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NICRA: Fortifying Agricultural Resilience through Innovation

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Introduction

Climate change is a serious global issue, marked by long-term shifts in temperature and weather patterns. While natural factors like solar cycles play a role, human activities, especially burning fossil fuels, have been the main cause of this change since the 1800s. This has led to a significant rise of about 1.1°C in the Earth's average temperature since the late 1800s, causing wide-ranging effects like altered rainfall patterns, extreme temperatures, and more frequent and intense extreme weather events. India, a country highly vulnerable to these changes, faces substantial challenges due to its large population, economic activities, and heavy reliance on rainfall. This puts India at risk of increased water scarcity, extreme heat, shifting monsoons, and threats to its natural resources. To tackle these issues, it's crucial to understand the potential impacts and take proactive steps, like those supported by initiatives such as the National Adaptation Fund on Climate Change (NAFCC) and National Innovations on Climate Resilient Agriculture (NICRA).

National Innovations on Climate Resilient Agriculture (NICRA)

NICRA is a collaborative initiative led by the Indian Council of Agricultural Research (ICAR), launched in February 2011 with an investment of Rs. 650 crores during the 11th plan. Its primary goal is to enhance the resilience of Indian farming against climate change by using smart research and technology demonstrations. This program covers various aspects such as crops, livestock, fisheries, and natural resource management. NICRA includes four main components: strategic research, technology showcases on farmers' fields, building skills among scientists and stakeholders for climate-resilient agriculture, and offering support through sponsored or competitive grants.

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Objectives of NICRA

The objectives of NICRA are quite clear. First, it aims to make Indian agriculture better equipped to handle the challenges posed by climate changes, including risks to crops, livestock, and fisheries. It intends to achieve this by developing and applying improved technologies for production and risk management. Secondly, NICRA seeks to practically demonstrate these technology packages in specific locations, showing farmers how to adapt to the current climate uncertainties. Lastly, the project strives to build the capacity of scientists and other involved parties in the field of climate-resilient agricultural research and its practical implementation.

Unique Aspects of the Program

NICRA has some notable features. It assesses different crops and regions in India to identify their vulnerability to changing climate patterns and extreme events. It also employs advanced equipment like flux towers to measure greenhouse gas emissions, providing insights into the impact of management practices. Additionally, NICRA quickly evaluates various crops for their ability to tolerate drought and heat, identifying promising varieties that can withstand these challenges. The initiative also focuses on alternative farming methods like aerobic rice and SRI, aiming to reduce greenhouse gas emissions and enhance water conservation. It places special emphasis on livestock and fisheries, documenting adaptive qualities in native breeds. Moreover, NICRA studies the intricate relationships between crops, pests, and pathogens that can change due to climate shifts. The project ensures that its findings reach a wider audience through agricultural extension offices and other outreach programs.

Project Components of NICRA

1. Strategic Research on Adaptation and Mitigation:

Strategic research involves studying to gather a wide range of knowledge to help solve current and future challenges. In NICRA, 21 research institutes under the Indian Council of Agricultural Research (ICAR) are involved. Seven core institutes establish advanced research infrastructure. Other 14 institutes focus on specific research themes. The research covers topics like assessing vulnerability of key production zones, providing weather-based farming advice, developing crops with better tolerance to climate stresses, monitoring greenhouse gas emissions, finding ways to adapt livestock through nutrition and environment, and promoting water-efficient, nutrient-smart agriculture.

2. Technology Demonstration for Climate Variability:

Demonstrating new techniques aims to prove their superiority, encourage farmers to adopt them, and create long-term learning opportunities. In NICRA, established technologies for dealing with climate variations are shown in one village per district. The objectives include demonstrating specific technology solutions on real farms, raising awareness among farmers about climate-resilient agriculture, and building innovative village-level mechanisms to handle climate stresses.

3. Capacity Building:

This component focuses on enhancing knowledge and skills. It involves strengthening the ability of scientists and stakeholders to conduct climate-resilient agricultural research and implement the strategies effectively.

4. Sponsored Competitive Research to Fill Gaps:

This part involves supporting research initiatives that address crucial gaps in climate-resilient agriculture.

The strategic research component investigates key areas like assessing vulnerability, providing weather-based advice, enhancing crop tolerance, monitoring greenhouse gases, livestock adaptation, and water-efficient agriculture. In technology demonstration, proven techniques are showcased to convince farmers and create innovative local solutions. Capacity building empowers researchers and stakeholders, and sponsored research fills crucial gaps.

The National Innovations on Climate Resilient Agriculture (NICRA) project is focused on enhancing agricultural resilience to climate change in India. It involves village-level contingency plans for delayed rainfall and extreme weather conditions, responses to events like excess rainfall and heat waves, and initiatives such as value addition of products. The project's outcomes include reduced migration, increased income, improved housing, and empowered farmers. NICRA has selected resilient genotypes, demonstrated best practices, strengthened research infrastructure, and provided training. A monitoring committee oversees progress, and an app aids in risk assessment and adaptation planning. Overall, NICRA aims to bolster agricultural resilience and improve livelihoods in vulnerable regions.

Conclusion

In conclusion, the National Innovations on Climate Resilient Agriculture (NICRA) project stands as a comprehensive and proactive initiative to address the challenges posed by climate change on India's agricultural sector. Through strategic research, technology demonstrations, capacity building, and competitive research, NICRA has worked towards enhancing the adaptability and sustainability of farming practices in the face

of changing climatic conditions. By implementing village-level contingency plans, responding to extreme events, and promoting value addition of agricultural products, the project has not only mitigated climate risks but also contributed to improved income, housing, and livelihoods for farmers. The project's focus on education, social participation, and innovation has resulted in positive attitudes towards climate-resilient technologies, further strengthening the sector's ability to withstand future challenges. With its outcomes encompassing enhanced agricultural production, empowered farmers, and heightened climate resilience, NICRA serves as a noteworthy model for targeted and effective climate adaptation strategies in agriculture.