VIGYAN ASHRAM
OPEN HOUSE EXHIBITION

Executive Summary

Vigyan Ashram, located in Pabal village, Maharashtra, represents a revolutionary approach to rural education and technology development. Founded in 1983 by the late Dr. S.S. Kalbag, this institution has become a beacon of innovation, hosting an annual Open House Exhibition that attracts 10,000-12,000 visitors from around the globe. The 2024 exhibition, held on July 30th to commemorate the 22nd death anniversary of Dr. Kalbag, showcased groundbreaking projects spanning agriculture, renewable energy, digital fabrication, and sustainable development.

Historical Context and Institutional Foundation

Origins and Philosophy

Dr. Shrinath Kalbag, a food technologist with a Ph.D. from the University of Illinois and former head of engineering sciences at Hindustan Lever Limited, established Vigyan Ashram with a transformative vision. After a successful corporate career, he chose to settle in the drought-prone village of Pabal, renouncing metropolitan opportunities to pursue educational reform. The institution embodies the philosophy where "Vigyan" means 'search of truth' and "Ashram" symbolizes 'simple living and high thinking'.

Dr. Kalbag's educational philosophy emerged from his childhood experiences in Mumbai, where his family had to create their own infrastructure—electricity, water, and sewers. This hands-on approach to problem-solving became the foundation of Vigyan Ashram's "learning while doing" methodology. Tragically, Dr. Kalbag passed away in July 2003 due to a heart attack, but his legacy continues through the institution he built.

Global Recognition and MIT Connection

The institution gained international recognition when Dr. Neil Gershenfeld, Director of the Center for Bits and Atoms at MIT, visited in 2001. Gershenfeld, who was teaching a course called "How to make almost anything," recognized the alignment between Vigyan Ashram's philosophy and his vision for digital fabrication. This led to the establishment of "Fab Lab 0" in 2002—the first Fab Lab outside MIT and the prototype for the global Fab Lab network.

MIT invested approximately $40,000 in equipment and continues to support the institution through Fab Academy lectures. Neil Gershenfeld described Vigyan Ashram as the inspiration for all Fab Labs, noting that "Vigyan Ashram should be an inspiration for all".

Educational Programs and Methodology

Diploma in Basic Rural Technology (DBRT)
The flagship program, DBRT, is a comprehensive 1-2 year residential course recognized by the National Institute of Open Schooling. Designed for youth aged 15-20, the program focuses on practical training across multiple sectors.

Core Areas of Training:

- Agriculture and Animal Husbandry: Hydroponics, vermi-composting, poultry management
- Engineering: Fabrication, construction, plumbing, carpentry, engineering drawing
- Energy and Environment: Solar technologies, biogas, electrical systems,environmental monitoring
- Home and Health: Food processing, medicinal plant cultivation, health science

The program's unique approach eliminates traditional classroom learning, instead providing hands-on experience in real-life situations. Students not only learn skills but also earn income by providing paid services to the community, making education self-sustaining.

Introduction to Basic Technology (IBT)

The IBT program has been implemented in over 200 schools across Maharashtra. Recognized as part of the National Skills Qualifications Framework (NSQF) under the Multi Skill Foundation Course (MSFC), this program brings Vigyan Ashram's philosophy to formal education.

Open House Exhibition 2024: Project Showcase

This year's exhibition, visited by Faculty and Student Representatives
Dr. Reshma Raskar-Phule (Civil Engineering), Faculty Coordinator of Prakriti: The Green Club of SPCE, and Dr. Swati Lavand (Electrical Engineering), Faculty Coordinator of SP Sustainability and Green Initiative Chapter (SPSGIC),were accompanied by two student representatives:

- Samarth Rasane (Third Year Mechanical Engineering), Campaign Coordinator of the Green Club
- Ayushya Maurya (B.Tech Electrical Engineering), former intern of the TUM-IITB-SEED Living Lab Summer Internship Program at Vigyan Ashram, Pabal, Maharashtra, and former Vice President of the Green Club

2024 Open House Exhibition:

Agricultural Innovation and Food Security

1. Photosynthesis Rate Measurement System

A sophisticated ₹80 lakh research project designed to collect data on crop photosynthesis rates to enhance agricultural productivity. This system addresses India's critical need for data-driven agriculture, as the country lags in yield optimization compared to global standards.

2. Hydroponics and Controlled Environment Agriculture

Vigyan Ashram operates multiple hydroponic systems including Deep Water Culture (DWC) and Nutrient Film Technique (NFT). The institution trains farmers and provides technology adoption support for:

- Aquaponics farming systems
- Polyhouse construction and climate control
- Nutrient management and dosing protocols

3. Solar Dome Dryer Technology

An innovative solar-powered drying system that preserves the nutritional content of agricultural produce. The dome-shaped structure utilizes UV-resistant transparent materials and maintains optimal temperature and humidity through natural and forced ventilation. This technology enables farmers to dry produce like chillies, tomatoes, and onions more efficiently than traditional sun-drying methods while preventing fungal growth and preserving color, flavor, and nutritional value.

Renewable Energy and Environmental Solutions

4. Biomass Gasifier and Biochar Production

The gasifier system produces biochar as a byproduct, which significantly enhances soil fertility and carbon sequestration. Research indicates that biochar can improve soil aggregate stability, water retention, and nutrient availability while reducing greenhouse gas emissions by 20-50%. The biochar application can increase crop yields and improve soil health for thousands of years due to its carbon persistence.

5. Grey Water Treatment System

A solar-powered grey water recycling system using reed bed bio-filtration reduces Chemical Oxygen Demand (COD) from 2500 ppm to below 250 ppm, making treated water suitable for agricultural use. This eco-friendly system operates without conventional electricity, making it ideal for rural applications.

Waste Management and Environmental Health

6. Sanitary Napkin Incinerator
Installed at the girls' hostel, this innovative incinerator processes 5-6 sanitary pads per cycle, producing only 0.05 grams of ash. The system operates at high temperatures (800-950°C) ensuring complete combustion with minimal emissions. This technology addresses the critical issue of menstrual waste management, as over 1 billion used sanitary pads are disposed of monthly in India.

Student Innovation Projects

The exhibition featured remarkable innovations by school students addressing real-world agricultural challenges:

7. Farmer Safety Innovations
- Snake Deterrent System: A vibrating stick designed to prevent snake bites during farming activities
- Multi-purpose Protection Device: An integrated system combining torch, sound alerts, and deterrent mechanisms for protection against wild animals
- Smart Window System: A window integrated with mosquito racket net powered by DC electricity

Food Processing and Value Addition

8. Hydraulic Oil Extraction System
A mechanical press system for extracting oil from various seeds using hydraulic pressure. This technology enables small-scale oil production while maintaining oil quality through cold-pressing methods that preserve natural nutrients and flavors.

9. Millet Processing Technology
Equipment for creating flakes from millets and jaggery, used in manufacturing protein bars and other nutritious food products. This technology supports local food processing enterprises and promotes nutritious indigenous grains.

Emerging Technologies

10. Seaweed Production for Biodegradable Plastics
A Malad-based startup project focusing on seaweed cultivation for producing edible and biodegradable plastic alternatives. This innovative approach addresses plastic pollution while creating sustainable packaging solutions.

Institutional Infrastructure and Facilities

Fab Lab 0: Digital Fabrication Hub

The Fab Lab at Vigyan Ashram houses state-of-the-art digital fabrication equipment:
- 3D Printers: For rapid prototyping and custom part production
- Laser Cutting Machines: For precision cutting and engraving
- CNC Routers: For computer-controlled machining
- PCB Fabrication Equipment: For electronics development
- Vinyl Cutting Machines: For signage and graphics production
- Electronics Lab: Complete with sensors, microcontrollers, and testing equipment

Design Innovation Center (DIC)

As a spoke center of Savitribai Phule Pune University's Design Innovation Center, Vigyan Ashram focuses on:
- Agriculture technology development
- Sensor technology applications
- Computer graphics and product design
- Environment and watershed management

The DIC program, funded by the Ministry of Human Resource Development (MHRD), promotes design thinking and innovation culture at the collegiate level.

Campus Facilities

The self-built campus includes dome houses, workshops, solar installations, and water management systems. Students and staff constructed the facilities themselves, embodying the institution's philosophy of hands-on learning and self-reliance.

Impact and Outreach

Educational Impact

Over the past four decades, Vigyan Ashram has:
- Trained hundreds of rural youth through DBRT programs
- Implemented IBT in 200+ schools across Maharashtra
- Supported rural entrepreneurship through micro-finance and marketing linkages
- Provided online support to Atal Tinkering Labs in Chhattisgarh and Andhra Pradesh

Global Influence

The institution has inspired educational models worldwide:
- Served as the prototype for the global Fab Lab network (1,600+ labs globally)
- Contributed to international development programs
- Hosted international students and researchers
- Influenced policy development for innovation centers in India

Community Development

Vigyan Ashram's impact extends beyond education:

- Rural Entrepreneurship: Many graduates have established successful enterprises in their villages
- Technology Transfer: Innovations developed at the ashram are scaled for broader community benefit
- Skill Development: Reduces rural-urban migration by creating local employment opportunities
Sustainable Development: Projects address critical issues like water scarcity, soil health, and renewable energy
- Challenges and Future Directions

The legacy of Dr. S.S. Kalbag lives on through the countless innovations emerging from this rural laboratory, proving that transformative change can originate from the most unexpected places. As Vigyan Ashram continues to evolve and expand its impact, it remains a beacon of hope for sustainable rural development and educational innovation, not just for India but for the world.

The 22nd death anniversary commemoration through the Open House Exhibition serves as both a tribute to the founder's vision and a commitment to continuing his mission of empowering rural communities through education, innovation, and technology. With its unique position as Fab Lab 0 and its comprehensive approach to rural development, Vigyan Ashram continues to demonstrate that the future of education lies in hands-on learning, community engagement, and the courage to solve real-world problems

खेड विभाग

सकाळ TODAY

पाबळ विज्ञान आश्रमात रमले विद्यार्थी

प्रदर्शनाला राज्यभरातील १२ हजार विद्यार्थ्यांची भेट : दोघांना पुरस्कार प्रदान

पाबळ/शिक्रापूर, ता. ३१ : थोर शास्त्रज्ञ तथा विज्ञान आश्रमाचे संस्थापक डॉ. एस. एस. कलबाग यांच्या २३ व्या स्मृतिदिनानिमित्त विज्ञान प्रदर्शनाचे आयोजन केले होते. विविध क्षेत्रांतील विज्ञान आश्रमामधील संशोधनांवर आधारित १५५ यशस्वी प्रयोगांच्या या दोनदिवसीय प्रदर्शनाला संपूर्ण राज्यभरातील २५ शाळांतील सुमारे १२ हजार विद्यार्थ्यांनी भेट दिली. यामध्ये डॉ. कलबाग यांच्या नावाने दिला जाणारा यंदाचा 'युवा उद्योजक पुरस्कार' पाबळ (ता. शिरूर) येथील मयूर चौधरी यांना, तर विशेष 'समाजोपयोगी युवक पुरस्कार' पुण्यातील धनंजय अभंग यांना मुख्य संचालक डॉ. योगेश कुलकर्णी यांच्या हस्ते प्रदान करण्यात आला.

पाबळ (ता. शिरूर) : विज्ञान आश्रममधील प्रदर्शनात विद्यार्थ्यांशी संवाद साधताना संस्थेचे पदाधिकारी व इतर.

शालाबाह्य मुलांसह अल्पशिक्षित व नापास मुलांसाठी गावातच उद्योगसंधी या प्रमुख उद्देशाने डॉ. कलबाग यांनी १९७९ मध्ये पाबळ येथे येऊन विज्ञान आश्रमाची सुरवात केली आणि ग्रामिण पदविक अभ्यासक्रम सुरू केला होता. या त्यांच्या प्रयोगाने संपूर्ण राज्यभरासह इतर राज्यांमध्येही चार हजारांपेक्षा जास्त उद्योजक घडले आहेत. यातीलच गुणवंत युवा उद्योजकांना पुरस्कार देण्याचा प्रघात डॉ. कलबाग यांच्या पश्चात त्यांच्या पत्नी दिवंगत मीरा (अम्मा) कलबाग यांनी २००३ पासून सुरू केला आहे. त्याअंतर्गतच यंदा पोल्ट्री व फूड प्रॉडक्ट उद्योगात भरारी घेतलेले पाबळ येथील मयूर चौधरी यांना 'युवा उद्योजक', तर बायोगॅस उद्योगात यशस्वी झालेल्या धनंजय अभंग यांना 'विशेष समाजोपयोगी उद्योजक' म्हणून पुरस्कार देण्यात आले.

अभियांत्रिकीच्या विद्यार्थ्यांचा वाढता कल

यावर्षी या प्रदर्शनाला पुण्यातील ज्ञानप्रबोधिनीसह पाच मोठ्या शाळांमधील विद्यार्थी-विद्यार्थिनींची सकाळपासूनच उपस्थिती लक्षवेधी होती. विशेष म्हणजे विज्ञान आश्रमचे अभियांत्रिकी क्षेत्रातील संशोधन जागतिक पातळीवर दखलपात्र असल्याने अभियांत्रिकी विषयातील विद्यार्थ्यांची संख्या गेल्या काही वर्षांपासून वाढत असल्याचा अनुभव आल्याची माहिती उपसंचालक रणजित शानबाग यांनी दिली.

दरम्यान, गेल्या वर्षभरात विविध विषयांवर झालेल्या विज्ञान आश्रमामधील संशोधनांच्या सुमारे १५५ प्रयोगांचे यावर्षी सलग दोन दिवस खुले प्रदर्शन मांडण्यात आले होते. यावेळी पुणे शहर, जिल्हा व राज्यभरासह विशेषतः: कोकणातून पहिल्या दिवशी ५ हजार तर दुसऱ्या दिवशी ७ हजार विद्यार्थी सहभागी यात झाले होत्या. प्रथम सत्रात पाबळचे सरपंच सोपान जाधव, पुणे जिल्हा परिषदेचे माजी उपाध्यक्ष विवेक वळसे पाटील, संस्थेचे व्यवस्थापकीय संचालक अशोक कलबाग यांनी प्रदर्शनाला भेट दिली.

Current Challenges

Despite its success, Vigyan Ashram faces several challenges:

- Funding Sustainability: Dependence on government grants and donations
- Technology Upgradation: Need for continuous equipment modernization
- Scale of Impact: Limited by physical capacity and resources
- Market Linkages: Connecting innovations to broader commercial markets

Future Opportunities

The institution is positioned to expand its impact through:

- Digital Education Platforms: Online delivery of courses and training
- Network Expansion: Replication of the model in other regions
- Industry Partnerships: Collaboration with private sector for technology development
- International Cooperation: Exchange programs and joint research initiatives

Visitor Testimonials and Academic Engagement

The 2024 Open House Exhibition attracted diverse visitors, including faculty and students from engineering colleges. Dr. Reshma Raskar-Phule from SPCE and Dr. Swati Lavand, along with students Samarth Rasane and Ayushya Maurya, represented the academic community's engagement with Vigyan Ashram's work.

Their visit highlighted the institution's role in:

- Interdisciplinary Learning: Bridging theoretical knowledge with practical application
- Sustainability Education: Demonstrating real-world solutions to environmental challenges
- Innovation Methodology: Teaching design thinking and first-principle approaches
- Community Engagement: Showing how technology can address local problems

Conclusion

Vigyan Ashram stands as a testament to the power of alternative education and community-driven innovation. Through its annual Open House Exhibition, the institution continues to inspire thousands of visitors while showcasing solutions to pressing rural development challenges. The integration of traditional wisdom with modern technology, embodied in the philosophy of "learning while doing," has created a unique educational ecosystem that produces not just skilled individuals but problem-solvers and entrepreneurs.