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# Establishment of Hi-tech Nursery for Quality Planting Material of Agroforestry and Plantation Trees in Bundelkhand Region of Uttar Pradesh under RKVY: A Success Story


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## Introduction

Bundelkhand, located in central part of India, grapples with severe environmental and economic issues, including frequent droughts, poor soil fertility, and limited vegetation. To tackle these challenges, the Govt. Of India has allocated funds through RKVY for the establishment of a Hi-Tech Nursery with the aim to facilitate farmer of the region by providing quality planting material for agroforestry and plantation trees. It will not only improve environmental conditions but also foster sustainable agricultural practices in the region.

The Hi-Tech Nursery initiative in Bundelkhand, Uttar Pradesh, funded under the Rashtriya Krishi Vikas Yojana (RKVY), addresses critical challenges such as deforestation, soil degradation, and low agricultural productivity in this resource-constrained region. This project aims to develop a cutting-edge nursery to produce high-quality saplings for agroforestry and plantation trees. The primary goal is to enhance agroforestry practices, improve soil health, and support sustainable development within Bundelkhand.

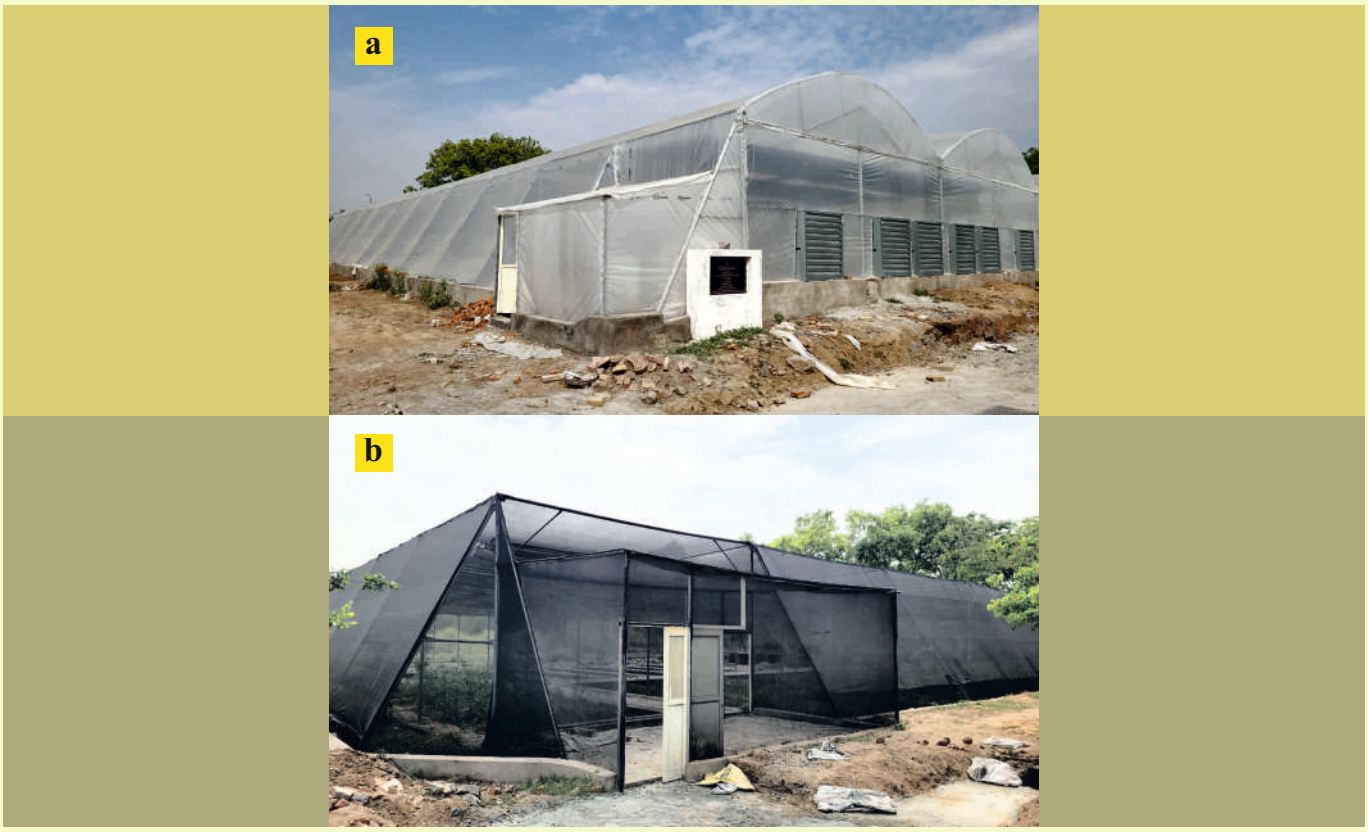


**Fig. 1. Pictorial view of a) Hi-tech poly house (1000 sq. feet); b) Shade net house (1000 sq. feet) at RLBCAU, Jhansi funding by RKVY**

## Problems addressed

The Hi-Tech Nursery initiative under the Rashtriya Krishi Vikas Yojana (RKVY) was implemented to address several pressing agricultural and environmental challenges in the Bundelkhand region of Uttar Pradesh. To combat these issues, the project established a state-of-the-art nursery aimed at producing high-quality saplings for agroforestry and plantation trees. Through this initiative, the farmers received necessary training and exposure to advanced nursery management techniques, enabling them to develop entrepreneurship skills and improve their livelihoods.

## Technology implemented

The project introduced modern technology for nursery development, including Hi-Tech Polyhouse and Shade Net House covering 1000 sq. feet each. These structures provide a controlled environment to grow resilient and disease-resistant saplings. Advanced irrigation systems and precision silvicultural techniques were also integrated to enhance the success rate of tree plantations. Additionally, the project focused on raising high-value short-rotation industrial tree species like *Melia dubia*, Teak, Kadamb, and Gmelina, which offer both environmental and economic benefits. Five extensive six-day training programs were conducted to educate farmers on nursery management, plantation techniques, and sustainable agroforestry practices, helping them adopt improved methods on their land.

Under this project improved tree germplasms were collected from the different institutions and the farmers were trained for quality seedling production, entrepreneurship development and economic upliftment. Further, the facility of hi-tech nursery was also created as a show-case to the farmers for awareness and development of technical know-how among the farmers for quality seedling production. The different trainings conducted are as:

1. Conducted six days Training Program from 13-18 December, 2021 on "Nursery and Plantation Techniques of Multipurpose Agroforestry Trees in Bundelkhand Region".
2. Conducted six days Training Program from 04-09 April, 2022 on "Plantation Techniques of Agroforestry Trees in Bundelkhand".
3. Conducted six days Training Program on from 15-20 June, 2022 "Agroforestry for livelihood Security".
4. Conducted six days Training Program 19-24 December, 2022 on "Selection and Management of MPTS in Agroforestry".
5. Conducted six days Training Program from 13-18 March, 2022 on "Nursery and Plantation Management in Agroforestry".

## Aims and Objectives

1. *To Establish a Hi-Tech Nursery*: Create a state-of-the-art facility equipped with advanced technologies for producing high-quality planting material.
2. *To Supply Quality Planting Material*: Provide resilient and disease-resistant saplings for agroforestry and plantation purposes.
3. *To Enhance Soil Health, environment and Agricultural Productivity*: Advocate for tree-based farming systems to improve soil fertility along with the climate resilient farming to boost overall farm productivity and income.
4. *To Educate and Train Local Farmers*: Conduct comprehensive training programs on agroforestry practices, nursery management, and sustainable farming techniques.
5. *Promotion of Multipurpose trees*: Establish demonstration of nursery plants to promote cultivation of multipurpose trees in Bundelkhand region.


**Fig. 2. Glimpses of trainings conducted under the RKVY funded project at RLBCAU, Jhansi**

## Strategy

The focus is to raise the market oriented industrial agroforestry tree species with short rotation. Additionally, to provide clonal plants of Teak, Melia, Kadamb, Gmelina *etc*. with precision silvicultural techniques for raising such plants. To develop facilitation center for promoting tree based farming or agroforestry following methodology would be adopted

1. ***Site Selection and Preparation:***
    - Site Selection: Identify a suitable location with access to essential resources such as water and transportation.
    - Site Preparation: Prepare the land by ensuring proper drainage and soil conditions, setting the stage for successful nursery operations.
2. ***Infrastructure Development:***
    - Hi-tech polyhouse: Constructa Hi-tech polyhouse with controlled environments to shield saplings from adverse weather conditions and pests.
    - Shade Nets and Irrigation Systems: Install shade nets to manage light and temperature, and establish efficient irrigation systems for consistent moisture.

- **Cost**

| S.No. | Item | Amount (in Lakhs) |
|---|---|---|
| **A.** | **Infrastructure development** | |
| 1. | Hi Tech polyhouse (40x25 = 100 $m^2$) with all amenities and fixtures | 16.50 |
| 2. | Shade net house (40x25 = 100 $m^2$) with all amenities and fixtures | 7.10 |
| **B.** | **Training of farmers, students and other stakeholders** | **9.50** |
| | **Total** | **33.10** |

- **Beneficiaries**

  Farmers, youth, extension functionaries and other stakeholders of Bundelkhand and adjoining areas.

- **Time Frame**

  The project is for 1 year (2021-22).

## Benefits of Technology

The implementation of this technology has brought several benefits to the region. Farmers now have access to high-quality planting material, which ensures better survival rates and higher yields. Agroforestry adoption has led to improved soil fertility, water conservation, and enhanced agricultural productivity. Moreover, the project has contributed to economic empowerment by promoting entrepreneurship opportunities among local farmers and youth. The demonstration nursery at Rani Lakshmi Bai Central Agricultural University (RLBCAU), Jhansi, serves as a regional hub for distributing quality saplings and educating farmers on best practices.

## Nursery Facility and Impact

Under the RKVY-funded Hi-Tech Nursery initiative at RLBCAU, Jhansi, a wide range of multipurpose and industrially important tree species were successfully raised. The nursery aimed to provide quality planting materials for agroforestry and plantation programs across Bundelkhand, thereby supporting local livelihood and environmental restoration. During the current year, a total of 1,897 seedlings of 13 different tree species were produced under controlled nursery conditions (Hi-tech polyhouse and shade net). These include both fast-growing industrial species and indigenous multipurpose trees suitable for various site conditions.

**Fig. 3. Quality planting material of agroforestry trees**

## Outcomes

1. Collected the superior genotypes of tree species from different institutions for multiplication and distribution under the developed facility.
2. Technical know-how to raise the seedling is provided though the five high end trainings.
3. Scientific plantation techniques and their management was also provided to the end users.
4. The farmers adopted the short rotation agroforestry system (Fig. 3) through the technological interventions.
5. Promotion of Sustainable Land Use Practices: Through the introduction of tree-based farming systems in Bundelkhand.
6. The practices for the advocation of production-oriented agroforestry models in the farmers land scape for economic well-being of local communities were developed.

## Farmer Outreach

- Quality seedlings from the nursery were supplied to progressive farmers in Jhansi and neighbouring villages for establishing demonstration agroforestry blocks. The farmlandswere brought under tree-based farming systems using the distributed planting material.
- The replicated models include combinations of *Eucalyptus*, *Melia*, and *Kadamb* with intercrops, showing better growth and income performance.
- Beneficiary farmers reported 20–30% higher income compared to sole cropping due to diversified tree-crop integration.

## Spread of the technology

The spread of this technology across Bundelkhand has been significant, with an increasing number of farmers adopting tree-based farming systems. Several farmers have already implemented *Melia dubia* and *Neolamarckia cadamba*-based agroforestry models, benefiting from higher income and improved land productivity. The project has laid the foundation for long-term sustainability by promoting climate-resilient farming systems and encouraging the adoption of agroforestry as a viable economic model. With continued support and awareness, this initiative has the potential to transform Bundelkhand into a green and economically self-sufficient region.

**Fig. 4. Adoption of *Melia dubia* and *Neolamarckia cadmba* based agroforestry system by the farmer through the technology intervention**


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