



SWARNA e-VATIKA

A Knowledge-Based Techno-Wellness Park



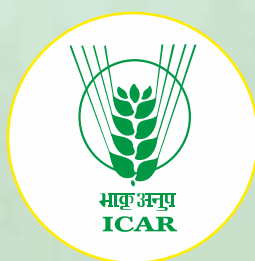
ICAR Research Complex for Eastern Region
ICAR Parisar, P.O.: Bihar Veterinary College
Patna-800 014 (Bihar)

Anup Das
Tanmay Kumar Koley
Abhay Kumar
Amitava Dey
Kumari Shubha
Kamal Sarma

SWARNA e-VATIKA

A Knowledge-Based Techno-Wellness Park

♦ Anup Das ♦ Tanmay Kumar Koley ♦ Abhay Kumar
♦ Amitava Dey ♦ Kumari Shubha ♦ Kamal Sarma



Published by

ICAR-Research Complex for Eastern Region, Patna

SWARNA e-VATIKA : A Knowledge-Based Techno-Wellness Park

Year of Publication : **2026**

Citation

Das, A., Koley, T. K., Kumar, A., Dey, A., Shubha, K., & Sarma, K. (2026). SWARNA e-VATIKA: A Knowledge-Based Techno-Wellness Park (TB No. R-98/Patna-61). ICAR-Research Complex for Eastern Region, Patna, pp. 1–25.

©ICAR-Research Complex for Eastern Region, Patna

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means - electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of the publisher or the authors.

Published by :

Director

ICAR-Research Complex for Eastern Region

(ICAR-RCER)

Patna-800014, Bihar, India

Printed at: Virtue Enterprises

M-5 Main Road, S.K. Nagar, Patna-800 001

Contact : 9304410331, 9162040001

Preface

Agro-biodiversity is the cornerstone of resilient, sustainable, and nutrition-sensitive agriculture. It encompasses the diversity of crops, trees, livestock, microorganisms, and associated ecological components that together support food production, environmental stability, and human well-being. In recent decades, increasing urbanization, monocropping, shrinking land holdings, and over dependence on external inputs have led to rapid erosion of agricultural biodiversity, particularly in smallholder production systems. Restoring and conserving this diversity has therefore become essential not only for ecological sustainability, but also for improving livelihoods, nutritional security, climate resilience, and rural prosperity.

Eastern India is predominantly characterized by small and marginal farmers who depend on fragmented land resources for their livelihood. In such conditions, diversified and integrated production systems provide immense opportunities to enhance productivity, generate year-round income, and strengthen ecological balance. Fruit-based diversified systems integrated with vegetables, medicinal plants, spices, livestock, pollinator habitats, water harvesting structures, and organic recycling units can transform conventional farms into vibrant centers of production, learning, conservation, and wellness. Such systems also preserve indigenous plant wealth, support beneficial insects and birds, improve soil health, recycle farm resources, and reduce ecological footprints through circular bio economy approaches.

"Swarna e-Vatika", developed at ICAR-Research Complex for Eastern Region, Patna represents an innovative model of agro-biodiversity conservation and utilization through a knowledge-based techno-wellness park. The park integrates a rich diversity of fruit crops, vegetables, medicinal and aromatic plants, ornamentals, spices, livestock, water bodies, and ecological infrastructures within an acre landscape. Beyond production, it serves as a living repository of indigenous and underutilized species, a demonstration hub for climate-resilient and organic farming practices, and an experiential learning platform for students, researchers, farmers, entrepreneurs and visitors.

This publication documents the concept, structure, components, management practices, and multi functional benefits of Swarna e-Vatika. It aims to inspire researchers, development agencies, policymakers, students, farming communities especially agripreneurs and to adopt agro-biodiversity-based integrated systems for resilient agriculture and sustainable development. It is hoped that such initiatives will contribute meaningfully towards conserving biological diversity, strengthening ecosystem services, enhancing farmer income and promoting harmony between agriculture, nature and society.

The authors acknowledge supports received from all corners including Honourable MLA, Digha, all Heads, Scientists, Administration and Finance, EMU section, technicals, farm management section supporting staffs and farm labourers in establishing the park.

Authors

Swarna e-Vatika

A knowledge-based Techno-wellness Park for small holders

Farmers in eastern India are overwhelmingly small and marginal, relying mostly on tiny, often fragmented landholdings as their primary asset. Farmers in the peri-urban areas primarily grow high valued crops, such as vegetables or flowers and are occasionally involved in dairying. There is a high potential of establishing fruit orchards as it provides long term sustainable income and also provides an array of ecosystem services like fruits, fodder, fuels, shade, habitats for birds, butterflies, serves as shelter belts, holds water and nutrients and adds scenic beauty to the surroundings. However, small and marginal farmers often earn very little as perennial tropical fruits provide income for a small span of 2 to 3 months (May to July) of the year. Integration of other viable agricultural components such as vegetables, spices, livestock etc will not only ensure year-round income, but will also opens a new avenue for income through controlled ecotourism. Establishing such system assure additional employment, income, nutritional security, sustainable productivity, ecological diversity and promote bio-happiness and circular economy.

Rationale:

Converting a poorly managed or low-yield and income generating fruit orchard such as mango, litchi etc. into a knowledge-based techno-wellness park would ensure nutritional security and economic innovation besides serving as agro-biodiversity knowledge park for diverse stakeholders especially students and farmers. The rationale behind creation of this farm park is to maximize the land utilization, creation of awareness on the agro-biodiversity, knowledge dissemination on the technology driven agriculture within natural environments, and connecting people with the ecosystem with ultimate aim of income enhancement and bio-happiness.

About the Swarna e-Vatika:

With the objective of creating a “Knowledge-based Techno-wellness Park” for small holders, a diversified fruit-based garden was developed at ICAR-Research Complex for Eastern India, Patna and named as *Swarna e-Vatika*. The name ‘*Swarna*’ comes from of the trade mark of the Institute ICAR-RCER and ‘*Vatika*’ stands for park with diversified plants

domination, while 'e' signifies ecology, environment and nature positive practices. The site is located at an altitude of 57 m above sea level with latitudes and longitudes of 25.59 °N and 85.08 °E, respectively. The total area allocated for the establishment of this park is approx. 1 acre. This area is fortified with various living and non-living components as below:

Park Components:

1. Living Components:

a. Plants:

- i. Fruits:** Thirty nine fruit species including major fruits (Mango, Litchi, Banana, Guava etc.) and underutilised fruits (Phalsa, Starfruit, Water apple, Mulberry, Rose apple etc.).
- ii. Vegetables:** Twenty Seven species including solanaceous vegetables (Tomato, Chilli, Brinjal), Cole crops (Cauliflower, Broccoli), Cucurbits (Pumpkin, Cucumber, ridge gourd etc), and leafy vegetables (Moringa, Amaranthus, Water spinach etc). This section of the park is named as '*Kamala Poshan Vatika*'.
- iii. Spices:** Eleven species including Onion, garlic, turmeric, ginger, bay leaves, allspices etc.
- iv. Ornamentals:** Twenty Species including Rose, Jasmine, Balsam, Rain lily, Ornamental banana, marigold etc. The flowering plants along with other ornamental plants such as hedge (*Duranta spp*), Ashoka tree and bottle palm are grown around the park alongside walking avenue for beautification and greening.
- v. Medicinal and aromatic garden:** Eighty Species of medicinal and aromatic plants including kalmegh, Aloe vera, madhunasini, black turmeric, mango ginger etc. are grown in the park in named '*Dhanvantari Udyan*'.
- vi. Tree:** A large banyan tree at the corner of park provide shade, shelter to small mammals and birds.

b. Livestock:

- I. Hen (Vanraja Variety) & aquarium fish (Common carp)

2. Non-living components:

- a. **Walking avenues:** The park has walking avenues of 7 feet width in two sides and connected with pitch roads in another two sides. The tiles in walking avenues allows downward water movement during rainy days.
- b. **Water pool:** A water pool (7.8 x 4.6 m) in the centre of the park is the major attraction for the visitors. The Pool has an artistic pedestrian arch footbridge and two fountains. It serves as a perfect site for selfie point and recreations especially for children. The pool is protected by steel pipe fencing for beautification and protection of childrens.
- c. **Steel display boards:** On both side of walking avenues steel boards (1.8 x 1.2 ft) have been provided with information on fruit plants like their scientific name, edible parts, important nutrient and mineral contents etc. It attracts youths and students to learn about the economic importance of fruits plants.
- d. **Technology gallery:** In Eastern side of the park and along the walking avenues, 6 x 4 ft steel frames have been provided which display advance technologies of RCER, Patna like smart water management model, indigenous livestock and poultry of Bihar and Jharkhand, Integrated Farming System models, Climate resilient rice varieties and technological options for greening rice fallow areas. Further, on another side of the park, along the walking avenues there are steel frames displaying improved vegetable varieties developed by the Institute and process model of extension program of the institute for technology dissemination in eastern India.
- e. **Illuminated coloured lamp:** Coloured electric lamps are provided around the park boundries on the top of steel pipe poles fitted above the black Granite covered RRC beams and the steel posts are connected by the beautifully carved two steel chains. Thus, granite beams, steel posts inter connected by steel chains and fitted with coloured lights give beautiful illuminations and ambience, attracting visitors and stakeholders.
- f. **Composting unit:** A permanent structure (2 x 3 meter) constructed using brick, cement and sand in one corner of the park. The depth of the pit is 1.5 meter. A shade has been erected over the compost pit to prevent from rain. The objective is to

recycle biomass generated in the park and provide nutrition to crops and plants in the park.

- g. Soak pit:** A soak pit structure (2 m × 6 m × 3 m) constructed with over brunt bricks and connected with the cemented channel (1 × 1 ft) provided around the park along the walking avenues. Excess water in rainy season goes to soak pit and thus recharge ground water and prevent flooding of the park.
- h. Polyhouse:** A small polyhouse (3 × 3 m) is established near technology galley which provides planting materials continuously to the Park including a small hydroponic unit.

3. Management:

- Year round vegetables are cultivated under and around the mango orchard (var. Malda) in one side of the park, while on another side medicinal and aromatic plants are grown under story of litchi orchard.
- In western side of the park, Mango variety Amrapalli is grown under high density system (2.5 × 2.5 m), while in between Malda and Amrapalli, a large number of minor and indigenous fruits are grown along with vegetables as intercrops and alley crops.
- Around the outer sides, different sequences of vegetables and leafy plants are grown throughout the year as source of nutrition and additional income.
- In Poultry shed, adjacent to Water Pool, about 50 poultry birds are maintained, with stall feeding also.
- The crops and plants are mostly grown organically with generated composts from the Vermicomposting tanks and additional biomass are used as mulch materials.
- Legume vegetables like cowpea, dolichos etc are also included in the sequence to enrich soil and generate nutrient rich vegetables. Pests and diseases are managed organically to the possible extent by using resistant and indigenous plants adapted to local conditions.
- *Swarna e-Vatika* supports a rich diversity of beneficial insects that play a crucial role in maintaining ecological balance and enhancing crop productivity. Among them, pollinators such as honey bees (*Apis spp.*) and butterflies are highly prominent as they significantly improve fruit set, seed formation, and productivity of vegetable and fruit crops. Natural predators, particularly ladybird beetles, help in controlling

aphid populations and other soft-bodied insect pests, thereby reducing crop damage and minimizing the need for chemical pesticides.

Multifunctional Benefits of *Swarna e-Vatika*

1. Education and Knowledge Resource

Swarna e-Vatika serves as a live learning laboratory for students, researchers, farmers, and visitors. School children gain practical exposure to diverse plant species and ecological interactions, helping develop awareness about biodiversity and sustainable agriculture. Students of botany learn taxonomy and identification of economically important plants, while horticulture and Ayurveda students benefit from hands-on exposure to fruit crops, vegetables, medicinal plants, spices, and aromatic species. The park also acts as a demonstration platform for experiential learning, field visits, and educational tours.

2. Nutritional Security

The model ensures year-round availability of fresh vegetables, fruits, tuber crops, spices, and honey, thereby contributing to household nutritional security. The diversified production system supplies essential vitamins, minerals, antioxidants, and dietary fibre required for balanced nutrition. Inclusion of medicinal and aromatic plants further supports preventive healthcare and traditional dietary practices. The integrated approach promotes healthy food habits and dietary diversification among rural and peri-urban households.

3. Wellness and Therapeutic Functions

The medicinal and aromatic plant section of *Swarna e-Vatika* supports traditional wellness practices and serves as a repository of herbal species used in Ayurveda and folk medicine. These plants help in managing common ailments and are valuable raw materials for herbal formulations, immunity enhancement, and natural healthcare products. Exposure to natural greenery, fragrances, and biodiversity also contributes to mental relaxation and stress reduction.

4. Health and Wellbeing

The park provides a serene and eco-friendly environment suitable for morning and evening walks, yoga, meditation, and nature therapy. Interaction with greenery, flowering plants, birds, butterflies, and water features creates a calming

atmosphere beneficial for physical and mental wellbeing. The healing environment can particularly support elderly individuals and people suffering from age-related disorders such as Alzheimer's disease, Parkinson's disease, stress, anxiety, and depression through therapeutic and restorative effects of nature.

5. Technology Gallery and Extension Hub

The Technology Gallery showcases location-specific agricultural technologies developed for eastern India. It provides visual demonstrations and practical knowledge on important themes such as rice-fallow management, multiple use of water, integrated farming systems, climate-resilient rice varieties, improved technology in livestock and fisheries. The gallery acts as a knowledge dissemination centre for farmers, entrepreneurs, students, extension workers, and state government officials, thereby strengthening technology transfer and adoption.

6. Recreation and Eco-Tourism

Swarna e-Vatika functions as an eco-recreational space for children, families, and visitors. The presence of birds, butterflies, bees, fish, flowering plants, fountains, and landscape elements creates a refreshing and enjoyable environment. Visitors experience relaxation and recreation while simultaneously learning about agriculture, biodiversity, and environmental conservation. The park has significant potential as a model for agri-eco tourism and community engagement.

7. Natural Studio for Creative Activities

The aesthetically designed landscape and biodiversity-rich environment make the park an ideal natural studio for photography, painting, educational video recording, and awareness campaigns. It supports documentation of agriculturally important technologies, biodiversity conservation, and nature-based creative works. Bird photography and environmental content creation are additional attractions that enhance educational and tourism value.

8. Year-Round Employment and Income Generation

The *Swarna e-Vatika* model generates continuous employment opportunities throughout the year, providing approximately 150 man-days of employment annually from a one-acre area. The model ensures an estimated annual income of

around Rs 2.32 lakh with a benefit-cost ratio of 2.1, demonstrating its economic viability and sustainability. In addition to income from produce, the park has strong potential for revenue generation through educational tourism and visitor-based activities. With an average of nearly 1,000 visitors per month during the last year, the concept can further generate income through nominal knowledge-entry passes and allied activities, thereby creating opportunities for entrepreneurship, livelihood enhancement, and rural economic development.

Further opportunities:

Youths can establish local cuisines parlour and integrate with the park to further enhance income and attract visitors. 'E-rickshaw' can be attached with the park for moving around the farm and surround dings for making its further attractive. Additionally, the introduction of a QR code-based plant information system provided real-time, digital access to crop details, cultivation practices, and nutritional information, making the park more interactive, educational and technology-driven benefitting the stakeholders.



Fig. 1: Technology wellness framework of *Swarna e-Vatika*

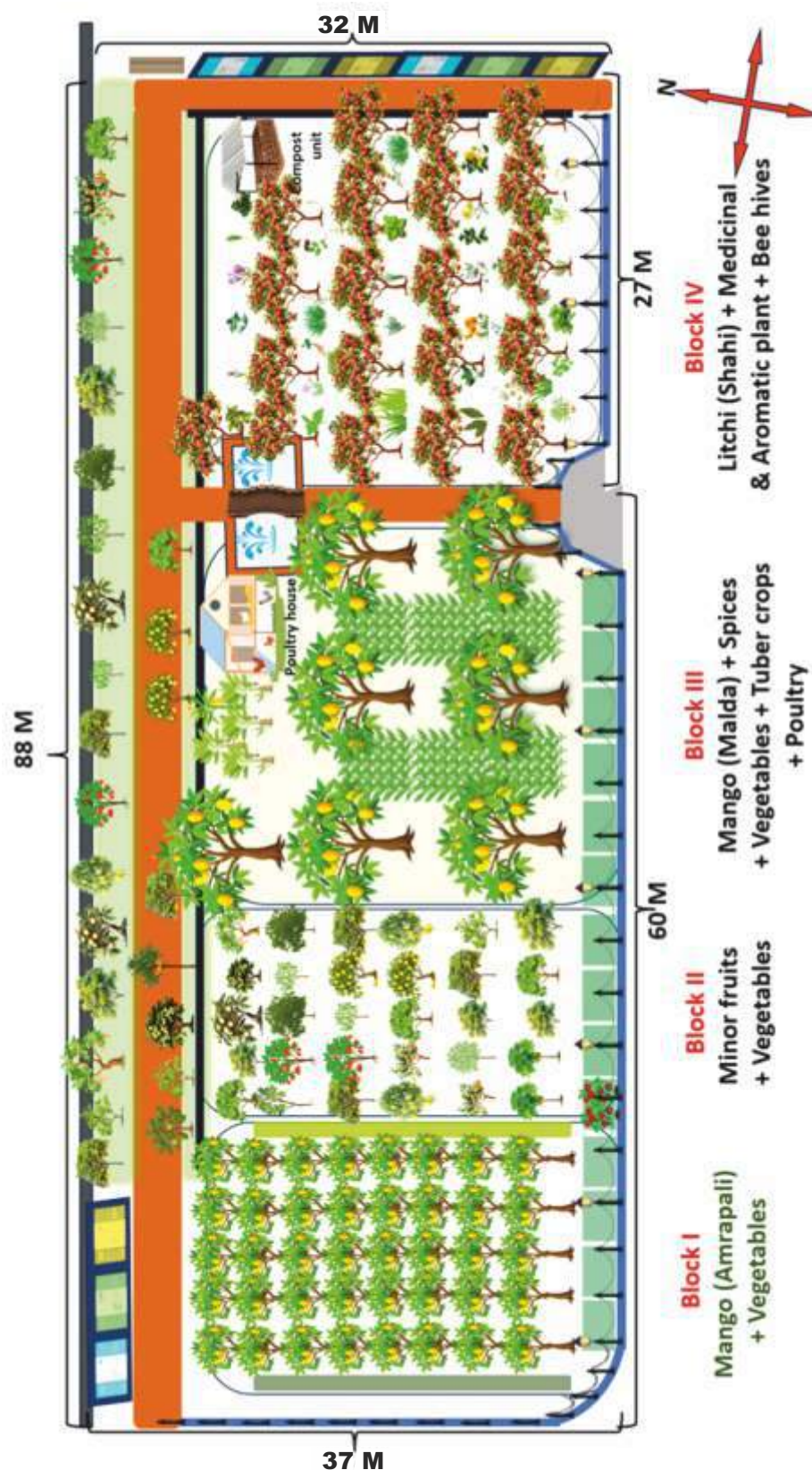


Fig.2 Graphical representation of *Swarna e-Vatika* (ICAR-RCER)

Gracefully inaugurated by honored Guests



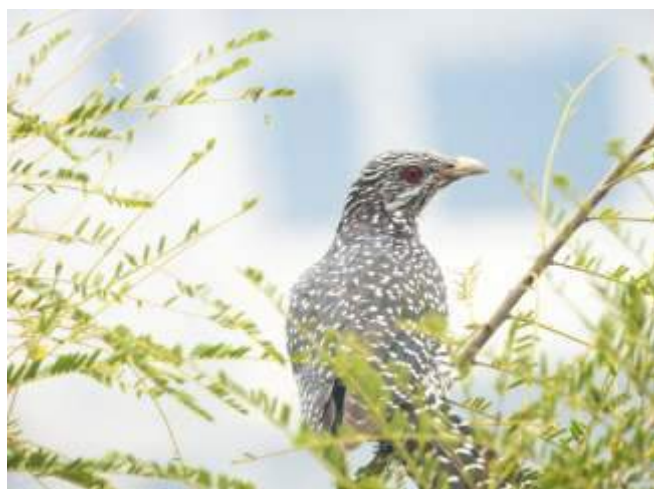
A landmark place at Swarna e-Vatika, blessed by the presence of honorable dignitaries.



Esteemed guests engage with the Technology Gallery



Swarna e-Vatika-a place where even the smallest life sparkles.



A peaceful night wrapped in green



Pause with Esteemed Guests. Capture Forever.



Visitors Experiencing the Rich Diversity of Vatika





Celebrating Nature's True Beauty



Learning by Doing-Students Explore Science while Kids Bloom with Joy at Swarna e-Vatika



Swarna e-Vatika – Where Every Seed Blossoms into Beauty.



Where Every Unit Completes the Cycle of Nature



Swarna e-Vatika - Where Nature Meets Nutrition



Distinguished visit to a living model of sustainability



From Nature to Nurture



Swarna Vatika—An ICAR-RCER initiative where every seed sows health, hope and nutritional security.



Banyan Tree: The Living Symbol of Eternal Strength





SWARNA e-VATIKA

Funding support by

Dr. Sanjiv Chaurasia

Hon'ble MLA, Digha Assembly Constituency, Patna, Bihar

Under the Chief Minister Area Development Scheme



हर कदम, हर डगर
किसानों का हमसफ़र
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch