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HOW CLIMATE RESILIENT AGRICULTURE TRAINING IS TRANSFORMING RURAL LIVELIHOODS



In this Good Practice Note, Adarsh Levan and Joe Shiney highlight insights from the Climate Resilient Agriculture (CRA) initiative, implemented by the M. S. Swaminathan Research Foundation (MSSRF) and supported by HDFC Parivartan. The initiative introduced innovations such as mulching, precision irrigation, fertigation, and integrated farming systems. It demonstrated how hands-on training, continuous support, and farmer-to-farmer knowledge sharing can help small and marginal farmers improve productivity, reduce input costs, and build climate-resilient livelihoods.



CONTEXT

Smallholder farmers in Kerala face multiple challenges, including erratic rainfall, water scarcity, rising input costs, and declining soil fertility. Traditional farming practices, while proven over time, were insufficient to maintain productivity under these changing climatic conditions. These challenges threatened both crop yields and farm incomes, highlighting the urgent need for innovative solutions to support sustainable livelihoods.

To address these issues, the Climate Resilient Agriculture (CRA) training, implemented by the M. S. Swaminathan Research Foundation (MSSRF) and supported by HDFC Parivartan, introduced farmers to sustainable practices such as mulching, drip and sprinkler irrigation, precision agriculture, integrated farming, and organic soil management. Villages and farmers were selected based on their farming activity, willingness to adopt new techniques, and vulnerability to climate-related challenges. The program reached approximately 300 small and marginal farmers across 17 villages in the Ernakulam district. Farmers were identified through collaboration with local Panchayaths, Krishi Bhavans, and Community Development Societies (CDS) in each village. From these initial lists, participants were further shortlisted considering key factors such as income level, gender representation, willingness to participate, and area of landholding. This inclusive approach ensured the participation of diverse groups, including women farmers, and enabled equitable access to the Climate Resilient Agriculture program.

This approach sought not only to strengthen farm productivity but also to empower farmers to adapt and innovate in the face of climate change, reduce input costs, improve water use efficiency, enhance soil fertility, and diversify income sources.

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Blended Learning Approach

The CRA training used a blended learning approach, combining classroom lessons with hands-on demonstrations in farmers' fields. The theoretical sessions introduced concepts such as mulching, drip irrigation, and integrated farming, while practical exercises allowed farmers to immediately apply these techniques on their own plots. This approach helped farmers understand not only what to do but also how and why it works in their local conditions. Trainers and community resource persons (CRPs) facilitated the sessions, provided guidance, answered questions, and encouraged experimentation. For replication, combining classroom instruction with field practice is crucial, as it allows farmers to see tangible results and adapt techniques to their specific farm situations.

Follow-up Support and Mentoring

After the CRA training, farmers were given continuous support to help them successfully use the new practices. The Development Assistant, Associate, Program Coordinator, and Community Resource Persons (CRPs) conducted regular farm visits, phone consultations, and group discussions to help farmers address challenges such as adjusting irrigation, applying mulching and managing crops. Mentoring, trust-building, and problem-solving were key skills used to guide and encourage farmers throughout the process. For others looking to replicate this approach, providing structured post-training support is essential to ensure knowledge is effectively translated into lasting farming practices.

Farmer-to-Farmer Knowledge Sharing

Successful trainees shared their experiences and demonstrated climate-resilient practices to other farmers in their villages. Demonstration plots became learning hubs where peers could observe results, ask questions, and adopt the methods themselves. The process relied on skills such as networking, collaborative learning, leadership and facilitation. For replication, engaging early adopters as role models helps build credibility and encourages more farmers to try and sustain these practices.

Adaptive Farming Practices

Farmers were encouraged to adapt the introduced techniques to fit their own farms. For example, they used drip and sprinkler irrigation according to their land size and needs, and applied mulching in ways that worked best for their crops. This hands-on approach allowed farmers to experiment safely, innovate, and reduce risks. MSSRF staff guided them throughout the process, offering feedback and fostering confidence. To replicate this practice, it is essential to create an environment where farmers can test, refine, and adapt techniques before implementing them fully.

Integrated and Sustainable Farming

The training encouraged farmers to adopt integrated farming practices, combining water-efficient irrigation, organic fertilization, crop diversification, and recycling of farm waste. Examples included making silage from agricultural residues to lower cattle feed costs and using vertical farming to maximize land use. This holistic approach improved productivity, reduced environmental impact, and promoted long-term sustainability. Extension staff provided hands-on guidance and motivational support to ensure successful adoption. For replication, it is important to highlight how these practices work together, rather than promoting single techniques in isolation.



The MSSRF team with James in the silage process

CHALLENGES

During the implementation of the Climate Resilient Agriculture (CRA) initiative in 17 villages of Ernakulam district, several challenges emerged that shaped the learning and adaptation process. Initially, farmers' reluctance and scepticism were major barriers. Many small and marginal farmers were hesitant to adopt new practices such as drip and sprinkler irrigation, mulching, and organic soil management, fearing risks and additional costs. This was addressed through demonstration plots, exposure visits, and peer learning, which allowed them to observe tangible benefits directly from early adopters. As a result, gradual trust and confidence were built within the community.

Resource constraints posed another limitation. Farmers found it difficult to access quality organic inputs and materials for mulching. The team addressed this by encouraging collective procurement, linking farmers with reliable input suppliers, and promoting low-cost, locally available alternatives. Environmental challenges were among the most significant obstacles. Erratic rainfall patterns, prolonged dry spells, and unexpected heavy showers often disrupted farm operations and delayed crop growth. In addition, human–wildlife conflict, particularly from wild boars, monkeys, and elephants, caused serious crop losses and discouraged some farmers from continuing cultivation. To manage these issues, farmers were supported with deterrent measures such as crop diversification, intercropping, and adjusting planting schedules to minimize damage.

Despite these difficulties, continuous follow-up, community meetings, and mentoring helped sustain motivation and adoption. The project learned that flexibility, empathy, and consistent engagement were key to overcoming field-level challenges. Farmers gradually developed confidence, seeing that small adaptive steps could improve productivity and resilience against climate stressors.

BENEFITS AND IMPACT

The Climate Resilient Agriculture (CRA) has brought measurable improvements in agricultural productivity, income stability, and environmental sustainability across 17 villages in Ernakulam district. Over 300 smallholder farmers were trained and have adopted mulching, drip and sprinkler irrigation, silage preparation, fertigation, and integrated farming.

Farmers like James reduced cattle feed costs by over 40% and improved milk quality through silage preparation using pineapple waste. Using cost-effective sprinkler irrigation, Jaison earned nearly ₹26,000 from half an acre of banana cultivation. Sinto reduced water usage by two-thirds through drip fertigation, demonstrating precise resource utilization. Majeesh, a differently-abled farmer, successfully converted hard, dry land into fertile soil, while Sanu diversified cropping through vertical farming, enhancing overall productivity. Over 50 acres have been brought under climate-resilient practices.



Sanu with spiny gourd and amaranthus cultivated using mulching and Jaison's Contour banana plantation

Farmers have developed economic resilience, with reduced input costs and diversified income sources. Environmentally, water conservation, organic soil management, and reduced chemical dependency have enhanced sustainability. Socially, farmers' collaboration and peer-to-peer mentoring have strengthened community cohesion and collective learning. Farmers demonstrated positive behavioural changes, showing higher confidence and innovation in adopting new practices and becoming role models in promoting climate-resilient practices, creating a lasting ripple effect across their communities.

SUSTAINABILITY AND SCALING UP

The Climate Resilient Agriculture (CRA) initiative has demonstrated clear signs of sustainability and strong potential for scaling. Financially, farmers have achieved measurable cost reductions through water-saving technologies, local resource use, and organic inputs, ensuring self-sustaining economic benefits beyond project support. Socially, farmer ownership and peer learning have strengthened local networks, motivating independent adoption of practices such as drip irrigation, mulching, and integrated farming. Environmentally, the emphasis on soil health, water conservation, and reduced chemical dependence promotes long-term ecological balance. The technologies used are technically simple, locally adaptable, and low-maintenance, making them suitable for smallholders.



Majeesh's farm is a model of climate resilience through mulching and drip irrigation

Scaling potential is high. The CRA model can be replicated across similar agro-climatic zones through partnerships with Krishi Bhavans, FPOs, and local extension networks. Farmer-led diffusion and institutional integration by MSSRF, coupled with structured follow-up visits, ensure long-term continuity, social inclusion, and widespread adaptability.

LESSONS LEARNED AND CONCLUSION

The Climate Resilient Agriculture (CRA) training program demonstrated that sustainable transformation is possible when learning goes beyond theory and enters the farmer's field. Hands-on training, continuous mentoring, and farmer-to-farmer sharing proved essential for lasting adoption. The involvement of the MSSRF team strengthened farmers' sense of ownership over the learning process and adoption of climate-resilient practices, ensuring timely support.

Key lessons include the importance of context-specific training, the value of local champions and early adopters in influencing peers, and the need for adaptive flexibility in promoting technologies. Continuous follow-up and post-training support can significantly enhance the sustainability of interventions.

In conclusion, the CRA initiative demonstrates that lasting impact is achieved through a combination of participatory learning, persistent mentoring, and strong institutional support. By fostering innovation, ownership, and community-led knowledge transfer, such programs can build climate-resilient farming systems and serve as models for wider replication.

As climate change reshapes agriculture, initiatives like CRA offer hope. Farmers trained under this program are leading examples of adaptation and resilience. Across Kerala's farmlands, the seeds of climate-resilient agriculture have been sown, promising a future of productive crops, stronger communities, and sustainable livelihoods for generations to come.

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