FARMING IN THE FACE OF CLIMATE CHANGE: HOW ASSAM'S FARMERS ARE ADAPTING

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The agricultural sector of Assam is significantly threatened by climate change, that has emerged as an undeniable and stark reality, having profound implications on the livelihood of farmers. Frequent occurrence of floods, erratic rainfall patterns, elevating temperatures and prolonged droughts have intensified the struggles faced by rural communities. Despite these adversities, remarkable resilience has been exhibited by the agricultural sector of Assam, by adopting innovative climate adaptation and mitigation strategies, indigenous traditional knowledge to sustain the productivity of crops.

CULTIVATING CLIMATE-RESILIENT VARIETIES

With unpredictable rainfall and frequent flooding affecting productivity, Assam's farmers are turning to climate-resilient crop varieties. Flood-tolerant rice strains such as Ranjit Sub1, Bahadur Sub1, and Swarna Sub1, developed specifically for regions prone to submergence, are now widely adopted in flood-prone districts like Dhemaji, Majuli, and Barpeta. Farmers have also begun diversifying their crops, increasingly cultivating drought-

resistant millets, pulses, and indigenous vegetables, ensuring food and nutritional security under changing climatic conditions. Vigyan Krishi Kendras play an instrumental role in imparting dissemination of climate adaptation strategies to the farmers. In addition to that Assam Agricultural University plays a pivotal role in developing new climateresilient crop varieties specifically suited to the state's unique agro-climatic zones.



EFFECTIVE FLOOD MANAGEMENT AND RAINWATER HARVESTING

Flood management has become critical in Assam's agriculture. Raised-bed cultivation. granaries, elevated and community-managed shelters for livestock have emerged as essential strategies, especially in vulnerable areas like Majuli and Lakhimpur. Additionally, rainwater harvesting practices, including farm ponds, small reservoirs, and check dams, are gaining popularity in hilly and drought-prone regions such as Karbi Anglong and Dima Hasao, significantly

improving water availability for irrigation during dry spells. Government initiatives such as MNREGA scheme is playing a crucial role in supporting rural communities in building and maintain rainwater harvesting structures. Moreover, the establishment of early-warning systems and flood shelters, is being facilitated by the Assam State Disaster Management Authority (ASDMA).thereby enhancing preparedness among farmers and local communities.



ADOPTION OF TECHNOLOGY AND INNOVATION



Technological advancements are transforming Assam's agricultural landscape. Farmers increasingly rely on mobile applications that offer real-time weather forecasts, pest and disease alerts, market price information, and crop advisories. Government initiatives have introduced drone technology for precise crop monitoring and pesticide application, soil health cards for optimized fertilizer use, and Geographic Information System (GIS) mapping to better manage land resources and reduce risk. Numerous

technology driven projects have been initiated by Krishi Vigyan Kendras (KVKs) and the North-Eastern Space Applications Centre (NESAC) that have significantly enhanced agricultural productivity and risk mitigation. Furthermore, farmers' access to market and transparency in pricing is facilitated by platforms like e-NAM (Electronic National Agriculture Market).

ORGANIC FARMING AND INTEGRATED AGRICULTURE

Assam has seen a remarkable shift toward organic and integrated farming systems. Farmers in districts like Jorhat, Kamrup, and Sonitpur have embraced practices such as vermicomposting, biofertilizers, organic mulching, and crop rotation, significantly improving soil fertility, water retention, and crop resilience. Integrated farming models combining agriculture, livestock, fisheries, and poultry are enhancing farm productivity, reducing dependency on single crops, and providing stable, diversified sources of income.



STRENGTHENING COMMUNITY PARTICIPATION

Community engagement and collective action have become cornerstones in Assam's adaptation strategy. Farmer Producer Organizations (FPOs), cooperatives, and self-help groups actively collaborate on sharing knowledge, pooling resources, and collectively marketing produce, thus achieving better bargaining power and market access. Programs like Assam State Rural Livelihood Mission (ASRLM) and various non-governmental organizations have supported training, capacity-building, and awareness campaigns to enhance community resilience. Women-led cooperatives, particularly active in districts like Lakhimpur and Golaghat, have significantly empowered communities, driving adoption of sustainable agricultural practices and diversification. Initiatives such as participatory plant breeding and seed banks also help farmers access high-quality, resilient seeds.

GOVERNMENT AND INSTITUTIONAL INITIATIVES

The Assam government has initiated several schemes to strengthen farmers' capacity to cope with climate change impacts. Key schemes include Rashtriya Krishi Vikas Yojana (RKVY), promoting infrastructure development and resource management; Pradhan Mantri Fasal Bima Yojana (PMFBY), providing crop insurance against climate risks; and Chief Minister Samagra Gramya Unnayan Yojana (CMSGUY), aiming at rural infrastructure enhancement. Institutional support from Assam Agricultural University (AAU), Krishi Vigyan Kendras (KVKs), and regional agricultural research stations are crucial for extending climate-smart technologies and comprehensive training to farmers. Moreover, international collaborations with organizations like the International Rice Research Institute (IRRI) and the International Centre for Integrated Mountain Development (ICIMOD) have also significantly contributed to enhancing farmers' resilience by bringing global expertise and technologies to Assam.

CONCLUSION

Climate change poses substantial challenges, yet Assam's farmers are adapting through innovation, community collaboration, and supportive government initiatives. Combining traditional agricultural wisdom with modern technological advancements and policy support, Assam is progressively building a climate-resilient farming future, ensuring sustainable livelihoods for future generations.

