Principal Investigator of TDC-NICRA, and **Dr. T.V. Prasad**, Co-Principal Investigator of TDC-NICRA, whose expertise and commitment have guided the Technology Demonstration Component with remarkable precision, ensuring impactful outcomes for farmers across vulnerable districts.

We also express our sincere gratitude 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 insightful direction and encouragement, which have strengthened the program's outreach and effectiveness, and to **Dr. A. K. Mohanty**, Director, ICAR-ATARI, Zone-VII, for his vital support. Our thanks extend to all colleagues in the Agricultural Extension Division, whose collaborative efforts and shared knowledge have enriched this report and the broader NICRA initiative.

This work would not have been possible without the dedication of the Krishi Vigyan Kendras (KVKs) and their teams, the farmers who embraced these innovations, and the support of ICAR-ATARI, Zone-VII. We are grateful for the opportunity to document these transformative journeys and hope this report inspires continued progress in sustainable agriculture.

Authors

CONTRIBUTORS

NICRA KVKs	Staffs
Krishi Vigyan Kendra Chandel, Manipur	Dr. Asem Ameeta Devi, Sr. Scientist and Head Dr. Kangjam Sonamani Singh, SMS (Agril. Engg.) Hb. Lungni Anal, SRF
Krishi Vigyan Kendra Senapati, Manipur	Dr. N. Jyotsna, Sr. Scientist and Head Dr. David Kamei, SMS (Plant Protection) Shri. W. Dipin Singh, SRF
Krishi Vigyan Kendra Ukhrul, Manipur	Dr. Soibam Khogen Singh, Sr. Scientist and Head Dr. N. Ajitkumar Singh, SMS (Plant Protection) Shri. Konsam Vikramjeet, SRF
Krishi Vigyan Kendra Jaintia Hills, Meghalaya	Smt. Larika L Challam, Sr. Scientist and Head Smt. Banylla Kharbudon, SMS (Horticulture) Shri. Firstborn Sutnga, SRF
Krishi Vigyan Kendra Ri Bhoi, Meghalaya	Dr. M. Mokidul Islam, Principal Scientist and Head Dr. Moloy Sarmah Baruah, SMS (Animal Science) Dr. Thokchom Dorenchand Singh, SRF
Krishi Vigyan Kendra South Garo Hills, Meghalaya	Dr. Athokpam Haribushan, Principal Scientist and Head Shri. Basu Langpoklakpam, SMS (Horticulture) Shri. Titus Dalang K. Momin, SRF
Krishi Vigyan Kendra West Garo Hills, Meghalaya	Dr. Monica Suresh Singh, Sr. Scientist and Head Dr. Tarun Kumar Das, SMS (Agri. Extension) Shri. Sanjay Chetry, YP-II
Krishi Vigyan Kendra Lawngtlai, Mizoram	Dr. C. Lalfakawma, Sr. Scientist and Head Shri. C. Rualthankhuma, SMS (Agronomy)
Krishi Vigyan Kendra Lunglei, Mizoram	Dr. Henry Saplalrinliana, Sr. Scientist and Head Shri. F. Lalthasanga, SMS (Agronomy) Shri. R. Lalrambeiseia, SRF
Krishi Vigyan Kendra Siaha, Mizoram	Dr. H. Vanlalhmuliana, Sr. Scientist and Head Smt. S. Sisi, SMS (Horticulture) Ms. Lalrinengi, SRF

Krishi Vigyan Kendra Serchhip, Mizoram	Dr. T. Vanlalngurzauva, Sr. Scientist and Head Smt. Mary Lalfakzuali, SMS (Soil Science) Ms. Abisag Lalremruatpuii, SRF
Krishi Vigyan Kendra Phek, Nagaland	Dr. Sanjeev Kumar Singh, Sr. Scientist and Head Dr. T. Esther Longkumer, CTO (Soil Science) Dr. Hannah K. Asangla, CTO (Agronomy) Shri. Manjunath K. S, SMS (Horticulture) Dr. Harini K. R, SMS (Animal Science) Shri. Khruzho Sakhamo, YP-II
Krishi Vigyan Kendra Mon, Nagaland	Dr. V. Akashe Zhimomi, Sr. Scientist and Head Smt. Bendangjungla. I, ACTO (PB & G) Shri. Peiwang, YP-II
Krishi Vigyan Kendra Tuensang, Nagaland	Dr. Pijush Kanti Biswas, Sr. Scientist and Head Dr. Kerimenla, ACTO (Horticulture) Ms. L. Khonzani Ezung, SRF
Krishi Vigyan Kendra Sepahijala, Tripura	Dr. Shatabhisa Sarkar, Sr. Scientist and Head Dr. Joy Kumar Dey, SMS (Agronomy) Dr. Utpal Dey, SMS (Plant Protection) Shri. Pramod Das, SRF

CONTENTS

LIST OF TABLES

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 2024-25, 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, resulting in yield increases of 10-25%, net returns up to Rs. 386,300/ha, and benefit-cost ratios as high as 5.25:1. Success stories from KVKs in Ri Bhoi (Meghalaya), Lunglei and Siaha (Mizoram), Mon (Nagaland), and Senapati (Manipur) exemplify the program's impact, transforming rainfed farming systems and fostering community-wide adoption. 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 (5x4x2 m, storing 40,000 litres) for multipurpose use in crop, livestock, and fish production, as adopted by farmer Smt. Jemnud Marpan in Thadnongiaw village (KVK Ri Bhoi, Meghalaya). 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). Similarly, paddy straw mulch (3-5 tons/ha) was introduced for garlic cultivation in Langmeing village (KVK Mon, Nagaland) by farmer Smt. Tanla Konyak, reducing evaporation by 30-40%, conserving 15-20% more soil moisture, and suppressing weeds, leading to 10-15% yield boosts and net returns of Rs. 2,84,500/ha (B:C ratio 3.25). 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. In Hnahthial village (KVK Lunglei, Mizoram), farmer H Lalnunmawia adopted water stress-tolerant dragon fruit varieties (Hylocereus Costaricensis and Hylocereus undatus), yielding 98 q/ha with net returns of Rs. 386,300/ha (B:C ratio 4.94). The technology, supported by planting materials and training, minimized nutrient and moisture deficits, inspiring neighbouring villages. Early planting of garden pea (late October-early November) in Tisopi village (KVK Siaha, Mizoram) by farmer Smt. S. Tenese leveraged residual soil moisture, avoiding terminal heat and pests, resulting in higher pod yields and early market advantages. Paddy straw mulch in garlic also contributed here, enhancing vegetative growth and bulb formation under moisture stress.

Module III: Livestock & Fisheries

This module integrated livestock and fisheries for diversified resilient income sources amid climate vulnerabilities. In Thadnongiaw (KVK Ri Bhoi, Meghalaya), Smt. Jemnud Marpan 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 while yielding fish, meat, and eggs. Vegetable yields reached 165 q/ha/year. In Tumuyon Khullen village (KVK Senapati, Manipur), landless farmer Smt. Steila reared climate-resilient Vanaraja poultry (30 chicks' startup), achieving 27 marketable birds at 6.5 months (2.2 kg each, sold at Rs. 800/bird), with low mortality (10%) and net returns of Rs. 17,600 (B:C ratio 5.25:1). Technical support included feeds, medicines, and household-based feeding strategies.

Module IV: Institutional Interventions

Collaborations with state departments and community structures bridged gaps in resource access and implementation. KVKs converged with the State Horticulture Department for dragon fruit demonstrations in Mizoram, providing saplings, pillars, and fertilizers. In Meghalaya and Nagaland, village-level contingency plans were developed based on focus group discussions, analyzing climate data, natural resources, and production systems. 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. In Mizoram, farmers received hands-on training on dragon fruit and garden pea packages of practices. In Manipur, Smt. Steila was trained on backyard poultry management at KVK Senapati, including breed selection and feeding. 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 in garlic mulch trials (Nagaland) showing 20-25% labour savings. Success stories were disseminated to adjacent villages, accelerating adoption of Jalkund and integrated systems. These activities fostered community engagement and evidence-based scaling of resilient practices.

Overall, NICRA-TDC in 2024-25 demonstrated tangible resilience-building, with interventions reducing climate risks, enhancing livelihoods, and informing policy for sustainable agriculture in the Northeast. Future efforts will expand to additional vulnerabilities, ensuring food security amid escalating climate challenges.

1 INTRODUCTION

Launched in 2011, the National Innovations in Climate Resilient Agriculture (NICRA) program aims to tackle the challenges posed by climate variability and change, addressing the urgent needs of farmers facing increasingly frequent extreme weather events such as droughts and floods. By leveraging science and technology, NICRA seeks to bolster the resilience of Indian agriculture to ensure food and nutritional security for a growing population. Given India's vulnerability due to its large agriculture-dependent population, the program focuses on strategic research and technology demonstrations to enhance adaptive capacity and sustainability. The Technology Demonstration Component (TDC) of NICRA plays a pivotal role by working directly with farmers to implement climate-resilient technologies under real-world conditions. The focus is on evaluating the performance of these technologies across diverse agro-ecological zones and farming systems. This approach enables a deeper understanding of how these interventions contribute to climate resilience in varied biophysical and socio-economic contexts. The TDC facilitates participatory, on-farm demonstrations in climatically vulnerable districts, promoting the adoption of proven technologies to enhance farm-level resilience and ensure long-term sustainability.

Krishi Vigyan Kendras (KVKs) under NICRA are instrumental in developing village-level contingency crop plans and implementing climate-resilient measures. The ICAR-Agricultural Technology Application Research Institute, Umiam oversees fifteen KVKs, which execute various modules under the NICRA-TDC. These efforts focus on adapting to climate variability by preparing farmers to respond effectively to extreme weather events and fostering sustainable agricultural practices. In highly intensive production systems, the emphasis is on improving natural resource use efficiency to sustain productivity while addressing vulnerabilities. By selecting NICRA villages based on their exposure to climatic variability, multidisciplinary KVK teams analyze constraints using secondary weather data, resource availability, farming systems, and historical yield trends.

NICRA's interventions aim to build adaptive capacity and resilience among farming communities, enabling them to cope with extreme weather events and climate variability effectively. By demonstrating proven technologies in vulnerable districts, the program accelerates their adoption, ensuring sustainable agricultural practices that safeguard productivity and livelihoods in the face of climate challenges.

The main objectives of the NICRA project are:

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies
- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks
- To enhance the capacity building of scientists and other stakeholders in climate resilient agricultural research and its application.

The primary goal of the National Innovations in Climate Resilient Agriculture (NICRA) is to strengthen the resilience of agricultural systems to climate variability in vulnerable regions. Initially, the project was implemented through 100 Krishi Vigyan Kendras (KVKs) across India. Subsequently, as part of the approved XII Plan, an additional 21 KVKs were incorporated to expand the project's reach nationwide. The research focuses on adaptation and mitigation strategies, encompassing crops, livestock, fisheries, and natural resource management. The initiative is structured around four key components.

- Strategic research on adaptation and mitigation
- Technology demonstration on farmers' fields to cope up with current climate variability
- Sponsored and competitive research grants to fill critical research gaps
- Capacity building of different stakeholders

The Technology Demonstration Component (TDC) is a cornerstone of the National Innovations in Climate Resilient Agriculture (NICRA) program, facilitating on-farm demonstrations of tailored, site-specific technology packages. These demonstrations empower farmers to adopt innovative technologies to address the challenges posed by climate change and existing climatic vulnerabilities. The TDC aims to deliver both short-term and long-term outcomes, including the development of climate-resilient crop varieties, improved livestock breeds, and advanced management practices. These efforts contribute to evidence-based policymaking, integrating climate-resilient agriculture into broader developmental planning for sustainable agricultural growth.

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

- Analysis of climate constraints of the village based on long-term data
- Assessment of natural resources status of the village
- Identification of major production systems

- Studying existing institutional structures and identifying the gaps
- Focus group discussion with the community to finalize the interventions

The interventions being implemented are based on four modules, i.e. (1) Natural resources management, (2) Crop production, (3) Livestock and fisheries and (4) Institutional interventions. Enhancing resilience is one of the important keys to achieving sustainability in agriculture, especially in the background of climate vulnerability and climate change.

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
Senapati	Hengbung, Mayangkhang, T.Khullen
Ukhrul	Ramva, Lungsang, Kazipphung
Jaintia Hills	Umjalasiew, Mukhnang, Namdong, Wahiajer & Niriang
Ri Bhoi	Thadnongiaw, Thadnongiaw, Mawbri, Liarkhla, Liarbang & Kdonghulu
South Garo Hills	Asugre
West Garo Hills	Bagugre, Marapara, Mebol Darechikgre
Lawngtlai	Chawnhu & Ngengpuikai
Lunglei	Hnahthial
Siaha	Tisopi
Serchipp	N.Vanlaiphai, Lungchhuan, Chekawn
Phek	Thipuzu, K. Basa, Phusachodu, Kikruma & Pfutseromi
Mon	Ngangching, Sowa Changle, Langmeing, Totok Chingha
Tuensang	Chendang and K. Wongthu
Sepahijala	Golaghati

The NICRA villages were selected based on the vulnerability of their agricultural systems to climatic variability. Multidisciplinary teams from Krishi Vigyan Kendras (KVKs) assess constraints by analyzing secondary weather data, resource availability, farming systems, and historical agricultural yields. Interventions implemented by NICRA-KVKs in these villages have significantly enhanced farmers' ability to address climate vulnerabilities while strengthening adaptive capacity and promoting sustainable agricultural production. In the fifteen KVK districts across Manipur, Meghalaya, Mizoram, Nagaland, and Tripura, assessments conducted under the NICRA program identified critical needs for technological support, human resource development, and community empowerment to combat climate challenges such as droughts, erratic rainfall, heatwaves, floods, and cyclonic storms. Accordingly, tailored action plans were developed, focusing on technological interventions to support crop production, resource conservation, livestock and fish rearing, water harvesting, and other climate-resilient practices.

These interventions are demonstrated through participatory approaches in NICRA villages, engaging farmers directly to ensure relevance and adoption. As a result, NICRA villages have emerged as regional hubs for learning and disseminating climate-resilient agricultural practices, inspiring sustainable farming innovations across their respective districts.

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

2 RAINFALL CHARACTERISTICS DURING 2024-25

The monthly average rainfall recorded at the NICRA adopted villages during the month of April 2024 – March 2025 in mm is as under:

Table 2.1: Actual rainfall received during April 2024 – March 2025 in mm

KVK/ Months	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Chandel	77.2	354.7	133.1	412.9	288.9	160.9	134.1	51.9	0.1	2.1	18.2	58.4
Ukhrul	55.7	425.1	141.7	365.3	303.2	164.1	162.9	88.5	0	0	5	15.1
Senapati	496	46.1	353.6	298.32	268.7	391.5	117.7	164.6	35	0.3	12.8	0
Jaintia Hills	496	655	689.5	717	749	729.5	690	668.5	537.6	446.4	426	426.1
Ri Bhoi	20.5	411.5	548.8	255.2	335.2	133.6	175	50.3	0	9.6	5	34.4
South Garo Hills	32.6	95.63	244.47	557.7	748.01	537.2	361.2	138.6	3.3	0	0	0
West Garo Hills	324.6	659.6	545.4	351.6	200.6	373.0	16.4	-	-	-	81.2	324.6
Lawngtlai	61	358.2	474.3	562.2	360.6	273.5	75.4	16.0	0.0	12.0	0.0	12.0
Lunglei	24	437.5	278	347.5	391	232.5	66.5	41	0.5	5.5	6.5	32
Siaha	5.5	177.17	132.6	151.2	114.92	69.3	28.7	16.3	16.3	0	0	0
Mon	19.2	585.2	585.2	481.9	340.4	312.0	92.2	39.4	0.0	15.4	0.0	31.4
Phek	229.8	132	537.6	329.6	280.8	224	123.3	9.2	0.2	14.7	20.1	23.7
Tuensang	23.2	208.0	256.2	277.8	261.4	62.2	147.6	25.4	0.0	0.0	10.8	20.8
Sepahijala	311.3	222.1	304.2	442.2	489.1	169.3	109	1.3	0.0	6.5	13.9	24

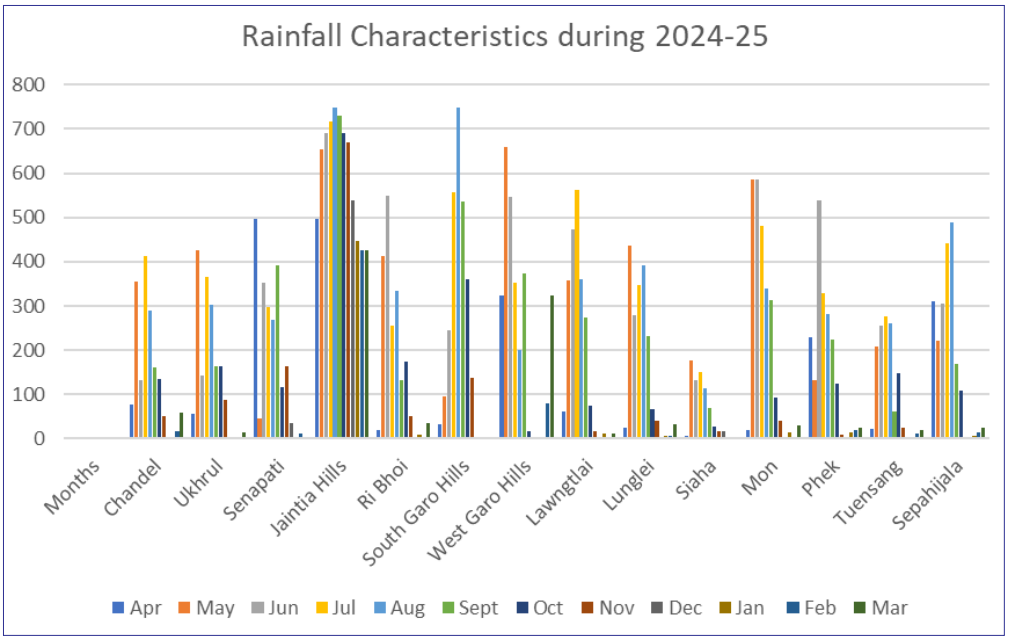

Fig 2.1: Rainfall Characteristics during 2024-25

The rainfall characteristics in Zone-VII, as observed during 2024-25, 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, Lunglei, Siaha, Mon, Phek, Tuensang, and Sepahijala reveal that the region experiences a pronounced monsoon season, with peak rainfall occurring between July and August, often exceeding 600 mm in some areas like Chandel and South Garo Hills. This heavy rainfall is critical for kharif crops but also leads to challenges such as flash floods and water logging. 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.

3 SEASONAL VULNERABILITIES AND CLIMATIC CHALLENGES IN NICRA VILLAGES

In Northeast India's agricultural landscape, vulnerabilities vary significantly across seasons and crop stages, posing challenges to farmers. During the Kharif season, dominant issues include dry spells, intense or erratic rainfall, floods, heat stress, and high pest incidence, often affecting vegetative, flowering, tillering, grain filling, booting, maturity, seedling, and fruit development stages in crops like paddy, vegetables, maize, king chilli, and cucurbits, with durations ranging from 1 to 108 days; for instance, flash floods in West Garo Hills disrupt grain filling for 4 days, while erratic rainfall in Siaha impacts sowing to harvest over 61 days. In the Rabi season, drought, cold stress, heat stress, and water scarcity prevail, targeting germination, vegetative growth, head development, flowering, pollination, early fruiting, and reproductive stages in winter vegetables, potato, mustard, pea, toria, French bean, cabbage, cauliflower, and garlic, lasting 4 to 130 days, such as the 75-day drought in Siaha hindering fruit development or the 11-day cold stress in Tuensang affecting cole crops. Vulnerabilities spanning both seasons, like drought and erratic rainfall in Ri Bhoi, Mon, Phek, and Sepahijala, influence multiple stages including vegetative, premature flowering, pod/seed formation, and germination, emphasizing the need for adaptive measures amid climate variability.

Paddy field damaged by flood

Tomato plants damaged by heavy rainfall

Maize plants affected due to dry spell

Table 3.1: Vulnerabilities in different seasons and crop stage

KVK	Major Vulnerability	Season (Kharif/ Rabi/Both)	Stage of crop affected	No. of days	Contingency measures adopted
Chandel	Dry Spell	Kharif	Initial tilling, Grain filling stage of paddy & Growth of winter vegetables	108 days	NRM: Jalkunds, mulching. Crop: Mid-duration paddy, improved crop varieties, diversification, mushroom cultivation. Livestock: IFS, semi-intensive pig housing
	Intense rainfall	Kharif	Vegetable crops in vegetative stage; occasional rainfall during paddy harvesting	2 days	Low-cost shade net for nursery and for off season vegetables
Ukhrul	Drought	Rabi	Flowering stage	116 days	Early planting of garden pea and mulching
	Intensive rainfall	Kharif	Lodging in Vegetative stage	1 day	RC Maniphou 15
		Kharif	Seedling stage in King chilli	3 days	Low-cost Set Net house and Intercropping system
Ri Bhoi	Dry spell	Kharif	Seedlings, vegetative, flowering	12 days	Drought-tolerant varieties, mulching, rainwater harvesting, supplemental irrigation, staggered sowing
	Cold stress	Rabi	Germination and early growth of potato, mustard, pea, vegetables	4 days	Protective irrigation, Protected cultivation on low-cost polyhouse
	Water scarcity, intense rain, runoff, low yields	Both	Across crop stages	Variable	Crop diversification, intercropping, integrated farming system, insurance coverage, community seed banks

KVK	Major Vulnerability	Season (Kharif/ Rabi/Both)	Stage of crop affected	No. of days	Contingency measures adopted
West Garo Hills	Drought	Kharif	Less rainfall during transplanting	8 days	Climate resilient paddy
		Rabi	Cabbage: Head development. Tomato: Flowering, fruit development	12-18 days	Jalkund
	Flood	Kharif	Grain filling stage	4 days	Climate resilient paddy varieties
Lunglei	Heat Stress	Kharif	Adverse effects on livestock component where the mortality rate increased	10 days	Intervened with improved housing system
	Extreme Weather-Cyclone Remal	Kharif	75 ha affected, delayed paddy transplanting, nurseries and polyhouses destroyed.	2 days	NRM: Improved drainage renovated farm ponds. Crop: Community nursery, low-cost polyhouse
Siaha	Drought	Rabi	Flowering, pollination and early fruit or grain development stage	75 days	Supplemental irrigation, mulching, and nutrient support for flowering and fruiting
	Erratic rainfall, Heavy rainfall	Kharif	Sowing, flowering, fruit development and harvest stage	61 days	Enhanced drainage, raised beds, mulching, timely sowing, protected nurseries
	High pest and disease incidence	Kharif	Seedlings, vegetative and reproductive stage	35 days	Integrated pest management, resistant varieties, timely spraying, crop monitoring
Mon	Drought	Both	Germination and Vegetative growth stage	130 days	NRM: Jalkunds, early pea planting, zero tillage. Crop: DSR with mid-duration RC Maniphou-14 & 15, matured

KVK	Major Vulnerability	Season (Kharif/ Rabi/Both)	Stage of crop affected	No. of days	Contingency measures adopted
	Cold stress	Rabi	Growth and Reproductive stage	13 days	Rearing climate-resilient Rainbow Rooster and Kuroiler birds, mulching for crop resilience
	Heat stress	Rabi	Germination and Vegetative growth stage	9 days	Paddy straw mulching for pea and garlic; zero tillage for rapeseed
Phek	Drought, Erratic rainfall, Moisture stress	Both	Vegetative, premature flowering, pod/seed formation, booting, maturity, fruit set	106 days	Straw mulching, lime application, early sowing, and intercropping for enhanced crop resilience
Tuensang	Drought	Rabi	Vegetative stage of cole crops and other vegetables affected	64 days	Polymulching enhances moisture retention, regulates soil temperature; lifesaving irrigation ensures crop survival
	Cold stress	Rabi	Vegetative stage of cole crops and other vegetables affected	11 days	Polymulching for enhanced moisture conservation and soil temperature regulation
	Heat stress	Kharif	Vegetative stage of crops- Maize and vegetables affected	4 days	Mulch layer reduces evaporation, regulates soil temperature; lifesaving irrigation applied
Sepahijala	Drought	Rabi	Vegetative stage (Toria, Pea, French Bean, Cabbage and Cauliflowers)	37 days	2% KCl application, mulching, short-duration, drought-tolerant crop varieties
	Flood	Kharif	Tillering stage (Paddy), Fruiting Stage (Chilli, Brinjal, Cucurbitaceous Crop)	16 days	Copper Oxychloride, 2% KCl, flood-tolerant variety, drainage, improved livestock housing

Table 3.2: 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
Senapati	Rainfed Upland (Hills with steep slopes)	Soil erosion	Low soil fertility	Low soil depth due to draining of topsoil
	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 animals (Hills with mild slopes)	Temperature stress, Soil erosion	Degradation of grazing ground	Moisture stress, low soil depth, lack of irrigation facility for 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	Terminal drought/ Moisture stress, increased in dry spell & decreasing rainy days, increasing rainfall intensity & hailstones, Soil erosion	Long-duration local rice varieties, fallow, low fertility, acidic soil, pests	Monocropping, straw burning, pests, diseases, weeds, water scarcity issues
	Rainfed Upland with animal		Poor animal shelter hygiene, water scarcity, low-quality breed, feed, unsuccessful fish spawning	Emerging animal diseases, improper, unhygienic housing conditions
	Rainfed Upland		Jhuming farming, low soil moisture, and poor soil fertility	Emerging pests/diseases, weeds, water scarcity, landslides, soil erosion
Jaintia Hills	Rainfed Upland with animal (Hills with mild slopes)	Dry spells, frost, flash floods, winter stress, and green forage scarcity; fish seed losses	Poor utilization of land and resources, Monocropping, Unavailability of quality seeds	Low soil fertility, erosion, pests/diseases, poor water retention

KVK	Farming System Typologies	Climate constraints	Resource/ Crop/ Animal constraints	Other constraints
	Plains in the valleys with animals	Dry spells, frost, flash flood, winter stress and unavailability of green forages during lean period	Poor utilization of land and resources, Low return from monocropping system of rice cultivation, Risk of crop failure	ow soil fertility, pest/ disease outbreaks, water scarcity, soil erosion
Ri Bhoi	Rainfed without animal	High-intensity rain, frost, cold waves, terminal drought, water scarcity, soil runoff, paddy straw burning	Timely unavailability of quality inputs, costly polyhouses, and scarce organic inputs hinder sustainable farming	Unaffordable costly inputs, soil acidity/erosion, and crop failure risks threaten farmers' livelihoods and productivity
	Rainfed with animal	Low yields from individual farming, livestock/poultry growth stunted, higher mortality due to heat, cold, hailstorms	Reliance on single enterprises, inadequate housing/feeding, and unavailability of improved livestock/poultry breeds limit productivity	Costly inputs, soil acidity/ erosion, and crop failure risks challenge farmers' sustainability and productivity
South Garo Hills	Rainfed midland without animal	Uncongenial temperature for cucurbits cultivation during winter	Low soil fertility, pest/ disease issues, water scarcity, poor seed quality	Drought in the mild slope
	Rainfed midland with animal	High temperature and relative humidity	High risks of raising only one crop or animal (climate uncertainties)	Soil erosion, poor fertility, pest/disease pressure, limited water availability
	Rainfed lowland with animal	Soil moisture stress, high temperature (post- rabi)	Long duration of crops, low productive performance of local poultry	Seasonal flash flood
	Irrigated lowland with animal	Floods, waterlogging, heat stress, drought, pest/ disease outbreaks	Heat stress and high humidity in animals	Seasonal flash flood, poor soil fertility and soil moisture stress

KVK	Farming System Typologies	Climate constraints	Resource/ Crop/ Animal constraints	Other constraints
West Garo Hills	Rainfed Midland with Animal	Erratic rainfall, flash flood, occasional drought	Low mechanization, inadequate irrigation, scarce quality seeds, low-yielding crops/livestock, and limited veterinary care	Remoteness, market inaccessibility, low extension reach
	Rainfed Lowland with Animal	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
	Rainfed *Jhumland* without animal	Erratic rainfall, flash flood, occasional drought	Low soil fertility due to repeated shifting, lack of irrigation, absence of livestock manure.	Steep slopes, risk of soil erosion, poor access to extension services.
Lawngtlai	Rainfed Upland without Animal	Erratic rainfall, soil erosion, excessive soil moisture, high temperature, moisture stress during the growing season	Scarcity of input supply (Seeds, feeds etc)	Pest and disease outbreaks
	Rainfed Upland with Animal			
	Rainfed Lowland without Animal	Erratic rainfall, high temperature, and moisture stress		
	Irrigated Lowland with Animal	Erratic rainfall, high temperature, heat, cold & moisture stress		

KVK	Farming System Typologies	Climate constraints	Resource/ Crop/ Animal constraints	Other constraints
Lunglei	Rainfed upland without animal	Prolonged dry spells, severe frost, intense heatwaves, erratic rainfall	Water & soil moisture stress, heat stress	Low soil fertility, erosion, pest/disease pressure, poor water retention
	Rainfed upland with animal	Erratic rainfall, terminal drought	Water & soil moisture stress, heat stress, increase mortality of animal	Top soil erosion, mud slide, surface runoff
	Plain in the valley without animal	Drought, heatwaves, frost, erratic rainfall, pest surges	Water & soil moisture stress, heat stress	ow soil fertility, weed infestation, pest/disease pressure, water scarcity
Siaha	Rainfed Upland without animal	Water stress, erratic rainfall, heat stress, terminal drought, and rabi moisture deficits impair crop yields	No water storage, low yields from outdated varieties, heavy parasitic infestations, high poultry mortality	Top soil erosion, run off, and loss of soil fertility
	Rainfed Upland with animal	Water stress, erratic rainfall, moisture stress, high humidity	No water storage, low yields from old varieties, disease/pest susceptibility, high poultry mortality	
Mon	Rainfed without animal (Hills with steep slope)	High intensity rainfall during kharif season, Dry spells & Terminal drought during rabi	Declining soil fertility, pest and disease infestation	Economic, Infrastructure and input gaps, poor road connectivity
	Rainfed with animal (Hills with steep slope)	High intensity rainfall, terminal drought & moisture stress during rabi	Low meat productivity, pest and insect infestation	Feed constraints & lack of regular health care support

KVK	Farming System Typologies	Climate constraints	Resource/ Crop/ Animal constraints	Other constraints
	Rainfed without animal (Hills with mild slope)	High intensity rainfall during kharif season, dry spells & terminal drought during rabi	Declining soil fertility, pest and disease infestation	Economic, infrastructure and input gaps. Poor road connectivity
	Rainfed with animal (Hills with mild slope)	High intensity rainfall, terminal drought & moisture stress during rabi	Low meat productivity, pest and insect infestation.	Feed scarcity, inadequate healthcare, poor road connectivity, and economic constraints hinder farming productivity
Phek	Rainfed without animal	Erratic Kharif rainfall, Rabi moisture stress, thunderstorms, wind/ heavy rains, and Rabi droughts damage crops	Crop- wilting/damping/ Plant nutrient loss/ moisture stress	Soil erosion, mud slide, run off, Farm mechanization, high input cost
	Rainfed with animal	Erratic rainfall during Kharif and excess moisture stress in Rabi	Crop- wilting/damping/ Plant nutrient loss/ moisture stress. Animal- Respiratory infections/viral disease	Soil erosion, mud slide, run off
	Rainfed Midland without animal	Erratic rainfall during Kharif and excess moisture stress in Rabi	Crop- wilting/damping/ Plant nutrient loss/ moisture stress	
Tuensang	Rainfed upland with animal	Drought, Erratic rainfall and inclement weather	Less availability of quality planting material, use of local genotypes and local strains leading to poor yield	Low soil fertility, erosion, pest/disease issues, limited water retention
	Rainfed upland without animal	Drought, Erratic rainfall and inclement weather	Less availability of quality planting material, use of local genotypes and local strains leading to poor yield	

KVK	Farming System Typologies	Climate constraints	Resource/ Crop/ Animal constraints	Other constraints
Sepahijala	Rainfed without animal	Late monsoon, erratic rain, lodging, winter water scarcity, low cropping intensity, drought, paddy straw burning	Slurry phosphorus management in paddy; VL Sabji Matar 13 pea; Arka Rakshak tomato mulching; oyster mushrooms	Soil acidity, low fertility, and pest/disease emergence hinder crop productivity
	Rainfed with animal	Late monsoon, erratic rain, lodging, winter water scarcity, heat stress, drought, low egg production, stunted livestock growth	Phosphorus slurry in Gomati paddy, Toria TS 67 minimum tillage, NRC French bean in rice fallow, improved White Pekin duck housing, Apis cerana indica beekeeping	Soil acidity, pest/disease emergence, high mortality, low agricultural income
	Irrigated without animal	Floods, persistent water scarcity, and drought disrupt cropping periods	Flood-tolerant Ranjit Sub-1 paddy, Arka Nikita okra, Arka Gagan chilli, Dilkash watermelon under mulching	High runoff, pest/disease emergence, and weed infestation reduce crop yields
	Irrigated with animal	Late monsoon, erratic rain, lodging, winter water scarcity, drought, heat stress, low livestock growth	Phosphorus slurry in Gomati paddy, Kufri Jyoti potato, SVAC-7209 cauliflower, BC 76 cabbage under mulching, scientific Hampshire-cross pig farming	Soil acidity, high runoff, low peak-season prices, smart housing, low agricultural income

4 ADOPTION OF SUCCESSFUL INTERVENTIONS

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

4.1 Natural Resource Management

KVKs across various districts implemented climate-resilient technologies under natural resource management, conducting 353 demonstrations benefiting 447 farmers over 94.785 hectares. Technologies included mulching, intercropping, Jalkund rainwater harvesting, vermicomposting, minimum tillage, and integrated farming systems. Key interventions involved moisture conservation, acid soil management, and pond renovation, with districts like Ukhrul (60 farmers, 15 ha), Mon (66 farmers, 18 ha), and Sepahijala (65 farmers, 14.2 ha) leading in coverage. These efforts enhance agricultural resilience against climate challenges.

Table 4.1.1: Successful interventions under NRM module

KVK	Climate Resilient Technology	No. of Demonstrations	No. of farmers covered	Area covered (ha)
Chandel	Mulching, intercropping of groundnut (ICGS-76) and maize (RCM 1-76), Rain water harvesting Jalkund, Low-cost shade net, Vermicomposting, Demonstration on Growing of mustard var. PM-27 after paddy	35	36	9
Senapati	Renovation of farm pond, Low-cost water harvesting structure Jalkund, Minimum tillage in filed pea	28	40	3
Ukhrul	Early sowing of Garden pea, Intercropping of Groundnut and maize, Cover crops in Jhum land	60	60	15

KVK	Climate Resilient Technology	No. of Demonstrations	No. of farmers covered	Area covered (ha)
Jaintia Hills	Vermicomposting, Jalkund (Low-cost harvesting unit), In situ moisture conservation using mulch in broccoli (paddy straw), Ridge and furrow system of planting potato, Paddy-Vegetables in furrow irrigated raised beds, Vermicomposting Paddy- Pea in furrow irrigated raised beds	20	45	6
Ri Bhoi	Micro irrigation through harvested water in Jalkund for multipurpose use	2	10	0.1
South Garo Hills	Jalkund Supplemental irrigation to overcome drought in the mild slope, Naturally Ventilated Low-cost polyhouse for cucumber, Vermicomposting Poly mulching in tomato.	30	30	0.25, 30(units)
West Garo Hills	Integrated Farming System (Fishery + Duck + Horticultural crops), Low cost rainwater harvesting (Jalkund), Organic manure production through vermicomposting, Paddy Straw Mushroom Cultivation, Paddy Straw mulching for vegetable production.	30	30	9.9
Lawngtlai	Poly-mulching cultivation of Tomato var. Arka abhed.	10	10	1.5
Lunglei	Low-cost Rainwater harvesting, RCTs, Low cost RWHs/Renovation of farm pond,	33	39	20.25

KVK	Climate Resilient Technology	No. of Demonstrations	No. of farmers covered	Area covered (ha)
Siaha	Walk in tunnel for off season cultivation of vegetables, Renovation of defunct ponds for multipurpose use, In-situ moisture conservation through black polythene mulch	38	38	13
Serchipp	Low-cost water harvesting unit, Ridge and furrow in French bean	7	7	1.5
Phek	Lime application for acid soil management in maize, Intercropping of Broccoli with Garden Pea, Low-cost shade net, Develop horticulture and poultry-based IFS model.	2	11	2
Mon	Paddy straw mulch in Pea. (Arka Apoorva), Zero tillage in late sown and drought tolerant Toria (TS-67), Paddy straw mulch in Garlic, Paddy straw mulch in pea.	38	66	18
Tuensang	Poly mulching in Broccoli to conserve soil moisture, regulate soil temperature and control weed, Protected Cultivation of Tomato under Low-Cost Polyhouse, Mushroom Cultivation.	11	20	2.035
Sepahijala	Intervention on mustard (TS 67) under minimum tillage, Intervention on Potato Variety Kufri Jyoti under paddy straw mulching, Demonstration on Garden pea under rice fallow, Intervention on Tomato under paddy straw mulching.	9	65	14.2

Bio-degradable plastic mulching in King Chilli

Low-cost water harvesting unit

Black Polymulch Cultivation of Tomato

Management of Rhizome Rot in Ginger

4.2 Crop Production

KVKs implemented climate-resilient crop production technologies across 494 demonstrations, benefiting 771 farmers over 206.38 hectares. Chandel promoted soybean, paddy, groundnut, and mushrooms (47 farmers, 19 ha). Senapati focused on finger millet and greenhouse vegetables (56 farmers, 8 ha). Ukhrul introduced paddy-field pea cropping, millets, and mushrooms (22 farmers, 11 ha). Jaintia Hills emphasized mushroom and vegetable production (125 farmers, 48 ha). Ri Bhoi and South Garo Hills adopted diversification and oyster mushrooms (40 farmers, 13.3 ha). West Garo Hills cultivated resilient paddy and millets (72 farmers, 22.12 ha). Lawngtlai and Lunglei focused on ginger, intercropping, and stress-tolerant crops (90 farmers, 26.8 ha). Siaha supported garden pea and nurseries (70 farmers, 14.66 ha). Serchipp, Phek, Mon, Tuensang, and Sepahijala promoted composting, nano-fertilizers, foxtail millet, direct-seeded rice, and flood-tolerant crops (269 farmers, 83.5 ha). These practices enhance crop resilience and farmer livelihoods.

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	Soybean (DSb-19) cover crops, paddy (RCM-13, RCM-15), groundnut (ICGS-76), mushroom (Pleurotus spp) cultivation	47	47	19
Senapati	Stress-tolerant finger millet, soil-enriching groundnut, year-round greenhouse vegetables, INM in banana	8	56	8
Ukhrul	Mid-duration paddy (RC Maniphou 16) + field pea (Aman) sequential cropping, aromatic black rice (Chakhao), millet introduction, mushroom secondary agriculture	22	22	11
Jaintia Hills	Year-round mushroom production, maize-based cropping, walk-in tunnel vegetable cultivation, safe ginger storage	25	125	48
Ri Bhoi	Crop diversification with raised beds in rice fallow, liming; year-round protected vegetable cultivation	8	20	3
South Garo Hills	Oyster mushroom cultivation, sequential cropping: SRI paddy, zero-tillage Toria	20	20	10.30
West Garo Hills	Climate-resilient paddy (Gitesh, CR Dhan-805), poly-mulched winter vegetables, fodder, pearl millet, foxtail, Megha Maize 1 and 2 cultivation	72	72	22.12
Lawngtlai	Ginger rhizome rot management, maize-groundnut intercropping, improved rice (RCM-13), stress-tolerant cabbage (Ryozeki) cultivation	30	30	14.8

KVK	Climate Resilient Technology	No. of Demonstrations	No. of farmers covered	Area covered (ha)
Lunglei	Intercropping, stress-tolerant crops, vermicompost, mushroom production, short-duration paddy, cropping sequence	60	60	12
Siaha	Early garden pea planting, community nursery for winter vegetable seedlings	14	70	14.66
Serchipp	Composting technology, nano-fertilizer use, climate-resilient soybean (VLS-89) cultivation	12	12	4.6
Phek	High-yielding, short-duration foxtail millet, low-cost shade net for broccoli and capsicum, intercropping garden pea with broccoli	13	85	8.15
Mon	Direct-seeded rice (RCM-14, RCM-15), Jalkund irrigation for potato, year-round oyster mushroom production, drought-resistant tomato (Arka Meghali) cultivation	48	48	29
Tuensang	Scientific soybean (RVSM-1135) and maize (HQPM-5) cultivation; diversified foxtail millet ("China") and rice	50	50	25
Sepahijala	Flood-tolerant paddy (Ranjit Sub1) demonstration; short-duration cauliflower (SAVAC-7209 F1) and cabbage (Wonder Ball F1) under paddy straw mulching; poly-mulched watermelon and chilli; straw-mulched tomato; oyster mushroom cultivation	55	74	16.75

Intercropping of Maize with Groundnut

Demonstration of RC Maniphou-15

Intercropping of Cabbage with Tomato

Dragon Fruit- Stress tolerant crop

Walk in tunnel for Off-Season cultivation of Vegetables

4.3 Livestock and Fisheries

KVKs across multiple districts have implemented climate-resilient livestock and integrated farming technologies, conducting 367 demonstrations that benefited 650 farmers and covered various areas and units. Chandel promoted integrated paddy-pig-fish and paddy-duck-fish systems with 17 demonstrations for 17 farmers across 17 units. Senapati focused on backyard poultry and pig feed supplementation, engaging 30 farmers and 620 animals. Ukhrul introduced hygienic pig housing and integrated fish-pig systems, covering 6 hectares for 24 farmers. Jaintia Hills implemented low-cost pigpen models and integrated fish-pig-vegetable systems, benefiting 24 farmers over 15 hectares. Ri Bhoi adopted climate-resilient fish-duck and fish-poultry systems for 25 farmers across 1 hectare. South Garo Hills conducted preventive vaccinations and deworming, reaching 124 farmers over 0.5 hectares. West Garo Hills organized animal health camps and liming in ponds, supporting 172 farmers. Lawngtlai and Siaha promoted backyard poultry and low-cost pig housing, covering 255 units and 35 farmers, respectively. Lunglei focused on heat stress and feeding management for 35 farmers. Serchipp introduced azolla feed and mineral blocks for 8 farmers over 0.4 hectares. Mon emphasized dual-purpose poultry and beekeeping, with 109 demonstrations across 109 units. Tuensang and Sepahijala supported backyard poultry and crossbreed piggery, engaging 37 farmers. These initiatives enhance livestock resilience and farmer incomes under climate challenges.

Table 4.3.1: Successful interventions under Livestock and Fisheries module

KVK	Climate Resilient Technology	No. of Demos	No. of Animals	No. of farmers covered	Area covered (ha)
Chandel	Backyard duck rearing, climate smart Goat rearing (*Black Bengal*), Integrated paddy-pig-fish farming system (paddy variety (RCM-15, Cross Breed Hampshire pig & *Catla, Rohu, Common carp),* Integrated paddy-duck-fish farming system (paddy variety RCM-15, & White pekins, *Catla, Rohu, Common carp)*	17	-	17	17 (Units)

KVK	Climate Resilient Technology	No. of Demos	No. of Animals	No. of farmers covered	Area covered (ha)
Senapati	Backyard poultry rearing, Feed supplement with mineral mixture in pig production, Backyard poultry rearing,	30	620	30	-
Ukhrul	Backyard poultry (Vanaraja), Hygienic pig Housing management using lime for Disinfection, IFS- Fish cum Pig (Cross breed Hampshire) farming. IFS-Pappy cum fish farming system	24	-	24	6
Jaintia Hills	Low-cost climate resilient environment-affinitive pigpen model, Backyard poultry farming with Vanaraja chicken as a subsidiary for income generation, Silage preparation using sweet potato vines, Integrated Farming systems (Fish+ Pig+ Vegetables)	12	-	24	15
Ri Bhoi	Climate resilient integrated fish cum duck system for sustainable income, Climate resilient fish cum raised floor poultry housing system for sustainable income	25	-	25	1
South Garo Hills	Preventive vaccination in livestock and poultry, Deworming and mineral supplementation	25	41	124	0.5
West Garo Hills	Animal Health Camp, Deworming in cattle, pig and poultry and mineral supplementation, Rearing of climate resilient backyard poultry breed Vanaraja, Liming in pond for maintaining of pH	42	-	172	-

KVK	Climate Resilient Technology	No. of Demos	No. of Animals	No. of farmers covered	Area covered (ha)
Lawngtlai	Backyard Poultry Farming (Rainbow rooster), Shelter management in Pig for enhanced stress resilience.	10	-	10	255 (Nos)
Lunglei	Dual Purpose Bird, Heat Stress Management, Feeding Management in Piggery & Poultry	8	-	35	-
Siaha	Backyard poultry farming (Rainbow Rooster), Low-cost deep litter housing for pig, Introduction of Crossbreed pig(Yorkshire X Local)	35	-	35	-
Serchipp	Salt and mineral lick block for Mithun farmers, Azolla for livestock feeds	8	-	8	0.4
Mon	Rearing of Improved climate resilient Dual-purpose poultry (Rainbow rooster) for egg and meat purpose, Beekeeping for income generation. Introduction of beekeeping for integration into agroforestry providing employment and income. 10 apiary boxes were provided, Rearing of Improved climate resilient Dual-purpose poultry (Kuroiler) for egg and meat purpose, Rearing of Improved climate resilient Dual-purpose poultry (Kuroiler) for egg and meat purpose.	109	-	109	109 (Units)
Tuensang	Backyard Poultry Rearing of breed Vanaraja	15	-	15	1
Sepahijala	Intervention on dual purpose Duckery “White Pekin”, Intervention on cross breed piggery (Hampshire X Yorkshire).	7	-	22	-

Animal Health Camp and Training on Climate Resilient Agriculture at KVK Chandel

Pig cum Fish Farming System at Ukhrul

Shelter management in Pig

Salt and mineral lick block for Mithun

Intervention on dual purpose duck breed White Pekin

5 TECHNOLOGIES ADOPTED BY FARMERS FOLLOWING THE SUCCESS OF NICRA DEMONSTRATIONS

Following successful NICRA demonstrations, farmers across KVKs adopted climate-resilient technologies, enhancing productivity. Chandel's paddy, groundnut, and soybean cultivation expanded from 7 to 48 hectares for 25 farmers via demonstrations. Senapati's minimum tillage and poultry scaled to 6 hectares and 30 units, reaching 66 farmers through training. Ukhrul's garden pea and intercropping grew to 50 hectares for 25 farmers via field observations. Jaintia Hills' pig pens and vermicomposting expanded to 2.5 hectares and 40 units for 48 farmers. Ri Bhoi's micro-irrigation and integrated systems covered 4.032 hectares for 70 farmers. South Garo Hills' SRI paddy and mushrooms reached 3.09 hectares for 18 farmers. West Garo Hills' resilient crops and systems spanned 13.85 hectares for 73 farmers. Lawngtlai, Lunglei, Siaha, Serchipp, Phek, Mon, Tuensang, and Sepahijala scaled Jalkund, intercropping, zero-tillage, and poultry, benefiting hundreds of farmers through training, demonstrations, and farmer networks, significantly boosting climate resilience.

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 and RC Maniphou-15 cultivation, groundnut ICGS-76 diversification, soybean Dsb-19 cover crop, integrated farming, paddy straw mulching.	7	25	48	Method demonstration and from farmer-to-farmer horizontal spread

KVK name	Name of Technology	Area (ha)		Farmers (No.)	Mode of spread (Process)
		Before NICRA	After NICRA		
Senapati	Minimum tillage of field pea, Mulching in winter vegetables, IFS, Backyard poultry rearing	3 & 5 units	6 & 30 units	66	Training, demonstration & visit of farmers at KVK campus
Ukhrul	Escaping moisture stress in Garden pea, Intercropping of groundnut with maize	2	25	50	Field observation
Jaintia Hills	Climate resilient affinitive pig pen mode, Vermicomposting unit, Mulching using paddy straw	0.45 ha & 8 units	2.5 ha & 40 units	48	Training and awareness programme
Ri Bhoi	Micro irrigation via Jalkund-harvested water for versatile use, year-round protected vegetable cultivation, soil acidity management to boost vegetable productivity, climate-resilient raised-floor poultry housing, integrated fish-poultry and duck-fish farming systems	0	4.032	70	Training programs & demonstration
South Garo Hills	SRI marker for paddy transplanting, oyster mushroom cultivation, low-cost vermicomposting	0	3.09	18	Method demonstration
West Garo Hills	Integrated Farming System, Jalkund water harvesting, climate-resilient paddy varieties (Gitesh, CR Dhan 805, Ranjit Sub-1, Bahadur Sub-1), poly/paddy straw mulching, oyster mushroom production	0	13.85	73	Farmers to farmer horizontal spread

KVK name	Name of Technology	Area (ha)		Farmers (No.)	Mode of spread (Process)
		Before NICRA	After NICRA		
Lawngtlai	Cultivation of disease-resistant HYV tomato (Arka Abhed), heat/cold-tolerant cabbage (Ryozekii), backyard poultry (Rainbow Rooster)	4.5	20.5	65	Method Demonstration, Media, Training & Field Day
Lunglei	Jalkund, Inter cropping, Dual-purpose birds	18	68	75	Scaling up
Siaha	Community nursery of winter vegetables to supply seedlings during water stress conditions	282 (q/ha)	640 (q/ha)	37	Training, demonstration and through farmer to farmer
	Backyard poultry farming (Rainbow rooster)	170 kg meat & 5400 eggs	91 kg meat & 2320 eggs	80	
Serchipp	Ridge and furrow in frenchbean, Low-cost polyhouse.	0	6	9	Technology demonstration and training
Phek	Zero-tillage field pea, short-duration foxtail millet, pea-broccoli intercropping, lime-applied maize	4.25	15.5	190	Training and demonstration
Mon	Rearing dual-purpose poultry- Kuroiler for meat and egg purpose, Paddy straw mulch in Garlic for moisture retention, Zero tillage in rapeseed	0	22.5 ha & 25 units	57	Through VCRMC members, Demonstration unit
Tuensang	Improved soybean (RVSM-1135), maize (HQPM-5) varieties, Vanaraja backyard poultry rearing	15	41	80	Horizontal spread
Sepahijala	Slurry method of phosphorus management in paddy	4	9.2	22	State Department

6 PERFORMANCE OF CUSTOM HIRING CENTRES

The performance of Custom Hiring Centres (CHCs) managed by KVKs under Zone-VII during 2024-25 reflects a robust effort to support smallholder farmers with access to modern agricultural implements. Districts like Siaha and Mon showcased exceptional activity, with Siaha serving 270 farmers across 47 hectares and generating ₹72,550 in revenue, while Mon supported 416 farmers over 19.3 hectares, earning ₹1,41,050, highlighting the high demand for equipment like rice mills and sprayers. Tuensang led in area coverage at 85.5 hectares, assisting 281 farmers with tools like water pumps and sprayers, yielding ₹17,580. Other notable performers include Ukhrul, with 130 farmers utilizing 31 hectares and earning ₹35,000, and Ri Bhoi, supporting 139 farmers across 16.8 hectares with a revenue of ₹55,692. However, some KVKs like South Garo Hills and Phek reported incomplete data on area and farmer utilization, though they still contributed revenues of ₹26,000 and ₹6,993 respectively. Overall, CHCs facilitated mechanization across 342.28 hectares, benefiting 1,897 farmers and generating ₹5,22,515, demonstrating their critical role in enhancing agricultural productivity and resilience in the region.

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

KVK	Name of implements	Area (ha)	No. of farmers utilized the equipment during 2024-25	Amount generated as revenue (₹)
Chandel	Power tiller, brush cutter, 5 HP water pump, digital moisture meter, weighing balance, crane hook scale	15	83	23,700.00
Senapati	Power tiller, maize sheller, seed bank, mini rice mill, drum seeder, brush cutter, feed machine	4.5	124	18,000.00
Ukhrul	Power tiller, Post hole digger, Sprayer, Harvester,	31	130	35,000.00
Jaintia Hills	Power tiller, Brush cutter	34	19	27,500.00

KVK	Name of implements	Area (ha)	No. of farmers utilized the equipment during 2024-25	Amount generated as revenue (₹)
Ri Bhoi	Power tiller, weighing balances, row maker, conoweeder, fruit harvesters, garden tools, maize shellers, SRI marker, rain gauge	16.8	139	55,692.00
South Garo Hills	Power operated chaff cutter, Brush cutter, Power Tiller.	-	-	26,000.00
West Garo Hills	Power Tiller, Water Pump.	3.22	9	9,600.00
Lawngtlai	Garden rakes, mini oil expeller, Makita brush cutter, power tillers, 4-stroke pump, weeder, digital scales, chainsaw, auger, sprayer, fertilizer broadcaster, 12-ft pruner, dao, dewatering machine, moisture meter	33.76	123	27,810.00
Lunglei	Mini Power tiller, Power weeder, Knapsack sprayer, Diesel water pump	19	77	35,700.00
Siaha	Chainsaw, diesel pump, brush cutter, mini tiller, digital scales, camera, sprayer, oil expeller, banana fiber extractor, maize sheller, egg incubator, cultivator, rice mill, earth auger	47	270	72,550.00
Serchipp	Brush cutter, Power tiller, Water pump, Knapsack sprayer.	8.5	56	11,800.00
Phek	Chaff cutter, Peg type dry land, Cono weeder, Manual rice transplanter, Thresher manual.	-	-	6,993.00

KVK	Name of implements	Area (ha)	No. of farmers utilized the equipment during 2024-25	Amount generated as revenue (₹)
Mon	Rice mill, knapsack sprayers, Sintex water tank, chair, rubber pipe, grass cutters, manual seed drill, paddle thresher, wheel hoe	19.30	416	1,41,050.00
Tuensang	Brush Cutter, Water pump, Platform balance, Knapsack sprayer	85.5	281	17,580.00
Sepahijala	Seedling transplanter, 100-kg digital weighing balance, moisture meter, crane hook, post hole digger, paddy reaper, row maker, knapsack sprayer, water pump, egg incubator	25.2	75	38,500.00

Inauguration of Custom Hiring Centre at Lunglei

7 SEED PRODUCTION IN NICRA VILLAGES

The seed production systems in NICRA villages under ATARI, Zone-VII during 2024-25 have 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. Villages like **Lambung (Chandel)** achieved commendable success by producing **148.69 quintals of paddy, soybean, maize, and groundnut seeds**—notably varieties such as *RC Maniphou-15* and *ICGS-76*—utilizing **260 kg of seed across 13.25 hectares**, engaging **23 farmers**, and earning **₹3,94,849**. Similarly, in **Ri Bhoi district**, villages including **Thadnongiaw** produced **193.2 quintals of turmeric, ginger, maize, and potato seeds** over **7.6 hectares** with **27 farmers**, generating a substantial **₹15,28,000**, underscoring the economic viability of diversified seed enterprises.

The success story from **Tisopi village in Siaha district** stands out, where **49 farmers** cultivated **45 hectares**, producing **618 quintals of rice and maize seeds**, collectively earning **₹27,69,000**—a remarkable example of community-led seed entrepreneurship. On a smaller yet significant scale, **Hengbung village in Senapati district** produced **2362 quintals of millets and groundnut** seeds over **2.2 hectares**, engaging **22 farmers**, and contributing **₹9,372**, highlighting the inclusiveness of the program across different production scales. Altogether, **163.73 hectares** were brought under seed production, involving **363 farmers** and generating **₹47,27,846**, reflecting the region's strong commitment to self-reliance.

These collective efforts have enhanced seed availability at the village level, reduced dependence on external sources, and ensured timely access to quality seeds during critical cropping seasons. 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.

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

KVK	Villages	Crop	Variety	Area (ha)	No. of farmers involved during 2024	Quantity produced (q)	Quantity of Seed utilized (Kg)	Revenue generated (₹)
Chandel	Lambung	Paddy, Soybean, Maize, Groundnut	RC Maniphou-15, RC Maniphou-13, Soybean (DsB-19), RC M 1-76, Groundnut (ICGS-76)	13.25	23	148.69	260	3,94,849.00
Senapati	Hengbung, Mayangkhang, T.Khullen	Millets, Groundnut	Var. VL Mandua-376, KDG-123	2.2	22	2362	-	9,372.00
Jaintia Hills	Umjalasiew, Mukhnang, Namdong, Wahiajer & Niriang	French bean, Paddy, Maize	Jaintia local & Naga local, CAUR1, DA-61	18.3	57	1.3	1.3	6,600.00
Ri Bhoi	Thadnongiaw, Thadnongiaw, Mawbri, Liarkhla, Liarbang & Kdonghulu	Turmeric, Ginger, Maize, Potato	Lakadong, local, Kufri Frysona	7.6	27	193.2		15,28,000.00
South Garo Hills	Asugre	Indian Mustard, Paddy	DRMR-150, CAU-R4, CAU-R1, RCM Maniphou -15	38.5	35	6	3.5	23,000.00
West Garo Hills	Bagugre, Marapara, Mebol Darechikgre	Hybrid Napier, Guinea	-	0.33	30	42	42	-

KVK	Villages	Crop	Variety	Area (ha)	No. of farmers involved during 2024	Quantity produced (q)	Quantity of Seed utilized (Kg)	Revenue generated (₹)
Lawngtlai	Chawnhu & Ngengpuikai	Rice, Groundnut, French bean Zorin (MZFB 48), Sesame (Local), Soybean, Maize.	RCM -13, Girner-4, MZFB 48, Local, RCM 5	4	19	36.85	-	1,44,125.00
Lunglei	Hnahthial	Paddy, Soybean, Maize	Maniphou12, Fazu, Fangsin(Local), RCM-76, Mimban(Local)	4.55	10	143	3.8	22,600.00
Siaha	Tisopi	Rice, Maize	Local	45	49	618	-	27,69,000.00
Serchipp	N.Vanlaiphai, Lungchhuan, Chekawn	Frenchbean, Soybean	Soybean, VL 89	4	8	2.4	1.5	14,000.00
Phek	Thipuzu, K. Basa, Phusachodu, Kikruma & Pfutseromi	Foxtail millet	SiA 3085	3	30	33.98	1700	84,900.00
Mon	Ngangching, Sowa Changle, Langmeing, Totok Chingha	Paddy, Garlic, Toria	Local, RC-Maniphou 15, Yamuna Purple-10, TS-67, RC Maniphou- 14	7.2	33	5.8	5.8	32,400.00
Tuensang	Chendang and K. Wongthu	Rice, Foxtail millet	Local germplasm	10	20	22	22	-

8 DRONE TECHNOLOGY DEMONSTRATED

Table 8.1: Drone Technology demonstrated at KVKs under Zone-VII

KVK	Technology	Area covered (ha)	Input saved (l)	No. of labour saved	Cost saved (Rs)	Impact	Efficiency (%)
Lunglei	Solar Light Trap	2	800 ml of Insecticide (Chloryriphos, Malathion)	5	8460/-	Eco-friendly pest management, chemical free farming practices	65%
	Ram Pump	3.5	15 lit Petrol	17	6485/-	No external energy utilizes free flowing water current. Highly suitable in hilly areas	80%
Phek	Spraying of bio- organics	1.5	285	5-6	3000-4000	Uniform spraying saving water, time, and reducing drudgery	70-80%

Demonstration of Drone Technology in farmer's field

9 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
Ukhrul	HQPM Maize	HQPM maize varieties have built-in disease resistance, reducing the need for pesticides and other chemicals	CAU, Imphal	8 farmers, 10 ha	31,000.00
Ri Bhoi	Jalkund	Micro-irrigation using Jalkund-harvested water for versatile agricultural applications	MIDH, Horticulture Dept	10 farmers	2,00,000.00
	Polyhouse for protected cultivation	Round the year vegetable cultivation under protected condition		10 farmers	3,00,000.00
	IFS system	Climate resilient integrated fish cum poultry/pig IFS system for sustainable income		28 farmers	2,00,000.00
South Garo Hills	Ghungroo pig	Resilient breed, low-input housing	NABARD	10 unit	1,35,000.00
	Duck cum Fish Farming (IOFS NABARD Project)	Polyculture, waste recycling, flood-resistant		0.15	42,500.00
	Vermicomposting	Organic waste conversion, soil fertility		10 unit	95,000.00

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
	Rainbow Rooster	Heat-tolerant, dual-purpose, low-maintenance		10 unit	44,000.00
West Garo Hills	Paddy Cultivation	CR Dhan 805 & Ranjit Sub-1	DAO, West Garo Hills, Meghalaya	27 farmers/ 4.67 ha	-
Lawngtlai	NRM	Poly-mulch in watermelon	PDMC, NHM	10 farmers	4,00,000.00
	Crop Production	Multiple disease tolerant variety of tomato (Arka abhed)	NHM, ATMA NREGA	11 farmers	2,50,000.00
	Animal Production	Backyard Poultry (Rainbow rooster)	NLM (AH & Vety), ICAR Centre Kolasib, NABARD	25 farmers	2,80,000.00
Lunglei	Renovation of RWHS	Harvesting & Recycling of Rainwater	MNREGS 2024-25	5 farmers	30,000.00
	Dragon fruit	Stress tolerant crops	District Horticulture Deptt (MIDH 2024-25)	10 farmers	20,000.00
	Maniphou 12	Short duration paddy	District Agriculture Deptt (2024-25)	10 farmers	25,000.00
	Cabbage + Tomato	Inter cropping	District Horticulture Deptt (MIDH 2024-25)	10 farmers	25,000.00
	Maize + Soybean	Inter cropping	District Agriculture Deptt (2024-25)	10 farmers	25,000.00

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
Siaha	Rainfed upland, mild/ steep hills, with/ without animals, diverse farming systems	Walk-in tunnel for off-season vegetables, community nursery for winter seedlings, early garden pea planting, in-situ moisture conservation with 20-micron black polythene mulch	MIDH, Horticulture Dept	73 farmers/ 28 ha	-
	Rainfed upland, mild hills, with/without animals, diverse agricultural systems	Semi-intensive poultry housing, backyard poultry, low-cost pig litter housing, Yorkshire-local crossbreed pig	RKVY, AH&Vety Dept	35 farmers	-
	Rainfed upland, steep hills, no animals, challenging agricultural conditions	Renovation of defunct ponds for multipurpose use	NREGA (DRDO)	7 farmers/ 4 ha	
Sepahijala	Hampshire-Yorkshire crossbreed pig, field pea in rice fallow intervention	Cross Breed (Hempshire x Yorkshire), Seeds	ICAR-VPKAS, Almora	20 farmers	75,000.00
	Mid-duration Gomati paddy, slurry phosphorus management for enhanced yields	Paddy variety Gomati, Fertlizers, Seeds, Fertilizers	Department of Agriculture & Farmers' Welfare, Govt of Tripura	60 farmers	45,000.00

10 CAPACITY BUILDING PROGRAMMES TAKEN UP IN 2024-25

Table 10.1: Capacity Building Programmes taken up in 2024-25

KVK	Topic of training	No. of programs	No. of beneficiaries		
			Male	Female	Total
Chandel	IFS, climate-resilient agriculture, gender-friendly tools, scientist-farmer interaction, livestock management, oyster mushroom cultivation	10	42	153	195
Senapati	INM in banana, finger millet, poultry rearing, Jalkund, polyhouse vegetables, animal health camp	9	143	127	270
Ukhrul	Vermicomposting, Astra-Agni, Brah & Neem applications, mushroom production using paddy straw, value addition in horticultural crops	5	30	68	98
Jaintia Hills	Mulching, maize, paddy-cum-fish, IFS, ginger, poultry, potato planting, soil health, mushroom, vegetables	11	61	292	354
Ri Bhoi	Poultry, polyhouse, resilient poultry, Jalkund sheets, fingerlings, ducklings, health camp, polyhouse vegetables	10	39	113	152
South Garo Hills	Beekeeping, cashewnut terracing, paddy root dip, poultry, polyhouse, IPM maize, aquaculture, biofertilizers	1	10	15	25
West Garo Hills	Eco-friendly pest management, IPM paddy, Dapog nursery, IFS, livestock care, mushroom, vegetables	17	172	399	561

KVK	Topic of training	No. of programs	No. of beneficiaries		
			Male	Female	Total
Lawngtlai	Climate-adaptive crop production, monsoon poultry management, irrigation, soil fertility, mulching, IPM, horticultural preservation	8	119	70	189
Lunglei	RCTs, RWHs, dragon fruit, maize-soybean practices, cropping sequences, backyard poultry management	5	130	109	229
Siaha	IFS, maize pest, rice disease, Rabi nursery, cole crops INM, mulching, water conservation, SHG, poultry, turmeric, piglets, mushrooms, livestock vaccination, Jeevamrut, beekeeping	21	270	272	542
Serchipp	Water harvesting, composting, nano fertilizers, quail health, Mithun nutrition, ginger rot, polyhouse practices	7	130	92	222
Phek	Vermicomposting, marketing, pulses, aerobic rice, water harvesting, foxtail millet, soil health, intercropping, IFS, high-value crops, diversification, climate-resilient technologies, biofertilizers, fertility management	28	231	378	619
Mon	Intercropping, rainwater harvesting, biological pest suppression, fertilizer management, backyard poultry, winter crops, polymulch, oyster mushroom, beekeeping	10	127	73	200
Tuensang	Heat stress crop management, adverse climate cultivation, mushroom, IFS, polymulching, nursery, maize cultivation	9	145	159	304
Sepahijala	Oyster mushroom production, livestock climate risk, flood crop planning, legume soil health, phosphorus slurry, mustard in rice fallow, duckling care	7	120	32	154

Capacity Building Programmes at KVK Chandel

Interaction with farmers at KVK Ukhrul

Intervention on Oyster mushroom cultivation in Sepahijala

Distribution of Piglets at KVK Siaha

11 EXTENSION ACTIVITIES

Extension activities conducted by KVKs under Zone-VII in 2024 have significantly engaged farmers, with a total of 220 programs benefiting 5,718 individuals, comprising 2,484 males and 2,234 females. Phek led with 105 programs, including mobile advisory services and field days, reaching 2,169 beneficiaries, while South Garo Hills organized 21 diverse events like animal health camps and input distributions, impacting 395 farmers. Siaha and Lunglei also excelled, hosting 21 and 7 programs respectively, benefiting 526 and 507 participants through intercropping demonstrations and agro-clinics. These activities, ranging from field days on climate-resilient varieties like RC Maniphou-15 in Chandel (45 beneficiaries) to vaccination camps in Tuensang (79 beneficiaries), focused on sustainable practices, livestock management, and technology adoption, fostering knowledge sharing and agricultural resilience across the region.

Table 11.1: Extension activities taken up in 2024-25

KVK	Name of the activity	No. of programs	No. of beneficiaries		
			Male	Female	Total
Chandel	Field day on RC Maniphou-15, farmer visits for crops and livestock	3	25	20	45
Senapati	Finger millet showcase, backyard poultry rearing. Training: Poultry care and management	3	39	51	90
Ukhrul	Field visits to progressive farmers for learning integrated farming systems and mulching technology	1	18	5	23
Jaintia Hills	VCRMC and KVK staff meeting, Custom Hiring Centre awareness, climate-resilient and smart agriculture, rainwater harvesting, horticulture, exposure visits	6	44	193	237

KVK	Name of the activity	No. of programs	No. of beneficiaries		
			Male	Female	Total
Ri Bhoi	Maize Field Day promotes sustainable cultivation practices; World Soil Day (December 5) highlights healthy soil's role in agriculture and environment; IFS Field Day showcases integrated farming through field activities and expert insights	3	12	81	93
South Garo Hills	Distribution of vermibeds, planting materials, Azolla beds, ducklings, poultry, water cans; Animal Health Camp; Farmers-Scientist Interaction; Custom Hiring Centre group meeting; Field Day; Kisan Gosthi awareness; Mera Gaon Mera Gaurav	21	147	248	395
West Garo Hills	Group discussion cum VCRMC Meeting cum Distribution of Kharif Vegetables, Distribution of Poultry chicks/feeds/ medicines, Group discussion cum distribution of Kharif vegetable seeds, VCRMC Meeting, Input distribution of livestock medicines, Group discussion cum VCRMC meeting under NICRA, Distribution of Winter Vegetable seeds, Field Day – Climate Resilient Paddy varieties: CR Dhan 805, Field day – Sali Paddy var. Ranjit Sub – 1, Animal Vaccination cum Health Camp, Distribution of Poultry chicks/feeds/ medicines, Input distribution under TDC NICRA	12	63	237	300
Lawngtlai	Pest & Disease problems of Rice, vegetables and Livestock/ Poultry, Tomato & Cabbage field, Harvesting of Watermelon, Rice, Cabbage etc., Distribution of medicines and anti-rabies vaccine for free under NICRA, Inputs- Sprayer, PP chemical, Fertilizers etc	13	137	142	279

KVK	Name of the activity	No. of programs	No. of beneficiaries		
			Male	Female	Total
Lunglei	Animal Health Camp, Agro Clinic, Exposure Visit, Field Day, World Environment Day	7	289	218	507
Siaha	Maize-soybean intercropping, weeding, intercultural maize operations, low-cost polyhouse vegetable cultivation, IPM, deep litter piggery/poultry housing, garden pea harvesting, diagnostic visits, farmer-scientist interactions, residue recycling, seed distribution, INM, jhum weed management, machinery handling, mushroom cultivation, livestock vaccination/treatment	21	281	245	526
Serchipp	Composting technology	1	5	7	12
Phek	Mobile advisory service, Field Day, Training & Demonstration (100-day Action Plan)	105	1157	1012	2169
Mon	Training and awareness on rainwater harvesting and efficient use, animal healthcare camp, group discussions, field day, field visits, VCRMC meetings	25	131	112	232
Tuensang	Vaccination camp for Vanaraja poultry chicks under NICRA; Soybean Field Day at Chendang village showcasing RVSM-1135 variety performance, harvest, and adoption of improved technologies for enhanced crop yields	2	48	31	79
Sepahijala	Slurry method demonstration for phosphorus management in paddy, Paddy Field Day, power tiller handover to Custom Hiring Centre, climate-resilient agriculture awareness, Garden Pea Field Day, Potato Field Day, VCRMC meeting	6	84	48	132

12 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	Best KVK Exhibition in Kisan Mela	ICAR-RC for NEH Region, Manipur Centre	9th December 2024
	Smt. St. Khuwngtha-Outstanding NICRA Farmer	ICAR-RC for NEH Region, Manipur Centre	28th March 2025
Jaintia Hills	Impact of Low-cost water harvesting structure in west Jaintia hills, Meghalaya	Indian Society of Dryland Agriculture	31st January 2025
Ri Bhoi	Best KVK Award (Meghalaya)	ICAR-ATARI, Zone VII	24th June 2025
West Garo Hills	Best Innovative Farmer Award	ICAR-ATARI, Zone VII	24th June 2025
Phek	Mrs. Nuzulu Chuzho: "Outlook Agri Tech Summit & Swaraj Awards 2024"	Outlook Group, New Delhi	9th September 2024

13 PUBLICATIONS

Table 13.1: Publications in 2024-25 under Zone-VII

KVK	Title	Type of publications
Chandel	Enhancing Farmers Livelihood in Lambung village, Chandel through Climate Resilient Technoloies: Impact of NICRA, Weathering the change Understanding and adapting to Climate Trends	Technical Bulletin
	Scope and Potential of Conservation Agriculcure in Millet-based Farming Systems, Ancient Super food Millet as a Sustainable solution to India's Agrarian and Nutritional Challenges	Book Chapter
	Enhancement of Farm Income through crop diversifacation in Chandel district of Manipur, Enhancing Rice Productivity in Lambung village through Climate Resilient Farming, Impact of Erratic Weather on Crop yields in Lambung:A NICRA Village	Popular Article
	Constraints faced by vegetable Growers in Chandel District, Manipur, Overcoming Low Farm Returns Limitation through Cultivation of Improved Rice Variety in the Aspirational District of Chandel, Income enhancement through Crop Diversification in Chandel District under NICRA Project, Improvement of Livelihood of Tribal Families through Scientific Backyard Piggery Farming	Research Paper
Senapati	Ridge and furrow method in potato production, Millet Cultivation in Context to Climate Change, Deep litter system in poultry production	Leaflets
Ri Bhoi	Impact and performance of climate resilient technologies demonstrated in Ribhoi district of Meghalaya (Technical Bulletin/2024)	Technical Bulletin
	Entrepreneurship Development through Commercial Duck Farming (Training Manual)	Training Manual
	An Evaluation Study on Integrated Farming System (IFS) Model in Ri-Bhoi District of Meghalaya, India	Research Paper

KVK	Title	Type of publications
	Impact & Performance of Climate Resilient Technologies Demonstrated in Ri-Bhoi Dist. of Meghalaya	Research Paper
	Entrepreneurship development through IFS	Research Paper
	Integrated fish cum pig farming system (Both in English & Khasi)	Research Paper
	Aqua-Rice Integrated Farming Syatem- A Sustainable Farming for Enhancing Farmers Income (Both in English & Khasi)	Research Paper
	Rep Kyllum: A Film on IFS model	Video Film
South Garo Hills	Effect of Sowing Dates and Variety on Growth, Yield Attributes and Yield of Rapeseed under Organic Farming Practices in South Garo Hills, Meghalaya	Research Article
West Garo Hills	Sustainable rice production through climate resilient varieties for stable future, Climate resilient Aquaculture, Green manuring- A viable option for improving soil fertility and soil health, Integrated Organic farming System (IOFS), Climate Smart Agriculture- Thriving amid change, In situ water conservation technique for climate resilient Agriculture	Folders
Lawngtlai	Sik leh sa zira thlai chin leh enkawl dan, Zikhlum (Rhyozeki) chin leh enkawl dan, Natna do thei Tomato (Arka abhed) chin leh enkawl dan, Backyard Poultry farming (Rainbow Rooster), Badam (Girnar-4)- Thar hlawk leh hrisel chin leh enkawl dan, Vaimim (Ranchaw) chin dan leh enkawl dan	Leaflets
	Demonstration of climate smart technologies in Lawngtlai district under TDC-NICRA	Bulletin
Siaha	Management of Fall Army Worm in Maize, Different Method of Water Conservation in Agriculture, Mushroom Cultivation, Care and Management of Piglets during Stress Condition	Folders
	Documentary video of NICRA Technologies	Video Film

KVK	Title	Type of publications
Phek	Fall Armyworm and their Organic Management Practices, Integrated Pests Management of Rice Yellow Stem Borer, Low- cost Water Harvesting with LDPE Lining (Jalkund), Package of Practices for Potato Cultivation, Scientific Method of Beekeeping	Leaflets
Mon	NICRA-TDC KVK Mon, Nagaland, Animal Health Care Camp (Nagaland Page)	Newsletter
	Package of practice of Broccoli, Care and Management in Beekeeping (Apis cerena), Technical information of different crops of Mon District in relation to climate change, Package of Practices of soybean, Package of Practices of direct seeded rice	Leaflets
	Production technology of Pea in rice fallow, Success story on Paddy straw mulch in Pea, Success story on Paddy straw mulch in Garlic	Bulletin
Tuensang	Climate Resilient Cultivation of Cabbage, Backyard Poultry Rearing	Leaflets
	Impact of NICRA project on Knowledge and Adoption of Sustainable Cabbage Production Technologies: A Study in Sangsangyu Block under Tuensang District of Nagaland, India	Research Article
Sepahijala	Slurry method of phosphorus management in paddy, Package and practices for Mustard and Rapeseed, Climate Resilient Integrated Farming System Success Story	Folders
	Energy Budgeting and Economic Analysis of Cowpea Varieties under Rainfed Condition	Research Article
	Compendium of Climate Resilient Success Stories of NICRA Adopted Village	Bulletin

14 CASESTUDIES(SUCCESSSTORIES) OF SUCCESSFUL NICRA FARMERS REPORTED BY THE NICRA KVKs UNDER ZONE-VII

KVK Chandel, Manipur

Farmer Profile

- Name: Smt. Bd. Shangrang
- Age: 58 years
- Mobile: 8731943050
- Address: Lambung village, Chandel, Manipur
- Land Holdings: 1 ha (Rainfed)

Challenges Faced

- Erratic and unreliable rainfall during the Kharif season, affecting rice cultivation.
- Dry spells during critical crop stages like flowering and milking-dough stage (100-120 days after sowing).
- Inability to practice secondary cropping due to water scarcity.

Climate-Resilient Technology Adopted

Cultivation of an improved mid-duration paddy variety, RC Maniphou-15, suitable for the region. This variety matures in 125-130 days, is sown in the first week of June, and harvested by the end of the first week of October, aligning well with the monsoon period.

Impact of Interventions

The RC Maniphou-15 variety optimizes rainfall utilization, flowering after early-season dry spells and maturing before late-season droughts. Its moderate vegetative growth enables faster recovery from short dry spells, ensuring stable yields despite climate variability.

Yield and Economic Outcomes

- Cost of Cultivation: ₹ 55,000/ha
- Gross Returns: ₹ 1,19,600/ha
- Net Returns: ₹ 64,600/ha
- Benefit-Cost (B:C) Ratio: 2.17
- Yield: 5.223 t/ha (compared to 4.159 t/ha for traditional varieties, a 25.6% increase)

Conclusion

Smt. Bd. Shangrang's adoption of RC Maniphou-15 has revolutionized rice farming in Lambung village. By aligning with the monsoon cycle and ensuring resilience against dry spells, this climate-smart variety has boosted yields by 25.6% and improved profitability, offering a sustainable solution for rainfed agriculture in Manipur.

Improved mid-duration paddy variety, RC Maniphou-15 growing at Chandel district

KVK Senapati, Manipur

Farmer Profile

- Name: Smt. Nengcha Hangshing
- Age: 46 years
- Mobile: 8787360896
- Address: Hengbung Village, Kangpokpi District, Manipur
- Land Holdings: 1 acre (Rainfed; 0.5 acre Cabbage, 0.5 acre Broccoli)

Challenges Faced

- Moisture stress during transplanting and vegetative stages of cabbage and broccoli cultivation.
- Limited water availability impacting crop growth in rainfed conditions.

Climate-Resilient Technology Adopted

Under the NICRA project, Smt. Nengcha adopted paddy straw mulching for cabbage and broccoli cultivation. Approximately 2.5 tons of paddy straw per hectare was spread over the main field soon after transplanting 20-day-old seedlings. This climate-resilient practice conserved soil moisture, reduced water requirements, and enhanced soil health.

Impact of Interventions

- Paddy straw mulching retained 26% of soil moisture at 90 days after transplanting, addressing moisture stress.
- Reduced weed growth by 30%, lowering labour and weed control costs.
- Increased soil organic matter through the slow decomposition of straw, improving soil health.
- Decreased water requirements due to enhanced soil moisture conservation.
- The technology was adopted by 60 farmers across 15 ha in Hengbung and nearby villages, demonstrating its scalability and effectiveness.

Yield and Economic Outcomes

Crop	Yield (q)	Gross cost (Rs)	Gross return	Net return	BC Ratio	%increase in income over farmer practice
Cabbage	155	66000	155000	89000	2.3:1	16%
Broccoli	109	108000	327000	219000	2.02:1	24%

Conclusion

Smt. Nengcha Hangshing's adoption of paddy straw mulching under the NICRA project has transformed cabbage and broccoli farming in Hengbung Village. By conserving soil moisture, reducing weed growth, and enhancing soil health, this climate-resilient technology boosted yields and income by 16–24%, setting a sustainable model for rainfed agriculture inManipur's Kangpokpi District.

Paddy straw mulching in Cabbage cultivation

Paddy straw mulching in Broccoli cultivation

KVK Jaintia Hills, Meghalaya

Farmer Profile

- Name: Smt. Tira Lyngdoh
- Age: 56 years
- Mobile: 8798379512
- Address: Wahiajer Village, Thadlaskein Block, West Jaintia Hills District, Meghalaya
- Land Holdings: 1.2 acres (Rainfed)

Challenges Faced

- Prolonged low winter water temperatures (4-5 months) in mid-hill regions, limiting the growth of Indian Major Carps (IMC).
- Shortened effective growing season for fish due to cold stress, leading to poor performance and low yields.

Climate-Resilient Technology Adopted

Under the NICRA project by KVK Jaintia Hills, a two-species fish culture system was introduced, stocking Amur common carp (Cyprinus carpio) and Labeo gonius in a 1:1 ratio at 8000 fish per hectare. The fish were fed a supplementary diet of Mustard Oil Cake (MOC) and Rice Polish at 2-3% of body weight daily, adjusted for growth and temperature. Proper pond management, including liming and manuring, was followed, with a culture duration of approximately 230 days.

Impact of Interventions

The introduction of Amur common carp and Labeo gonius, both cold-tolerant species, mitigated the impact of low winter temperatures (below 18°C) in Meghalaya's mid-hill regions. Unlike traditional IMC, these species maintained growth and survival, achieving up to 75% survival rates, 30% higher yields, and 73% higher net returns compared to IMC-based culture. This climate-resilient approach improved feed utilization, ensured stable production, and enhanced profitability for small and marginal farmers.

Yield and Economic Outcomes

- Fish Yield: 2.02 quintals/0.1 ha (30% higher than 1.55 q/0.1 ha in traditional IMC culture)
- Growth: Amur carp averaged 550g (max 600g, 1.97% daily growth rate); Labeo gonius averaged 270g (1.66% daily growth rate)
- Survival Rates: 75% for Amur carp, 65% for Labeo gonius

- Cost of Cultivation: Not specified in provided data
- Gross Returns: ₹ 40,400/ha
- Net Returns: ₹ 26,320/ha
- Benefit-Cost (B:C) Ratio: 2.86:1 (compared to 1.99:1 in traditional practice)

Conclusion

Smt. Tira Lyngdoh's adoption of a climate-resilient two-species fish culture system has transformed aquaculture in Meghalaya's mid-hill regions. By leveraging cold-tolerant Amur carp and Labeo gonius, she achieved higher yields, better survival rates, and increased profitability, setting a sustainable model for small-scale farmers facing climate challenges.

Harvesting of Amur common carp showing good growth performance under mid-hill conditions

KVK Jaintia Hills, Meghalaya

Farmer Profile

- Name: Smt. Angel Syngkon
- Age: Not specified
- Mobile: 9856804305
- Address: Niriang village, Thadlaskein Block, West Jaintia Hills, Meghalaya
- Land Holdings: 2 acres (Rainfed)

Challenges Faced

- Monocropping limiting agricultural productivity.
- Water stress during the rabi season (November to March) affecting potato and vegetable crops.
- Critical impacts during vegetative to harvesting stages of cole crops due to prolonged dry spells in upland areas.

Climate-Resilient Technology Adopted

Under the NICRA project by KVK Jaintia, potato and cabbage cultivation was introduced in lowland fields after paddy harvest, utilizing residual soil moisture. Potato (variety Kufri Pukhraj) was grown on raised beds from February to May at a spacing of 20x20 cm. Cabbage was transplanted on raised beds in the fourth week of November, post-paddy harvest, at a spacing of 45x45 cm, with harvesting by the end of February.

Impact of Interventions

The use of residual moisture in lowland paddy fields effectively addressed water stress during the dry winter months, enabling successful cultivation of potato and cabbage. This approach increased cropping intensity, promoted crop diversification, and achieved a high adoption rate among farmers. The intervention transformed monocropping systems into a more resilient and productive farming model, enhancing food security and income stability.

Yield and Economic Outcomes

Technology	Crop	Area (ha)	Production (Q.)	Gross cost	Gross Income (Rs.)	Net Income (Rs.)	B.C ratio
Before intervention monocropping of paddy	Paddy	0.7	19.50	41600	58500	16900	1.41
Paddy followed by potato	Paddy	0.4	14.88	28280	44640	16360	1.58
	Potato	0.4	76.8	46800	153600	106800	3.28
	Combined	0.4	91.68	75080	198240	123160	2.64
Paddy followed by cabbage	Paddy	0.3	10.1	18100	30300	12200	1.7
	Cabbage	0.3	81.2	37500	121800	84300	3.2
	Combined	0.3	91.3	55600	152100	96500	2.74
Total of both the technologies		0.7	365.96	261360	700680	439320	2.68

Conclusion

Smt. Angel Syngkon's adoption of lowland potato and cabbage cultivation under the NICRA project has revolutionized farming in Niriang village. By leveraging residual moisture from paddy fields, she overcame water stress, boosted cropping intensity, and achieved a dramatic increase in yield and income, setting a sustainable model for climate-resilient agriculture in Meghalaya's West Jaintia Hills.

Lowland potato and cabbage cultivation at Jaintia Hills district

KVK Ri Bhoi, Meghalaya

Farmer Profile

- Name: Smt. Jemnud Marpan
- Age: 47 years
- Mobile: 9362172152
- Address: Thadnongiaw, Ri Bhoi District, Meghalaya
- Land Holdings: 0.8 ha (Rainfed)

Challenges Faced

- Low output from traditional individual farming systems.
- Water scarcity during the Rabi season, particularly at the vegetative stage.

Climate-Resilient Technologies Adopted

1. Integrated Fish cum Raised Floor Poultry Farming System:

   This innovative system integrates poultry and fish farming, utilizing poultry droppings as fish feed to promote the growth of phytoplankton, zooplankton, and bacteria. The poultry house, built with locally available materials and a split bamboo floor, ensures hygiene and dryness. This approach reduces costs for fertilizer, feed, and water while producing fish, meat, and eggs, enhancing income and food security.

2. Micro-Irrigation through Jalkund for Multipurpose Use:

   To combat water stress from unpredictable rainfall and drought, Smt. Jemnud adopted a Jalkund—a 5x4x2 m water harvesting structure capable of storing 40,000 litres. This rainwater conservation system supports crop, livestock, and fish production, enabling diversified and efficient water use in rain-fed areas.

Impact of Interventions

- Enhanced Resilience: The Integrated Fish cum Raised Floor Poultry Farming System thrives in moderate climates with water access, offering small-scale farmers like Smt. Jemnud a sustainable way to diversify income and improve food security.
- Water Management: The Jalkund based micro-irrigation system ensures efficient water use, supporting crop and livestock production in rain-fed conditions, thus enhancing farm resilience.

- Farmer Acceptance: Both technologies have been well-received for their cost-effectiveness, increased productivity, and resource efficiency, making them ideal for resource-limited farmers.

Yield and Economic Outcomes

- Average Vegetable Yield: 165 q/ha/year
- Average Net Return: Rs. 47,880/ha/year with a Benefit-Cost (B:C) ratio of 2.19
- Cropping Intensity: Increased to 204%, reflecting improved land productivity

Conclusion

Smt. Jemnud Marpan's adoption of the Integrated Fish cum Raised Floor Poultry Farming System and Jalkund-based micro-irrigation showcases how climate-resilient technologies can transform small-scale farming. These innovations have not only addressed water scarcity and low productivity but also empowered her to achieve sustainable income, food security, and farm resilience in Meghalaya's challenging agro-climatic conditions.

Jalkund based micro-irrigation system at Mrs. Jemnud's field

Demonstration of Integrated Fish Cum Poultry Farming System

KVK South Garo Hills, Meghalaya

Farmer Profile

- Name: Mr. Kenedy D. Momin
- Age: 59 years
- Mobile: 9863869026
- Address: Asugre, South Garo Hills, Meghalaya
- Land Holdings: 1 ha (Rainfed)

Challenges Faced

- Flash floods and water logging for 3–4 days during the kharif season (tillering to heading stage).
- Erratic rainfall during the post-monsoon season (dough to physiological maturity stage).
- Long-duration local paddy varieties limiting farmers to monocropping, preventing sequential cropping.

Climate-Resilient Technology Adopted

Under the NICRA project, Kenedy adopted the CAU R4 paddy variety, which is tolerant to water submergence for up to 7 days and matures in 125–130 days, allowing harvest by mid-October. This enabled sequential cropping of Indian mustard (variety DRMR-150) using residual moisture and zero tillage, minimizing labour costs and leveraging the short-duration mustard variety for post-paddy cultivation.

Impact of Interventions

In 2022, despite heavy kharif rainfall (3862.47 mm) causing flash floods and water logging, the CAU R4 paddy variety withstood submergence, ensuring stable yields. Its medium duration allowed harvesting before erratic post-monsoon rainfall, mitigating climate variability. The introduction of zero-tillage Indian mustard (DRMR-150) enabled sequential cropping, increasing cropping intensity and income while utilizing residual soil moisture efficiently.

Yield and Economic Outcomes

	Crop Variety	Productivity (kg ha^{-1})	COC (₹ ha^{-1})	Gross returns (₹ ha^{-1})	B:C ratio	Net Return (₹ ha^{-1})
NICRA Farmers	CAU-R4	3820	48,700	1,24,600	2.55	75,900
	DRMR 150	980	27,600	63,700	2.30	36,100
Farmers Practice	Local paddy var. Mirosi	3200	45,500	1,06,600	2.34	61,100

Conclusion

Mr. Kenedy D. Momin's adoption of the CAU R4 paddy variety and zero-tillage Indian mustard (DRMR-150) under the NICRA project has transformed his farming in South Garo Hills. By overcoming flash floods and erratic rainfall, he achieved higher yields and introduced sequential cropping, significantly boosting income and setting a sustainable, climate-resilient model for rainfed agriculture in Meghalaya.

Field damaged by flood

Field after flood

SRI method of transplanting paddy

Crop stand in the field after the stress

KVK West Garo Hills, Meghalaya

Farmer Profile

- Name: Mr. Tengseng Sangma
- Age: 37 years
- Mobile: +918798583864
- Address: Bagugre Village, Dalu Block, West Garo Hills, Meghalaya
- Land Holdings: 1.30 ha (Rainfed), 1.20 ha (Irrigated)

Challenges Faced

- Short-term drought during the rabi season (November to March), affecting winter vegetable production.
- Climate vulnerability: Flash floods during the rainy season and drought during the rabi season.
- **Crop stages affected:**
  - Tomato: Flowering, fruit development, and ripening stages.
  - Cabbage: Head formation stage.

Climate-Resilient Technology Adopted

Under the NICRA project, Mr. Tengseng Sangma implemented two climate-resilient technologies:

1. Low-Cost Water Harvesting Structure (Jalkund): A 5 × 4 × 1.5 m structure with a 30,000-liter capacity was established to provide supplemental irrigation during rabi season droughts.
2. Paddy Straw Mulching: Paddy straw was used as mulch for winter vegetable production to enhance soil moisture retention, moderate soil temperature, suppress weeds, and improve soil health through organic matter decomposition.

Impact of Interventions

The Jalkund ensured a reliable water supply for irrigation during short-term droughts, maintaining soil moisture and supporting crop growth. Paddy straw mulching conserved soil moisture, reduced evaporation losses, moderated soil temperature, and suppressed weed growth, while also enriching soil organic matter and microbial activity. Together, these interventions mitigated the adverse effects of drought, ensuring stable vegetable production and improved soil health in a flash flood-prone and drought-affected region.

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

Conclusion

Mr. Tengseng Sangma's adoption of Jalkund and paddy straw mulching under the NICRA project has transformed winter vegetable farming in West Garo Hills. By addressing drought and flash flood challenges, these low-cost, climate-resilient technologies ensured consistent yields, enhanced soil health, and significantly boosted profitability, setting a sustainable model for farmers in Meghalaya's climate-vulnerable regions.

Jalkund at Mr. Sangma's field

Paddy straw mulch in Tomato cultivation

Paddy straw mulch in Cabbage cultivation

KVK Lawngtlai, Mizoram

Farmer Profile

- Name: Mr. Lalmuansanga
- Age: 40 years
- Mobile: 8974284494
- Address: Chandmari (L-4), Lawngtlai District, Mizoram
- Land Holdings: 1.375 acres (Rainfed), 5.75 acres (Irrigated)

Challenges Faced

- Moisture stress, cold, and dry spells during the rabi season affecting crop growth.
- Critical impacts during the flowering and fruit-setting stages of watermelon due to water scarcity and temperature fluctuations.

Climate-Resilient Technology Adopted Under the NICRA project, Shri Lalmuansanga adopted poly-mulching for hybrid watermelon cultivation during the rabi season, combined with sprinkler irrigation. Poly-mulching reduced soil moisture loss prevented nutrient leaching, increased soil temperature and radiation, improved water use efficiency, suppressed weeds, and facilitated efficient fertilizer placement.

Impact of Interventions

- Poly-mulching increased water uses efficiency and water savings by over 20% by reducing soil evaporation, enabling stable yields.
- Sprinkler irrigation with poly-mulching enhanced water and fertilizer use efficiency by 50%.
- Created a stable microclimate, protecting crops from environmental stressors, pests, and diseases.
- Improved fruit quality and enabled cultivation of a second crop by enhancing water security for critical growth stages.
- Reduced irrigation water requirement by approximately 500 litres and lowered labour and weedicide costs by ₹ 9,500/ha.
- Increased cropped area and supported crop diversification.

Yield and Economic Outcomes

- Poly-Mulched Watermelon:
    - Yield: 160 q/ha (compared to 148 q/ha in non-mulched watermelon)
    - Gross Returns: ₹ 9,60,000/ha
    - Cost of Cultivation: ₹ 1,57,000/ha
    - Net Returns: ₹ 8,03,000/ha
    - Benefit-Cost (B:C) Ratio: 6.1:1

Conclusion

Mr. Lalmuansanga's adoption of poly-mulching and sprinkler irrigation for watermelon cultivation has transformed farming in Mizoram's Lawngtlai District. By addressing moisture stress and cold spells, these climate-resilient technologies improved water and fertilizer efficiency, enhanced fruit quality, and significantly boosted profitability, setting a sustainable model for rabi season agriculture in the region.

Poly-mulching and sprinkler irrigation in Watermelon cultivation

KVK Lunglei, Mizoram

Farmer Profile

- Name: Mr. H Lalnunmawia
- Age: 64 years
- Mobile: 9862751597
- Address: Chandmari Veng, Hnahthial, Mizoram
- Land Holdings: 1.5 ha (Rainfed)

Challenges Faced

- Erratic rainfall and moisture stress.
- Poor nutrient availability and climate variability.
- Persistent pest and disease issues.

Climate-Resilient Technology Adopted

Under the NICRA Project, KVK Lunglei, in collaboration with the State Horticulture Department, introduced water stress-tolerant dragon fruit varieties (Hylocereus Costaricensis and Hylocereus undatus) to five selected farmers in Hnahthial, including Mr. H Lalnunmawia. The initiative included awareness programs, training on best practices, and provision of planting materials such as saplings, concrete pillars, tires, plastic thread, and fertilizers. KVK Lunglei supervised all technological practices to ensure success.

Impact of Interventions

The adoption of dragon fruit has brought joy to farmers like Mr. H Lalnunmawia, effectively minimizing the impact of climate variability. The success has inspired farmers beyond Hnahthial, with neighboring villages approaching KVK Lunglei to expand demonstrations, showcasing the technology's widespread acceptance and potential.

Yield and Economic Outcomes

- Yield: 98 q/ha
- Gross Income: Rs. 484,300/ha
- Net Return: Rs. 386,300/ha
- Benefit-Cost (B:C) Ratio: 4.94

Conclusion

Mr. H Lalnunmawia's journey with dragon fruit cultivation highlights how climate-resilient technologies can transform rainfed farming in Mizoram. With KVK Lunglei's guidance, this initiative has not only boosted yields and income but also sparked a regional movement toward sustainable agriculture.

Mr. H Lalnunmawia showcases his thriving Dragon Fruit Farm

Mr. H Lalnunmawia showcases his bountiful Dragon Fruit harvest

KVK Siaha, Mizoram

Farmer Profile

- Name: Smt. S. Tenese
- Age: 42 years
- Mobile: 9863595925
- Address: Tisopi, Siaha, Mizoram
- Land Holdings: 2 ha (Rainfed)

Challenges Faced

- Season: Rabi
- Climate Vulnerability: Water stress, erratic rainfall, moisture stress, high humidity, soil and water erosion.
- Crop Stage Affected: Early vegetative stage.

Climate-Resilient Technology Adopted

Early planting of garden pea is a strategic climate-resilient practice tailored to adapt to erratic rainfall and temperature fluctuations. By sowing in late October to early November at the onset of the rabi season, farmers like Smt. S. Tenese leverage residual soil moisture post-kharif crops for better germination, reducing irrigation needs. This timing helps the crop avoid terminal heat stress and pest outbreaks common in later stages, boosting pod yield, enhancing produce quality, and securing an early market advantage with higher prices.

Impact of Interventions

Early planting capitalized on residual moisture, shielding the crop from heat and moisture stress during flowering and pod formation. This ensured robust establishment, lowered pest and disease risks, and delivered higher yields and income compared to traditional late sowing. The NICRA village farmers in Tisopi, Siaha district, have widely embraced this effective adaptation strategy.

Yield and Economic Outcomes

Technology	Crop/ Variety	Area (ha)	Yield/ ha	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B C ratio
CRT	Garden Pea (Kiwi-101)	0.5	86	60000	172000	112000	2.86
FP		0.5	53	60000	106000	46000	1.76

Conclusion

Smt. S. Tenese's success with early garden pea planting exemplifies how timely innovation can conquer climate challenges in Mizoram's rainfed fields, offering a sustainable path to increased productivity and profitability.

Early Planting of Garden Pea at Tisopi village of Siaha district

KVK Mon, Nagaland

Farmer Profile

- Name: Smt. Tanla Konyak
- Age: 46 years
- Mobile: 9362605924
- Address: H/No. 835, Pinkhong Ward, Langmeing Village, Aboi P.O, Mon, Nagaland, 798603
- Land Holdings: 1.6 ha (Rainfed)

Challenges Faced

- Moisture stress during the rabi season.
- Critical impacts during vegetative growth and bulb formation stages.

Climate-Resilient Technology Adopted

Under the NICRA project, paddy straw mulch technology was introduced to enhance garlic cultivation in Langmeing village, Mon District. This method repurposes residual paddy straw from the kharif harvest as a natural mulch, applied at 3-5 tons per hectare during the rabi season. The straw acts as a protective layer, reducing evaporation, conserving soil moisture, suppressing weeds, and improving soil health, offering a sustainable solution for rainfed garlic farming.

Impact of Interventions

The NICRA initiative addressed moisture loss (30-40% due to evaporation) with paddy straw mulch, boosting yields by 10-15% and reducing weeding labour by 20-25%. Training sessions highlighted the use of leftover straw, with pilot trials showing a 10-15% increase in soil moisture retention. This cost-effective, locally sourced practice has proven resilient, gaining traction among farmers for its long-term sustainability.

Yield and Economic Outcomes

- Cost of Cultivation: ₹ 1,26,500/ha
- Gross Returns: ₹ 4,11,000/ha
- Net Returns: ₹ 2,84,500/ha
- Benefit-Cost (B:C) Ratio: 3.25

Conclusion

Smt. Tanla Konyak's adoption of paddy straw mulch technology showcases how innovative, low-cost solutions can transform rainfed garlic farming in Nagaland. By leveraging her own paddy straw, Smt. Tanla has enhanced moisture retention, reduced labour costs, and boosted profitability, setting a resilient example for sustainable agriculture in the region.

Paddy straw mulching in Garlic cultivation

Harvested Garlic ready for sale in the market

KVK Sepahijala, Tripura

Farmer Profile

- Name: Mr. Animesh Sarkar
- Age: 34 years
- Mobile: 8837080968
- Address: Golaghati, Sepahijala, Tripura
- Land Holdings: 0.5 ha (0.4 ha Rainfed, 0.1 ha Irrigated)

Challenges Faced

- Flooding during the tillering stage of paddy crops, causing significant yield losses.
- Reliance on local paddy varieties (e.g., Gomati) that are not flood-tolerant, leading to the need for re-transplanting.

Climate-Resilient Technology Adopted

Under the NICRA project, Mr. Animesh adopted the flood-tolerant paddy variety Ranjit Sub-1. This variety is designed to withstand flooding, ensuring crop survival and productivity during adverse conditions.

Impact of Interventions

The introduction of Ranjit Sub-1 eliminated the need for re-transplanting by enabling the paddy crop to tolerate flooding during the critical tillering stage. This climate-resilient variety ensured stable yields despite flood-prone conditions, reducing losses and enhancing productivity for farmers in the region.

Yield and Economic Outcomes

- Yield: 58.8 q/ha
- Cost of Cultivation: ₹ 69,270/ha
- Gross Returns: ₹ 1,33,250/ha
- Net Returns: ₹ 63,980/ha
- Benefit-Cost (B:C) Ratio: 1.92:1

Conclusion

Mr. Animesh Sarkar's adoption of the flood-tolerant Ranjit Sub-1 paddy variety under the NICRA project has revolutionized paddy farming in Golaghati, Sepahijala.

By mitigating the impact of floods during the tillering stage, this climate-resilient technology ensured stable yields and improved profitability, offering a sustainable solution for flood-prone agriculture in Tripura.

Seedlings grown in Nursery bed

Seedlings transplanted into main field

Flood during Seedling stage

Harvesting stage

15 STATUS OF FUNDS RECEIVED AND EXPENDITURE DETAILS DURING 2024-25

KVK	Budget sanctioned	Budget released	Budget utilized for each component								Refund amount/ Balance on release
			NRM	Crop	Livestock	Others	SRF/YP Salary	TA	Equipment	Total	
Chandel	2754500	2754500	2254500						500000	2754500	0
Senapati	2054500	2054500	2054500							2054500	0
Ukhrul	2026500	2026500	538700	400000	500000	587800				2026500	
Jaintia Hills	2259500	2259500	247300	560000	350000	1102200				2259500	0
Ri Bhoi	2303500	1538242	692208.90	307648.40	538384.70	-	-	-	-	1538175	67
South Garo Hills	2864500	2864500	655823	334000	650000	514677			710000	2864500	0
West Garo Hills	2030500	1631500	380456	715338	335279	200427				1631500	0
Lawngtlai	2657500	2657500	2126500						531000	2657500	0
Lunglei	2210500	2210500	1926500						284000	2210500	0
Siaha	2728400	2728400	513125	154000	445000	1616275				2728400	0
Serchipp	2366000	2366000	585000	359000	295000	1127000				2366000	0
Phek	2354500	2354500	307387	400810	269350	498660	451703	26550	145000	2099460	255040
Mon	2247100	2247100	532000	410000	480500	-	504000	-	320600	2247100	0
Tuensang	2676500	2676500	582500	715000	185000	1194000				2676500	0
Sepahijala	2367500	2367500	555700	650800	340600	607400			213000	2154500	0