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Celebrating Young Innovators
INSPIRE-MANAK

- Compassion that Innovates:
  A Farmer's Innovation Story
- Aconitum:
  Exploring therapeutic potential
- Celebrating Young Innovators:
  A Report on the 12th NLEPC under INSPIRE-MANAK
- Innovation Yatra:
  Identifying Unsung Heroes

MATCHING GRASSROOTS INNOVATION TO LOCAL NEEDS

Editor-in-Chief
Dr. Arvind C. Ranade

Editor
Dr. Rintu Nath

Publication Committee:
Dr. Vivek Kumar
Dr. R K Ravikumar
Dr. Nitin Maurya
Er. Rakesh Maheshwari
Shri Hardev Choudhary
Dr. Satya Singh

Design
Ms. Roli Dharmsaktu

Address for correspondence
National Innovation Foundation - India
Grambharti, Amrapur, Gandhinagar,
Gujarat- 382650

Tel: +91-02764-261131, 32, 34, 35

E-mail
info.nif@nifindia.org

Website
https://www nif.org.in

राष्ट्रीय नवप्रवर्तन प्रतिष्ठान – भारत
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CONTENTS

Editorial 3
Dr. Arvind C. Ranade

4 **Matching Grassroots Innovation to Local Needs**
Rahul Prakash, Nitin Maurya, and Vivek Kumar

Compassion that Innovates: A Farmer's Innovation Story 9
Swaraj Parida

12 **Aconitum: Exploring therapeutic potential**
Hiral Gadhavi and Ravikumar R K

Celebrating Young Innovators: A Report on the 12th NLEPC under INSPIRE-MANAK 16

20 **Innovation Yatra: Identifying Unsung Heroes**
Rajiv Mili, Garima, Dipti, R. Lalbikzuala, Dipjyoti Choudhury, and Navneet Kumar

Editorial

Every technological epoch redefines how society perceives knowledge. Today, as Artificial Intelligence achieves extraordinary fluency in synthesizing text, predicting structures, and optimizing systems, we risk mistaking computational scale for complete understanding. The architecture of machine intelligence rests upon a fundamental constraint that it can only process what has been codified. Algorithms works on the explicit data that has been derived from its living context, standardized into symbols, and stored in digital repositories. However, the vast, submerged continent of tacit knowledge remains largely invisible. This knowledge remains embodied, sensory, and situational wisdom which human beings acquire through an intimate, lifelong dialogue with their material and ecological worlds.

At the grassroots, knowledge is inseparably integrated to the practitioners. It lives in the muscle memory of the artisan who judges the temper of clay or fibre by touch and it resides in the agrarian intuition of the cultivator who reads subtle shifts in soil, canopy, and microclimate. Furthermore, this knowledge also endures in the custodian of traditional healing who navigates the delicate threshold between botanical potency and human safety through generations of observational discipline. Such mastery is not a static formula that can be scraped by a neural network. It is a dynamic, lived epistemology where perception, ethics, and action are inseparable and where the hand knows truths that language has not learned to articulate so far.

The same truth governs how technology travels across society. In a hyper-connected world, we often assume that solutions can be scaled through uniform, top-down deployment. Yet a technology only takes root when it enters into a respectful conversation with indigenous ways of life. True social diffusion is not the mechanical transfer of hardware but a delicate alignment of human capabilities, ecological rhythms, and cultural continuity. Whether in forest fringes, river plains, or fragile mountain landscapes, sustainable transformation happens only when external tools honour and augment the tacit skills a community already possesses, turning passive recipients into confident co-creators of their own resilience.

The future of innovation, therefore, does not lie in choosing between high computation and human intuition, but in recognizing their *epistemic complementarity*. As artificial systems automate routine cognition, the strategic value of uncodified, context-rich human ingenuity will only rise. Scouting the hinterlands, listening patiently to communities, validating indigenous knowledge, and nurturing young curious minds are not only developmental exercises but also acts of epistemological stewardship. By safeguarding the tacit wisdom of the grassroots, NIF strive to ensure that our technological future remains anchored in human dignity, ecological harmony, and lived truth.

Dr. Arvind C. Ranade

Matching Grassroots Innovation to Local Needs

Rahul Prakash, Nitin Maurya, and Vivek Kumar

A technology is most effective when it reaches the people who need it. For over two decades, the National Innovation Foundation-India (NIF) has been making concerted efforts towards this effect. The NIF's approach has been simple - understand the place and community, identify the problems or need-gaps, match-make it with available grassroots innovation(s) and then introduce the same. This is important to ensure optimal usage of the innovations, so that appropriate benefits are generated in the process. In practice, broadly this unfolds in five steps: understanding the place and listening to the people, choosing an innovation that fits, preparing both the innovator and the users, installing the machine and training those who will run it, and going back later to see what worked. The examples shared below are a few among many from the various social diffusion projects carried out in collaboration with district administrations, forest divisions, livelihood missions, universities and other partners, across the country.



NIF representative interacting with SHG women at Pithora Block Mahasamund

Listening to People

Everything starts with a conversation. Before any machine is chosen for the region, the team first sits with people to understand about the place, resources available, how people live, what they earn from, and where their work is the hardest. Over the years, these talks have taken place along the roads, in block offices, panchayat bhawans, universities, ITIs, forest range offices, tribal hamlets and forest fringe villages, and in recent years even at correctional homes.

When NIF team went to the Mahasamund district in Chhattisgarh to find out how grassroots innovations could help rural families, efforts began with meetings with the district officials who knew the area best. Fourteen of them were met at the Zila Panchayat including the Chief Executive Officer, the Upper Collector, the head of the Krishi Vigyan Kendra (the local farm science centre), and the block project managers of 'BIHAN', Chhattisgarh's state rural livelihood mission, from five blocks. The officials pointed the team to Pithora block. There, in Rajadera and Godbahal villages, the team met the leaders of 22 women's self-help groups and four cluster-level federations, which bring many such groups together.

From these meetings, a clear



Koya tribal members of a Vana Samrakshana Samiti interacting with NIF team

picture emerged. Many families in Pithora belong to Particularly Vulnerable Tribal Groups (PVTG), which are among the most economically backward communities in India. They grow or collect rice, pulses, cotton and forest leaves, but they mostly sell them as they are, at low prices. Whatever processing they do, they do by hand. Machines that could turn these raw materials into plates, puffed rice, dal and cotton wicks would let them earn more from what they already have. As a result, after team's presentation on available grassroots innovations, the community asked for four machines: a leaf plate and bowl making machine, a puffed rice machine, a dal mill and a cotton wick making machine.

However, not every conversation leads straight to a request. Some are simply about learning. In the Narsampet range of Warangal, Telangana, 30 Koya tribal members of a Vana Samrakshana Samiti, a village forest protection committee, told the team how their community lives and earns. Knowing this is the first step for any work that aims to build on what people already have, rather than replace it. NIF acknowledges that it may not have a grassroots innovation for every problem its teams encounter in the field. In many such cases, it encourages local people to innovate their own solutions, and it commits to supporting them in the effort.

Choosing the Right Grassroots Innovation

Once the need is understood, the next step is choosing the innovation. NIF has a large database of grassroots innovations, developed by farmers, artisans, fabricators and mechanics across India, and the task is to pick the one that fits. One lesson from NIF's work has been simple: an innovation usually works best when it speeds up or mechanises the work people already know how to do, instead of asking them to learn something completely new.



Leaf plate making unit at Gadchiroli, Mahrashtra.

The Sal leaf plate and bowl making machine is a good example. In the forest villages of Jharkhand, families have collected sal leaves for generations and stitched them by hand into plates, which they sell in local markets. It is slow work and earns little. The machine, developed by Jogendra Patra of Odisha, presses these stitched leaves into firm, neat plates and bowls much faster. The women already know how to collect and prepare the leaves, so the machine fits easily into their work. This is one reason why 21 such units could be set up in a single week across 21 villages of the Porahat Forest Division, each run by its own trained group. The same logic was used in Gadchiroli, Maharashtra. There, families make plates from Palash leaves instead of Sal, so the same machine was introduced in villages where Palash trees grow in plenty. The Science and Technology Resource Centre of Gondwana University supported the effort as the local partner.

Choosing the right machine is only part of the decision. Many innovations come in more than one model (of varying capacity and efficiency), and the model must suit the place. This is what happened in Pithora once the community had identified an innovation. The puffed rice machine chosen there, built by Madhuri Das Adhikari of Odisha, runs on a solar panel and battery, so it produces its own power and keeps running costs low. It uses Sela, a parboiled rice the local women already know and use. The cotton wick machine comes in three versions, which differ in how the cotton is fed into it: by hand, partly automatic or fully automatic. All the three run on electricity. The hand-fed version was chosen because it costs less, uses very little power and is simple enough for women to run at home. Being



Visit of Mansukhbhai Prajapati of Gujarat to Moga Punjab

affordable, it can also be easily purchased by other women or groups who may need it.

The last consideration is who will run the machine. Small machines like these need little initial investment to start, take little space and allow flexible working hours. This is why they seem to suit women's self-help groups. The same reasoning was used in Rajasthan, where cotton wick and sanitary napkin machines were provided to women inmates at Reform Centres in five District Correctional Homes. The aim was to give them a skill they can earn a living from once they return home, which also eases their reintegration into society.

Preparing the Match

Even after the right innovation is chosen, a few things are ensured before any innovation is delivered - the site is checked, the innovator and the users are brought together, and the local partners agree in writing on who will do what. All machines need a suitable place for installation, operation, and safe storage of raw materials and finished products. In Dumka, Jharkhand, before 28 sal leaf plate machines were placed, the Jharkhand State Livelihood Promotion Society (JSLPS), the state's rural livelihood mission, prepared a document detailing every proposed site. It recorded the size of the room, the distance to the nearest electricity line, how many leaves the village collects each month, and how many shops and small eateries nearby might buy the plates. This helped decide how many machines each site could take. Some sites were ready for four machines. Others first needed an electricity connection, so installation there was planned for later.

Wherever possible, NIF brings the innovator and the prospective users face to face. This lets the innovator see how people already work, and lets the users ask questions before the machine arrives.

Wherever possible, NIF brings the innovator and the prospective users face to face. This lets the innovator see how people already work, and lets the users ask questions before the machine arrives. Mansukhbhai Prajapati of Gujarat, who created the Mitticool range of clay products, visited the pottery cluster of West Jaintia Hills district in Meghalaya and Moga district in Punjab to watch the local potters at work, understand their level of operation including their technology and skill. When distance makes such visits difficult, the meeting is organised over video call. In Dantewada, Chhattisgarh, tribal women spoke with the innovators over video call and watched how leaves are dried and stitched, so they knew what to expect before their machines arrived. Any innovation remains functional only if someone looks after it once the trainers leave, so each partner's role is settled before the work begins. Intervention in Anuppur district of Madhya Pradesh is one example. There, the Block Mission Management Unit (BMMU), Pushprajgarh, of the Madhya Pradesh State Rural Livelihood Mission (MPSRLM), took on the local side: preparing the sites, bringing the women's groups together, and helping them find buyers. The day-to-day running of the units was given to the cluster-level federations and self-help groups, with BMMU field staff visiting regularly to check on progress. NIF's part was to work with the innovators, arrange delivery



Sabai Grass Making Machine Installed at Saraikela Kharsawan.

and installation, and train the women who would run the machines.

Installation and Training

Once the site is chosen, the machine is brought in and installed. Some of this work starts before the machine arrives, because the room has to be prepared for it, and each machine has its own needs. A multi-spice grinder, for example, throws fine, pungent dust into the air when grinding chilli or turmeric, which can make the eyes water and cause coughing and sneezing. So the room needs good ventilation, through windows or an exhaust fan, so that the dust is carried away from the person running the machine. It also needs a firm, level floor so the machine stays steady while running, a dry space so the ground spice does not absorb moisture, and a proper electricity connection with earthing for its motor. Operators are also advised to wear a mask. After the room is ready, the machine is delivered and installed in its proper place. Such a multi-spice grinder was among the four innovations installed in Saraikela-Kharsawan district of Jharkhand, in villages of Nimdih, Chandil and Kukru blocks. These were installed in two rounds.

The sabai grass rope making machine was set up first, in October 2025, and the vegetable de-seeder, multipurpose food processing machine and multi-spice grinder followed in April 2026. Installing machines together also gives a chance to see which ones can complement each other. Here, the vegetable de-seeder and the multipurpose food processing machine were set up in the same unit, so that tomato seeds can be extracted using one and ketchup, sauce and other products made using the other.

Training comes next, and it takes the most time. It starts with the raw material, before the machine is even switched on. In the dal mill trainings, for example, women first learn to prepare the pulses to make them machine-ready. The grain is cleaned of stones, dust and broken seeds, and sorted by size so it moves through the mill evenly. It is then lightly wetted with water and dried well in the sun, which loosens the outer husk and makes it easier to remove. Thereafter training on machine is introduced: how to feed the pulses at a steady rate, how to set the gap so the husk comes off without breaking too many grains, how to separate the split dal from the husk and broken pieces, and how to pack the finished dal in clean, dry bags. The last part is upkeep, which often decides how long a unit lasts. This covers cleaning the mill after every use, checking and tightening the belts, oiling the moving parts, and keeping the electrical connection safe and dry. Every woman runs the mill herself during the training. In each group, one person is also trained as a master trainer, so help is close by if something goes wrong. In each group, one person is also trained as a master trainer, so help is close by if something goes wrong. In Dantewada, for instance, 22 Muria tribal women were trained on leaf plate machines. Ten women at Chitaloor village were trained on an automatic sanitary napkin machine, and they named their product Saheli, meaning “friend”.

Going Back to Learn

The last step is to go back, months or even years later, and



Women working at Bamboo Slicer unit at Gadchiroli

see whether the machines are still in use and whether they have made a difference. These follow-up visits check how often each machine runs, how much the group produces and sells, and what problems have come up.

In Mahasamund, the first results from the machines installed in Pithora block are encouraging. The four women running the cotton wick machines now earn about Rs 7,800 a month each on an average, and the two women running the puffed rice machine earn about Rs 11,200 a month each. The leaf plate machines placed in the Palash-growing villages of Gadchiroli show a similar picture: the units at Kharkadi and Jangda villages earn about Rs 11,000 and Rs 9,500 a month respectively. A bamboo slicer at the Gondwana University resource centre also generates about Rs 9,000 a month. Older projects show that machines placed well can keep working for years. In Mizoram, the team revisited areca nut cleaners, paddy threshers and ginger slicers that had been introduced two to three years before. They were still running and still contributing to household incomes.

Learning goes on

The projects described here are only a few of the many NIF has taken up with its partners. No two have been exactly alike, and each has taught something that shaped the next. The numbers tell part of the story: in 2025-26 alone, 45 grassroots innovations from 37 grassroots innovators reached 112 districts across 28 States and Union Territories. Behind these numbers, however, are the people who make the work happen: a team member who sits through a village meeting observing and listening to everyone, the innovator who travels to observe people go about their daily work and the problems they face, and the trainer who continues till the last participant completes his/her assigned work.

India's villages keep producing grassroots innovations, and each needs a link to a community where it can solve a problem people already have. Social diffusion, done thoughtfully and with the community at its centre, is that link. A good machine is only half the story; the other half is understanding what the community truly needs.

Acknowledgements

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Dr. Rahul Prakash is a Principal Associate in National Innovation Foundation-India. He holds PhD in Management, and is currently associated with the Dissemination and Social Diffusion Department (DSD) at the National Innovation Foundation-India. Email: rahulp@nifindia.org

Dr. Nitin Maurya is a Scientist – E and Head of the INSPIRE-MANAK program and the Dissemination and Social Diffusion (DSD) Department at the National Innovation Foundation – India.
Email: nitin@nifindia.org

Dr. Vivek Kumar is Scientist – F at National Innovation Foundation – India. He has more than twenty years of experience in Grassroots Innovations and Ethnobotanical explorations across the country. Dr. Vivek leads the Scouting, Documentation and Database Management department. Email: vivekkumar@nifindia.org

Compassion that Innovates: A Farmer's Innovation Story

Swaraj Parida

Mr. Krishna Chandra Naik belongs to Sambalpur district of the state of Odisha, a region known for its rich culture and diversity. It has also established itself as a major agrarian district, contributing a significant share to the state's paddy production. As per the Odisha Agriculture Statistics 2023–24, the district recorded a paddy yield rate of 5016 Kg/Ha, placing it 4th among districts of Odisha. The district possesses vast stretches of arable land, supported by mighty Hirakud dam and rivers, which ensure an abundant water supply. This encourages many farmers to adopt paddy cultivation as their primary occupation. Accordingly, like many others, Mr. Krishna took up agriculture after completing his graduation study. He shares that he was deeply inspired by his father Late Paramananda Naik, a well-known progressive farmer in the district. Therefore, he chose farming over other career options. Over time, he has proven himself to be a successful farmer, cultivating crops on his 3 acres of land.



Mr. Krishna Chandra Naik
Innovator

In recent years, erratic monsoon patterns due to climate change, coupled with the indiscriminate use of pesticides, have led to the outbreak of the Brown Planthopper (*Nilaparvata lugens Stål.*) commonly known as BPH, a highly destructive pest causing severe losses in paddy crops. The economic impact has been devastating, pushing several farmers in the district into extreme distress, with some even taking their own lives due to financial burdens. Although the government has implemented various control measures, complete eradication remains challenging. BPH attacks crop at an early growth stage and resides at the basal portion under dense canopy, making detection and pesticide application difficult. Eventually, the plants turn brown and die as the pests feed on their nutrients. The situation worsens as the pest rapidly spreads to nearby fields, and pesticide effectiveness declines in dense crops. As a result, some farmers resort to burning affected patches of their fields.

Witnessing this crisis, the innovator consulted scientists from Krishi Vigyan Kendra, Sambalpur, where he learned about various pest management strategies. One of the most effective methods was the



Brown planthopper insects feeding at the base of rice plants.



Rice crop damaged and dried due to a brown plant hopper infestation.

formation of alleys between crop rows, which helps in controlling pest infestation to nearby crop patches and enabling effective pesticide application at the base of plants.

Inspired by the struggles of fellow farmers battling Brown Planthopper infestation, Mr. Krishna Chandra Naik transformed a field-level challenge into a practical agricultural innovation. His Manual Paddy Row Separator reflects the power of empathy, perseverance and grassroots ingenuity in addressing farmers' needs.

Initially, Mr. Krishna adopted this method manually by bending plants in opposite directions using long bamboo logs. However, the process required two labourers and was both tedious and time consuming. Consequently, he began conceptualizing a machine to simplify the process. Motivated further by the hardships faced by fellow farmers, he resolved to develop an implement that could significantly ease their burden and benefit them on a larger scale. He then started working on the design and development of the machine and, after constructing three models, he successfully developed a functional prototype.



Implement in action for effective BPH pest management



Crop separating implement

The Manual Paddy Row Separator is a specialized three-wheeled agricultural implement designed to operate efficiently in densely planted rice fields. It incorporates a manual pivot linkage mechanism controlled through a T-shaped handlebar. As the operator pushes the handlebar, the mechanism actuates two lateral flap bars that extend outward, gently displacing the crop canopy to create temporary alleys. This enables farmers to carry out spraying operations effectively at the base of the crop. With a working width of 24 inches, the implement has an area coverage capacity of approximately 1 acre/hour and weighs around 13 kg. The innovator is currently selling the implement at a price of ₹3,000 per unit.

When the implement came to the notice of the district agriculture authorities, they encouraged him to apply for the Mukhya Mantri Abhinav Krushi Jantrapati Samman (MMAKJS), a scheme jointly launched by the Department of Agriculture and Farmers' Empowerment, Government of Odisha, and the National Innovation Foundation-India (NIF). The scheme aims to identify and recognize farmer-led innovations in agriculture and provides support for value addition, technology diffusion, machine testing, and intellectual property rights. Its objective is



Innovator with other state awardees during MMAKJS 1st edition



Diffusion of implements among affected farmers

to promote technologies that enhance farmers' livelihoods and contribute to self-reliance in agricultural advancement.

Impressed by the scope and versatility of the scheme, the innovator applied and was selected at the district level. He went on to secure second position at the state level during the first edition of MMAKJS in 2018–19.

Recognizing the novelty and social relevance of the innovation, the expert committee recommended it for wider diffusion. Subsequently, the NIF supported the innovator in value addition and diffusion, leading to the distribution of 60 units among progressive farmers in Sambalpur and Bargarh districts, which are among the most BPH prone regions of Odisha.

After using the implement throughout the crop season, many farmers visited the innovator to share their positive experiences of effectively controlling BPH. Several also provided valuable feedback. Based on these insights, further modifications were carried out to improve the implement's adaptability across different field conditions. Observing its potential, NIF also extended patent support by filing both provisional and complete specifications on behalf of the innovator. Eventually, he secured the patent **(Patent Number: 495772)**.

At present, he continues to receive inquiries about the implement and manages its manufacturing alongside his farming activities. Many farmers in the region also approach him for technical guidance on agricultural challenges. To date, he has delivered more than 100 units of the implement to farmers across various districts of western Odisha.

This journey highlights the power of observation and compassion as key drivers of innovation. It stands as an inspiring example of how a farmer, driven by empathy and determination, can create meaningful solutions that benefit an entire community.■



Innovator with some manufactured units

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Er. Swaraj Parida is a Junior Associate with National Innovation Foundation – India. He is a mechanical engineer and associated with VARD & IPM - Engineering division. Email: swarajp@nifindia.org

Aconitum: Exploring therapeutic potential

Hiral Gadhavi and Ravikumar R K

Plants are valuable source of medicinal properties and have been integral part of civilization. In current scenario, there is need for scientific evaluation in terms of their efficacy, safety for their acceptance among stakeholders. This knowledge helps resource personnels involved in herbal value chain in their capability to respond to health requirements. The herbal medicine is gaining prominence as synthetic medicine were found with poor treatment response over certain period and contraindications in lifestyle disorders. Further, the outstanding traditional practices derived from herbs are found to be useful in providing cost effective health care. The relevance of phytotherapy lost its momentum due to lack of knowledge in industrial processing. Subsequently, the long lasting impact of medicinal plants were realised during later part of 20th century. The establishment of analytical tools helped to generate suitable evidences.

These plant based therapies are generally regarded for their safety, which in turn depends on the presence of phytochemicals, process of preparation, dosage and duration of therapeutic application. Studies were undertaken to identify chemical composition, primarily secondary metabolites for their therapeutic properties. In this endeavour, it is necessary to appreciate harmful effects of these herbs, which may be due to the presence of toxic compounds or overdoses. Studies on animal model had substantiated that certain plants are toxic by causing damage to vital organs. The study on these herbal practices will help to minimize risk in health care. It is to be noted that salicin, extract from White willow tree was found useful in fever, but affects gastric mucosa. A chemical variation helped in development of acetylsalicylic acid (Jones, 2011). By having comprehensive understanding of plant chemistry, safety, efficacy studies helped species like *Aconitum, Punica granatum, Hyosciamus, Stramonium, Secale cornutum, Filix mas, Opium, Styrax, Colchicum, Ricinus* to regain their status in medicinal system (Petrovska, 2012). Hence it is valuable to have knowledge of their pharmacological impact have to be known. In this paper, the genus *Aconitum* is taken into consideration in appreciating role of scientific documentation, bioactive compounds, Medicinal properties are described.

The genus *Aconitum* is considered most toxic among medicinal plants in the world. The plant is predominantly distributed in mountainous meadows at altitudes ranging from 2,500 to 4,500 m. *Aconitum* species are known by several common names, such as aconite, wolf's-bane, devil's helmet, monkshood, women's bane, or queen of poisons. These herbaceous perennial plants have around 300 species, sparsely scattered in moisture-retentive, well-draining soils across mountainous ranges in North America, Europe, and Asia. In India, the plant is known as Vatsanabha or Mahavisha in Ayurveda, and as Indian Aconite, Bikh, or Bish as well. The plant belongs to buttercup family (*Ranunculaceae*) and contains highly toxic compounds, predominantly aconitine. This phytochemical is present in its stems, roots, tubers, and leaves (Vats and Kumar, 2024). Despite their ancient use in traditional medical systems, safety profile, therapeutic efficacy, chemical variability and standardisation of many *Aconitum* preparations remains to be explored.

History of *Aconitum*

In ancient India the plant is known as Vatsanabha (Sanskrit), it was historically used more as a weapon than as a cure. In ancient Indian warfare, arrows were immersed in plant's venomous extract. The Charaka Samhita

and the Sushruta Samhita documented this plant, their descriptions are characterized by distinct caution rather than liberal or routine recommendation. It was categorized under "Upavisha" semi-poisonous herbs that could kill or cure depending on the usage.

The name *Aconitum* is believed to be derived from Greek word "*Akonitos*," meaning "without struggle," possibly referring to its rapid, severe effect associated with poisonous properties. The toxic nature of the plant is due to presence of alkaloids. The other alternative for its name may be attributed to certain etymology derives of Greek roots "ak" (sharp or pointed) and "konos" (cone), referring to acuminate morphology of plant's foliage.

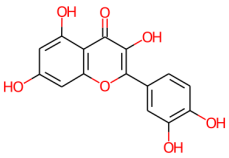
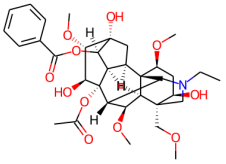
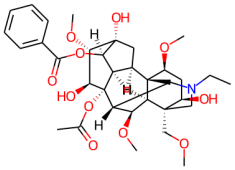
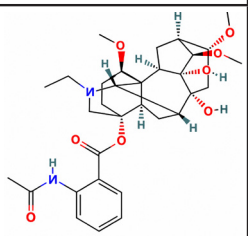
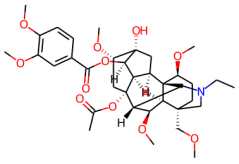
The name *Aconitum* is believed to be derived from Greek word "Akonitos," meaning "without struggle," possibly referring to its rapid, severe effect associated with poisonous properties.

According to Greek mythology, the origin of Aconitum is connected to the place called Acona and the nearby Hill of Akonitos, where the plant was believed to have been discovered. According to legend, when Heracles (Hercules) dragged the three-headed hound Cerberus from underworld, the creature's foaming saliva dripped onto the surrounding vegetation at this site, and it is said to have rendered the plant permanently toxic. Historical interpretations also associate *Aconitum* with poisoning in ancient Rome. It has been referred that the Roman Emperor Claudius was poisoned with *Aconitum* during the reign of Nero. The Roman poet Ovid indicated Aconitum in his works, associating the plant with poisonous practices of a stepmother (Kakkar et al, 2023).

Aconitum : Bioactive compounds, usefulness and detoxification prospects

Aconitum species contain bioactive diterpenoid alkaloids, including aconitine, mesaconitine, and hypaconitine. These diester-diterpenoid alkaloids are responsible for much of the potent pharmacological activity and acute toxicity. Traditional processing methods, including prolonged boiling, steaming, soaking, and other heat-based procedures, can hydrolyse these compounds, transforming them into less toxic monoester-diterpenoid alkaloids, such as benzoylaconine, benzoylmesaconine, and benzoylhypaconine. Further hydrolysis may produce aminoalcohol-type alkaloids, including aconine, mesaconine, and hypaconine. However, these processing reduce toxicity rather than necessarily eliminating the property. The effectiveness of detoxification depends on *Aconitum* species, plant part, alkaloid composition, processing method, temperature, duration, and other conditions. Inadequately processed or improperly prepared aconite material may cause cardiotoxic, neurotoxic, and potentially fatal effects. The selected *Aconitum* species like *Aconitum heterophyllum*, *Aconitum napellus*, *Aconitum chasmanthum Stapf ex Holmes*, *Aconitum laeve Royle* and *Aconitum violaceum Jacquem* used in traditional medicine were examined (Table 1). These plants were found with reported therapeutic applications and specific plant parts used in scientific reports were enlisted. The reported medicinal properties refer their usage for wellbeing. Some of these phytochemicals may be valuable tool for control of pests and protect environment. Inorder to harness medicinal properties, certain detoxification process were adhered. Centuries of traditional practice, including Chinese preparation of fuzi and the Ayurvedic Vatsanabha shodhana process (Detoxification), indicate that therapeutic or toxic effects of *Aconitum* depend not only on its natural chemical composition but on processing method, dosage, and plant part used. In the traditional medicine context, indigenous healers possess deep knowledge of these herbal practices. Knowledge holders appropriately follow cultivation, harvesting of herbs without disturbing its habitat maintaining community ethics. They sustain inherent knowledge and detailed documentation of preparation method like paste or decoction, dosage are critical. Adverse outcomes emerge due to prolong use, excessive administration and expert guidance is necessary. The effectiveness of drugs may be reduced by changes in their metabolism as well. The interaction of herbal medicine with drugs, herbal ingredients influence metabolic pathways have to be recognized as well. Thus, the pharmaceutical chemistry had evolved by understanding

Table 1: Selected Aconitum species with their medicinal and pharmacological properties

SNo.	Scientific Name	Common Name	Plant part used	Phytochemical*	Medicinal properties	Pharmacological activities
1.	Aconitum hetero-phyllum	Atees, Atis	Tuberous root	 Atisine	Disorders related to digestion, fever, vomiting, cough, worm infestation, diarrhoea, and pe-diatric conditions	Antidiarrheal, antipyretic, anti-inflammatory, an-timicrobial, antioxidant, and digestive (Aggarwal & Aggarwal, 2026)
2.	Aconitum napellus	Monkshood	Root	 Quercetin	Facial paralysis, musculoskeletal pain, inflammation, gout, pyrexia, peri-carditis for sciatica, and rheumatism.	Antipyretic, antidiabetic, antioxidant, and neuropro-tective (Yeshi & Wangchuk, 2023)
3.	Aconitum chasman-thum Stapf ex Holmes	Vatsan-abha	Rhizomes	 Aconitine	In treatment of pain, inflamma-tion, abscess and boils, fever, cough, asthma and snake bitesheart disease and as an appetizer, treat tonsillitis and cold	Antifungal, insecticidal and antibacterial, antirheumatic properties, antidiarrhoeal, anodyne, anti-inflammato-ry, antidiabetic, neurasthen-ic, astringent, antioxidant (Rafiq et al., 2022)
4.	Aconitum laeve Royle	Grape-leaf Monkshood	Root	 Lappaconitine	Treatment of rheu-matism, neuralgia and sciatica, fever and general body pain	Neuroprotective activity against Alzheimer's disease, anti-inflammatory, antioxi-dant, tyrosinase inhibition, and analgesic properties. (Shaheen et al., 2005)
5.	Aconitum viola-ceum Jacquem	Violet monkshood	Roots and tubers	 Bikhaconitine	To treat respiratory issues, nerve pain, rheumatism, heart ailments, digestive disorders, fever, and venomous bites.	Analgesic, anti-inflammato-ry, neuroprotective, anti-oxidant, antimicrobial, and anti-proliferative activities used to treat respiratory, cardiovascular, neurologi-cal, digestive, and cancerous conditions (Safdar & Bibi, 2020)

** Indian Medicinal Plants, Phytochemistry and Therapeutics [IMPPAT], 2026 The Institute of Mathematical Sciences (IMSc), Chennai https://cb.imsc.res.in/imppat/*

transformative potential of traditional medicine. These activities led to development of new therapeutic methods.

Conclusion

The plant species *Aconitum heterophyllum*, *Aconitum napellus*, and *Aconitum violaceum* were studied for analgesic, anti-inflammatory, antipyretic, antioxidant, and neuroprotective properties. Across various culture *Aconitum* represents a remarkable paradox as it has been regarded as one of the world's most poisonous plant genera and valued as a therapeutic resource in different pharmacopoeia, scientific reports. This arises from its bioactive alkaloids, particularly aconitine, which contribute to both toxic potential and medicinal properties. The study reiterate clinical testing, regulatory requirements of herbal medicine for ensuring safe usage.

In this respect, recognizing outstanding knowledge holders and documenting their practices is a valuable exercise in the value chain for sustaining, scaling indigenous medicinal system. ■

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Dr. Hiral Gadhavi, Research Associate-I is associated with VARD & IPM – Human Health & Veterinary Division at NIF-India. She holds a PhD in Botany from Gujarat University, Ahmedabad.
Email:hiralg@nifindia.org

Dr. R K Ravikumar is Scientist 'F' at National Innovation Foundation – India. He holds doctorate degree from the Indian Veterinary Research Institute [IVRI] and is recipient of NASI – Platinum Jubilee Award in Biological Sciences, 2022. Dr. Ravikumar leads Value Addition Research and Development & Intellectual Property Management (VARD & IPM) - Human Health & Veterinary Division.
Email: ravikumar@nifindia.org

Celebrating Young Innovators: A Report on the 12th NLEPC under INSPIRE-MANAK

The 12th National Level Exhibition and Project Competition (NLEPC) and Winners' Felicitation Ceremony under the INSPIRE-MANAK (Million Minds Augmenting National Aspiration and Knowledge) scheme were organised by the National Innovation Foundation (NIF)-India and the Department of Science and Technology (DST), Government of India at Bharat Mandapam, New Delhi, from 12th to 14th October 2026. The three-day national event brought together 792 school students selected from 33 States and Union Territories to present original science and technology based innovations addressing everyday societal challenges.



Prof. Umesh V. Waghmare, Secretary, DST, in the esteemed presence of Dr. Anil Sahasrabuddhe, Chairperson, NIF, Dr. Arvind Ranade, Director NIF, inaugurating the 12th INSPIRE-MANAK National Level Exhibition and Project Competition (NLEPC) 2026 at Bharat Mandapam, New Delhi.

About INSPIRE-MANAK

The INSPIRE-MANAK scheme is one of the flagship schemes of DST, implemented by NIF, an autonomous institute of DST. It encourages students of classes VI to XII to develop original ideas rooted in science and societal applications, thereby fostering scientific temper, creativity, problem-solving ability, and interest in science and technology careers. The initiative is aligned with the Start-up India vision and seeks to build a strong human-resource base for expanding India's research and innovation ecosystem.



Prof. Umesh V. Waghmare, Dr. Anil Sahasrabuddhe, Dr. Arvind Ranade, and other dignitaries interacting with participants

Day One: Inauguration and Showcase of Young Innovators

The event was inaugurated on the first day, 12th October 2026, by Prof. Umesh V. Waghmare, Secretary, DST, in the presence



Dr. Jitendra Singh, Hon'ble Union Minister of State (Independent Charge), Ministry of Science & Technology, felicitating the winners of the 12th NLEPC under INSPIRE–MANAK on 14th October 2026 at Bharat Mandapam, New Delhi.

of Prof. Anil D. Sahasrabudhe, Chairperson, NIF-India, Dr. Umesh Kumar Sharma, Head, Science and Technology Capacity Building Division, DST, and Dr. Arvind C. Ranade, Director, NIF-India, along with senior officials, teachers, mentors, and other stakeholders. The inauguration marked the beginning of the national exhibition, providing the selected students with an opportunity to display their projects and prototypes before experts, mentors, officials, and fellow innovators. The participants had been selected during the financial years 2023-24 and 2024-25, following their successful participation in district- and state-level Exhibition and Project Competitions.

The exhibition reflected remarkable geographical and social diversity, with participants representing regions ranging from the Andaman and Nicobar Islands to Jammu & Kashmir and from Mizoram to Gujarat. The projects covered priority areas such as agriculture, healthcare, environmental protection, accessibility, energy, water conservation, safety, and technologies to improve the daily lives of the elderly. The innovations on display demonstrated the ability of school students to identify local problems and develop practical, affordable, and socially relevant solutions.

Day Two: Exhibition and Visitor Interaction

The second day of the event, on 13th October 2026, continued the national exhibition, with the participating students presenting their projects and prototypes at their respective stalls. The day provided an extended opportunity for students to explain the objectives, working principles, social relevance, and potential applications of their innovations to a wider audience. School students, teachers, officials, mentors, and other visitors toured the exhibition stalls throughout the day. The interactions enabled the young innovators to receive feedback, answer questions, and understand how their ideas



Unveiling the compendium of the 12th INSPIRE-MANAK National Level Exhibition and Project Competition (NLEPC) on October 14, 2026, at Bharat Mandapam.



Dr. Jitendra Singh addressing students and delegates during the 12th NLEPC under INSPIRE–MANAK on 14 October 2026 at Bharat Mandapam, New Delhi.

were perceived by different users and stakeholders. This exposure helped students gain confidence and view their innovations from practical and user-oriented perspectives.

Over the two days of the exhibition, about 120 jury members, working in teams, visited each stall to understand the work done by the students. They awarded marks to the projects and, at the end, deliberated to decide the top projects for recognition.

Day Three: Recognition and Future Direction

The programme concluded on 14th October 2026 with the felicitation of 62 young innovators by Dr. Jitendra Singh, Union Minister of State (Independent Charge) for Science and Technology and Earth Sciences. The ceremony was attended by Prof. Waghmare, Prof. Sahasrabudhe, Dr. Sharma, and Dr. Ranade, along with senior officials, teachers, mentors, and other stakeholders. The INSPIRE-MANAK 2026 Compendium was also released on the occasion.

Among the winners, the first prize was won by Shradhha R Londhe (Maharashtra) for her 'AI based teaching assistant for visually challenged', the second prize was won by Purav Jain (Jharkhand) for 'Mini electricity consumption meter' and jointly the third prize was won by Saikrishna EK (Kerala) for 'Smart underwater boat alarm system' and Krishna Agarwal (Chhattisgarh) for her project, 'Flip electric iron for child safety'.

Addressing the young innovators, Dr. Jitendra Singh stated that school students are increasingly translating their ideas into marketable products and entrepreneurial ventures. He added that many projects



Dr. Jitendra Singh with all the annual INSPIRE-MANAK winners



INSPIRE-MANAK winners

demonstrated how scientific curiosity, commitment, and access to opportunities can transform ideas into practical outcomes. He emphasised that promising innovations should not remain confined to exhibitions or working models. He called for stronger industry partnerships, business-to-business interactions, early market feedback, and sustained mentorship to help student innovators improve their products, respond to market requirements, and explore commercial opportunities.

Programme Reach and Inclusivity

INSPIRE-MANAK has emerged as one of India's most inclusive school-level innovation programmes. The scheme received 8.54 lakh applications during 2023-24 and 10.13 lakh during 2024-25 from all States and Union Territories. The programme drew participation from 99 per cent of the country's districts, with 53 per cent representation from girls and 47 per cent from boys, reflecting its strong focus on gender inclusion and geographical equity.

A total of 46,926 students in 2023-24 and 50,009 students in 2024-25 were selected for financial support of Rs 10,000 each to develop prototypes. Following district-level and state-level competitions, 792 students progressed to the 12th NLEPC, representing some of the country's most promising young scientific talent.

Significance and Key Messages

The 12th NLEPC highlighted the importance of connecting school-level creativity with India's expanding start-up and technology ecosystem. The Union Minister noted that the number of start-ups in India has grown from around 350–400 in 2014 to approximately 2.5 lakh, nearly 60 per cent of which are located in Tier-II and Tier-III cities, indicating that innovation opportunities are becoming more widely distributed across the country.

The event also underscored the role of parents, teachers, and mentors in creating an environment where children feel encouraged to experiment, question established approaches, and learn from failure. Dr. Jitendra Singh proposed that future editions of the programme include a dedicated session where each participating student is accompanied by at least one parent or guardian, so families can better understand and support their children's innovative work.

The Minister further encouraged students to continue questioning, experimenting, and learning rather than becoming complacent after an achievement. He advised young innovators to explore their interests, seek appropriate guidance, and continuously improve their ideas through practical experience. ■



Students are interacting with participants of 12th INSPIRE-MANAK National Level Exhibition and Project Competition (NLEPC) 2026 at Bharat Mandapam, New Delhi.

Innovation Yatra: A Tool for Identifying Unsung Heroes

Rajiv Mili, Garima, Dipti, R. Lalbikzuala, Dipjyoti Choudhury, and Navneet Kumar

In order to identify the grassroots innovations, National Innovation Foundation–India (NIF–India) conducted Innovation Yatra 2026 across six states in two regional programs: Assam, Mizoram and Meghalaya from 23 September to 8 October 2026, and Uttar Pradesh, Madhya Pradesh and Rajasthan from 23 September to 7 October 2026. The initiative aimed to scout, document and promote grassroots technological innovations and outstanding traditional knowledge practices while strengthening collaboration among grassroots innovators, farmers, educational institutions, government agencies and community organisations. The program integrated field visits, community interactions, institutional engagements, technology demonstrations, student idea competitions and Farmer Field School activities to identify locally relevant innovations, document traditional practices, address practical community needs and explore opportunities for appropriate validation, recognition and dissemination.



Farmers are important stakeholders in the grassroots innovation ecosystem: Reflection of a farmer meeting in Mainpuri, Uttar Pradesh

Geographical coverage and participation

The Yatra engaged communities across six states, covering

Table 1. State-wise geographical coverage and reported participant numbers during Innovation Yatra 2026 across six Indian states

State	Districts Covered	Reported Participants
Uttar Pradesh	Mathura, Etah, Mainpuri, Jhansi, Jalaun, Banda, Chitrakoot, Mahoba and Noida	430
Rajasthan	Dholpur, Bharatpur and Alwar	320
Madhya Pradesh	Satna, Chhatarpur and Tikamgarh	178
Assam	Nagaon, Dima Hasao, Hailakandi and Sribhumi	246
Mizoram	Aizawl, Mamit, Serchhip, Lunglei, Champhai, Saitual and Kolasib	381
Meghalaya	West Jaintia Hills, East Jaintia Hills and Ri-Bhoi	152
Cross-location field discussion	Innovator's premises near Lunglei, Hnahthial districts in Mizoram and Sribhumi district in Assam	58

30 districts of Uttar Pradesh, Madhya Pradesh, Rajasthan, Assam, Mizoram and Meghalaya respectively in the span of 15 days. The reports recorded 928 participant instances in the three northern and central Indian states and 837 in the Northeast, giving a combined reported total of 1,765 participants in the more than 30 meetings organised with various stakeholders (Table 1). Participants included grassroots innovators, farmers, women's Self-Help Groups (SHGs), traditional knowledge holders,



Women shelf help group at Larnai village symbolizing self-sustaining through black pottery industry, Larnai, West Jaintia Hills, Meghalaya.

students, entrepreneurs, local organisations and institutional representatives.

Women's participation was significant. Approximately 178 women farmers and SHG members attended meetings in Uttar Pradesh, Madhya Pradesh and Rajasthan, while 75 women farmers participated in the Jorbil village in Meghalaya. Approximately 280 students participated in idea competitions in the three northern and central Indian states, generating around 80 ideas.

Institutional and community engagement

The Yatra engaged universities, colleges, technical institutions, government departments and agricultural extension organisations. Key institutions included Mizoram University, the Mizoram Science, Technology and Innovation Council, Mizoram, The University of Science and Technology Meghalaya, ADP College, Assam, Srikishan Sarda College, Assam in Northeast Indian states and Krishi Vigyan Kendras at Chitrakoot, Uttar Pradesh and Bharatpur, Rajasthan, the College of Agriculture, Bharatpur, Rajasthan and Industrial Training Institutes in Uttar Pradesh and Rajasthan. These interactions promoted awareness of NIF–India's initiatives and explored opportunities for institutional collaboration, innovation assessment, technology dissemination and student engagement.



Mainstreaming traditional knowledge Scouting and documentation of TK practices at Mamit district, Mizoram



Idea competition conducted at Jaluan, Uttar Pradesh

Innovation scouting and demonstrations

Field activities identified grassroots technologies addressing needs in agriculture, food processing, energy, fabrication, mobility and rural livelihoods. Examples included portable inverters, smokeless stoves, biofertilizers, vegetable and solar dryers, rice-grinding machines, tea-leaf processing equipment, arecanut polishing machines, paddy-husk stoves, fruit nippers, sugarcane bud chippers, head-load-reducing devices, adjustable walkers and shock-absorber crutches.

The Northeast team recorded 20 newly scouted innovations and ideas, in addition to 9 innovations have been documented in detailed from earlier scouting that are available at NIF-India's database. The Yatra recorded another 10 grassroots innovations and four agricultural varieties from North and central Indian region.

Demonstrations facilitated direct engagement with locally



Idea competition conducted at Jaluan, Uttar Pradesh

developed technologies and helped identify solutions warranting further technical assessment, validation, intellectual property protection where appropriate, and dissemination.

Traditional knowledge and farmer field schools

The Yatra documented 75 traditional knowledge related to human health, animal health, plant protection and agriculture in preliminary documentation. The Northeast recorded 20 provisional traditional knowledge entries 11 on veterinary health and nine for human health practices.

Further it has recorded 55 human-health and animal-health practices, five plant protection practices and five plant varieties from North and Central Indian region. These inventories require verification and reconciliation before final database entry. Reported traditional health practices should be treated as documented community knowledge, not as scientifically validated treatments.

Farmer Field School activities focused on crop-protection and animal-health concerns. Participants were introduced to locally available plant resources used in traditional practices, and demonstrations covered the preparation and application of herbal formulations. Field interactions also identified persistent skin ailments, lumpy skin disease and labour-intensive manual processing of agricultural produce as issues requiring appropriate technical or professional follow-up.

Conclusion

Innovation Yatra 2026 established a field-based platform for identifying grassroots technological innovations, documenting traditional knowledge and strengthening engagement among rural communities, innovators and institutions across six states. The reported 1,765 participant instances, student-generated ideas, women's participation and institutional interactions demonstrate the programme's outreach potential. However, participation and documentation figures alone do not establish technological effectiveness, adoption or socioeconomic impact. The need of the hour is to convert preliminary findings into verified, actionable outcomes through the following measures:

- **Verification and database consolidation** Reconcile the innovation and traditional knowledge inventories, verify dates and inventor details, remove duplicate entries, and finalise the records before integration into NIF–India's database.
- **Technical assessment of innovations** Screen documented technologies for originality, functionality, safety, affordability and relevance to identified community needs. Shortlist promising innovations for prototype improvement, field testing and further validation, as appropriate.
- **Agricultural technology demonstrations** Collaborate with the Krishi Vigyan Kendras at Chitrakoot and Bharatpur and other relevant agricultural institutions to assess technologies addressing labour-intensive crop processing and post-harvest operations, including green-gram processing and maize-seed removal in Madhya Pradesh.
- **Health and veterinary follow-up** Coordinate with qualified health and veterinary institutions to assess reported skin ailments and animal-health concerns, including lumpy skin disease. Any investigation of traditional formulations should follow appropriate professional, ethical and regulatory procedures; documented practices must not be presented as validated treatments.
- **Protection of traditional knowledge and intellectual property** Obtain appropriate consent from knowledge holders, document remedies and preparation methods systematically, and assess

relevant conservation, confidentiality and intellectual property considerations before dissemination.

- **Institutional coordination and inventor support** Establish follow-up communication with participating universities, technical institutions, KVKs, government agencies and community organisations. Assign responsibilities for promising cases and facilitate access to technical expertise, testing facilities and appropriate recognition mechanisms.
- **Documentation of unmet needs**
  The unmet needs identified during the yatra will be translated by providing the technological solution from NIF database.
- **Outcome monitoring** Maintain a follow-up register tracking verified records, innovations assessed, technologies tested, institutional collaborations, adoption and documented community benefits.

Finally, the Yatra's success should be measured not merely by the number of locations visited or entries recorded, but by the quality of documentation, the practical performance of identified innovations and demonstrable benefits to their intended users. A structured, evidence-based follow-up mechanism is essential to translate grassroots ingenuity into viable, inclusive and sustainable developmental outcomes.

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Dr. Rajiv Mili is a Principal Associate at the National Innovation Foundation – India. He holds a PhD in Botany and is associated with the Scouting, Documentation, and Database Management (SDDM) Department. Email: rajivmili@nifindia.org

Ms. Garima is Junior Fellow at the National Innovation Foundation – India. She holds Master Degree in Applied Medicinal Plant Science and associated with Scouting, Documentation and Database Management (SDDM) Department.
Email: garimav@nifindia.org

Ms. Dipti Jaguri is Junior Fellow at the National Innovation Foundation – India. She holds Master Degree in Seed Science and Technology and associated with Dissemination and Social Diffusion Department (DSD). Email: deeptij@nifindia.org

Mr. Kitapungbe Pame is Junior Fellow at the National Innovation Foundation – India. He holds Master Degree in Agriculture and Rural Development and associated with Scouting, Documentation and Database Management (SDDM) Department.
Email: kitapungbep@nifindia.org

Mr. R. Lalbikzuala is Junior Associate at the National Innovation Foundation – India. He holds Mater Degree in Biotechnology and associated with Dissemination and Social Diffusion Department (DSD). Email: bika@nifindia.org

Er. Dipjyoti Choudhury is Junior Associate at the National Innovation Foundation – India. He holds bachelor degree in Mechanical engineering and MBA and is associated with Value Addition Research and Development Department (VARD).
Email: dipjyotic@nifindia.org

Dr. Navneet Kumar is Principal Associate at the National Innovation Foundation – India. He holds M.Sc and Ph.D. degrees in Genetics and Plant Breeding and Ph.d and is associated with and associated with Dissemination and Social Diffusion Department (DSD). Email: navnetkr@nifindia.org

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Innovation Yatra

राष्ट्रीय नवप्रवर्तन प्रतिष्ठान – भारत
विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार का स्वायत्तशासी संस्थान
National Innovation Foundation - India
Autonomous Institute of the Department of Science & Technology, Govt. of India

National Innovation Foundation - India
Headquarters : Grambharti, Amrapur, Gandhinagar - Mahudi Road, Gandhinagar, Gujarat, India - 382650
Camp Offices : Bhubaneswar (Odisha), Guwahati (Assam), Jammu & Kashmir (Srinagar), NOIDA (Uttar Pradesh).
Phone: NIF Headquarters, Gandhinagar - 02764-261131, 32, 34, 35, 36, 38, 39 | Email: publication@nifindia.org
Website: www.nif.org.in