Transforming Meghalaya's Farmers' Fields: Sustainable Strawberry Cultivation Through Agro-Technological Innovation

Background:

Meghalaya has favourable climatic conditions for cultivation of strawberry. The cultivation of strawberry in some districts of the State has brought a noticeable change in the socio-economic conditions and living standards of many people directly and indirectly engaged in the cultivation of this crop. Productivity, quality and profitability from this crop can be made sustainable through introduction of quality planting material, adoption of good agricultural practices and capacity building of cultivars.

The primary objective of this initiative is to showcase strawberry cultivation, both with popular dominant varieties and the introduction of exotic varieties, in open fields. Additionally, it aims to standardize the agro-technologies, practices, and techniques associated with strawberry farming while providing technological interventions and training to farmers.

This initiative is a collaborative effort between the Bio-Resources Development Centre (BRDC), Upper Shillong, and the Institute of Horticulture Technologies (IHT), Greater Noida, with support from the Department of Biotechnology, Government of India. As part of the project, crop production modules and agro-technological packages have been demonstrated to farmers at the BRDC Demonstration Plot in Meghalaya. A total of 50 farmers from various districts of the state were selected to participate. These farmers received comprehensive support, including tissue-cultured plants of dominant strawberry varieties like Sweet Charlie, Camarosa, Chandler, and the exotic Seolhyang, along with hands-on training at various growth stages to standardize production practices and familiarize them with the required techniques.

Farmers involved in this project are not only producing fresh strawberries but are also cultivating high-quality planting materials of both exotic and popular varieties annually. In addition to strawberry farming, many have ventured into the profitable business of strawberry wine production, which has seen increasing demand year after year. This diversification of income sources has contributed to the continued success and economic growth of the farming community.

A total land area of 25.35 acres was utilized under the initiative.

a) **During the 1st year,**

- **15.15 acres** has been covered in the 50 farmers' fields (each of 0.30 acres) and
- **0.15 acres** in demonstration unit in BRDC, with popular **dominant varieties of strawberry.**

b) **During the 2nd year,**

- **1.00 acres** was covered as demonstration unit in BRDC, Meghalaya and
- **10.2 acres** in the farmers' fields with the exotic **sweet variety of strawberry.**

Problem Statement and Baseline Indicators:

Horticulture in Meghalaya holds immense potential for generating rural employment, boosting incomes, and tapping into both national and international markets. The state's favorable climatic conditions make it an ideal location for strawberry cultivation. In several districts, the cultivation of strawberries has already positively impacted the socio-economic conditions and improved the quality of life for many people directly and indirectly involved in the industry.

However, despite this potential, the state has struggled to meet the growing market demand due to gaps in technological interventions. Without modern farming practices and improved crop management, the state's strawberry production has been limited. The lack of access to suitable varieties, proper training, and advanced agricultural technologies has hindered the sector's growth.

This project addresses these gaps by introducing several technological interventions, such as the introduction of strawberry varieties better suited to the state’s climatic conditions, providing comprehensive training and support to farmers, and implementing improved drip-line micro-irrigation systems. These interventions have significantly enhanced productivity and the scale of quality strawberry production, making the sector more sustainable and better positioned to meet market demands.

Best Practice:

- Use of quality runners of exotic variety and dominant varieties of the state and promising tissue cultured plants of 3varieties having international demand.
- Non-chemical soil sterilization,
- Use of mulches
- Use of low poly-tunnels
- Use of improved drip line micro irrigation,
- Fertigation technology for different stages of the crop
- Soilless media for clean runner production
- IPM in strawberry production

Impact of the Initiative:

The adoption of modern production technologies, such as the use of soilless media for clean runner production, non-chemical soil sterilization, effective soil moisture management, weed control, micro-irrigation, fertigation, and Integrated Pest Management (IPM), has brought about significant positive changes in strawberry farming in Meghalaya. These interventions have proven invaluable for farmers, enabling them to achieve successful and sustainable strawberry cultivation.

Shri Spingwel Kharmarshra's journey is truly inspiring and demonstrates how passion, innovation, and hard work can transform a small farm into a thriving business. Starting from humble beginnings in 2006, his commitment to strawberry farming has not only revolutionized his own livelihood but also helped elevate the agricultural landscape of Meghalaya. His diversification into

wine production has added a unique dimension to his farm, creating a niche market for strawberry wine and offering new opportunities for local farmers.

Through technological interventions and advanced agricultural practices, he has managed to optimize productivity while maintaining high-quality standards. His role as a speaker and trainer further highlights his leadership in the industry, as he aims to share his knowledge and help others succeed in similar agricultural ventures.

His story could serve as a blueprint for aspiring farmers, not just in Meghalaya but across the country, to explore innovative ways to add value to their produce and diversify their income streams. Shri Kharmarshra's dedication to sustainable farming practices and his willingness to mentor others play a pivotal role in transforming the agricultural sector.

The initiative has indeed brought about a transformative change in the agricultural sector of Meghalaya, particularly in strawberry cultivation. By focusing on improving farming practices, introducing high-value strawberry varieties, and offering advanced agricultural inputs, it has empowered farmers like Shri. Spingwel Kharmarshra to elevate their production and diversify their income sources.

This shift toward more sustainable and profitable farming practices ensures long-term growth for the region. Not only does it improve the livelihood of individual farmers, but it also contributes to the local economy by making Meghalaya a prominent player in strawberry production. The integration of high-value varieties and new cultivation techniques enhances both the quality and quantity of the crops, leading to better market opportunities and an expanding customer base.

Moreover, the broader impact of this initiative extends beyond just the farmers—it fosters a community of knowledgeable and skilled individuals who can share best practices and innovations with others. This collaborative approach is helping to create a robust agricultural ecosystem in the region, paving the way for a more prosperous future for strawberry cultivation in Meghalaya.

Key Learning and Takeaways:

- The crop production module for strawberry cultivation was developed and demonstrated to farmers in demonstration unit at Bio-Resources Development Centre and in farmers' field.
- A total of 25.40 acres of the area was covered under the project and in addition some farmers have gone for horizontal spread from the runners harvested from their demonstration units.
- Successfully introduced the exotic Korean variety in farmers' fields.
- The farmers are well versed with modern production practices for the cultivation of strawberry with various technological interventions.

Implementation Challenges Faced:

The main challenge faced during the project was the identification and selection of farmers, as many lacked reliable sources of water for irrigation. Additionally, the COVID-19 lockdown

imposed strict restrictions across Meghalaya, which further complicated the implementation of the project. The restrictions prevented effective intervention in key areas such as crop nutrition, Integrated Pest Management (IPM), and daily maintenance, which ultimately led to a significant decrease in yields—an average of 40% below the potential. The occurrence of hailstorms in 2020 also contributed to the reduction in yield.

Further, an exposure visit was planned for beneficiary farmers and technical staff from BRDC and IHT to visit progressive strawberry farms in Mahabaleshwar. However, due to the travel restrictions during the pandemic, this tour had to be canceled. Another setback was the delay in receiving the imported sweet strawberry variety "Seolhyang." While the order was placed in February 2020, the consignment did not arrive in India until October 2020 due to pandemic-related disruptions. The plants were then required to be held in a post-entry quarantine facility for 9–10 months in compliance with the country's quarantine regulations, delaying their release until September 2021 by the Plant Protection Quarantine & Storage (PPQ&S).

Fig: Strawberry Farm of Shri Spingwel Kharmarshra of West Khasi Hills District, Meghalaya