

WEST BENGAL INNOVATES



National Innovation Foundation



WEST BENGAL INNOVATES



National Innovation Foundation

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HONEY BEE NETWORK

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Regional Collaborators
Jharkhand Sahasra Shiksha
DRDC, Kishan
OD, Kishan

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PREFACE

National Innovation Foundation has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. We have not been equally successful in scouting and documenting innovations and traditional knowledge practices in every state.

Thanks to the support of volunteers of Honey Bee network, we have been able to discover many unsung heroes and heroines of our society who have solved local problems without any outside help.

Despite various constraints, NIF has put together a small book celebrating creativity, innovations and traditional knowledge from West Bengal. I am conscious of its limitation in terms of coverage and outreach. But if we could uncover so many examples of the ability of local communities and individuals to solve problems on their own without outside help, how

much more can be done if state and private sector agencies join hands with NIF actively.

I invite the state government and its various organs to actively support our quest to uncover many more creative communities and individuals in rural and urban areas. NIF will then help in building value chain around them.

The book is divided in three parts. The mechanical innovations developed by innovators from West Bengal are covered in part one. Selected examples of herbal traditional knowledge are given in part two. The innovations from other parts of the country suitable for the development of West Bengal are given in part three.

By no stretch of imagination, could we claim that we have achieved a great deal. We have merely made a simple point. There are a large number of knowledge rich people who

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may not have been educated much, may in fact be economically poor also, but still have the ability to solve a few problems so well.

The challenge really is to work out a synergy so that no creative voice remains unheard, and no solution remains localized and unrecognized. By adapting public policy in support of grassroots innovators and traditional knowledge holders, we can make economic development process more inclusive and sustainable.

This book on innovations has been compiled at the request of Dr. Vijay Kelkar, Chairman, Finance Commission and Member, Governing Council of the National Innovation Foundation as a tribute to the creativity and innovation at grassroots. This presentation is part of a series of innovation compendium prepared for each State of India. We hope this will be followed up in the form of concrete policy and

institutional initiatives in each State to empower creative people to improve the quality of life of common people and thus promote inclusive growth.

It is my belief that such examples will act as spur for other State government departments to look for creative efforts of their staff and users at ground level. I hope that NIF will have the opportunity to work closely with the State government in future and expand knowledge base, add value to selected technologies and help them diffuse through commercial and non-commercial social channels for improving the livelihood of the majority of the people.



R. A. Mashelkar, FRS
Chairperson, Governing Council
National Innovation Foundation, Ahmedabad
mashelkar@nifindia.org

Building a Bridge with Grassroots Innovators in Informal Sector

To make Indian development process more inclusive, there is no escape from building upon creative and innovative experiments pursued by common people at village or semi-urban level. Many of these experiments lead to development of innovations, which can improve productivity and generate employment. However, the purpose of a particular innovator may often be to solve his problem. There is no mechanism available for him to share the knowledge, innovation or practice with other people in different regions. Sometimes, ideas and innovations get diffused through word of mouth. But many times, these ideas remain localized. In the process, potential growth and social development gets constrained. To overcome this constraint, Honey Bee Network with a handful of volunteers triggered a movement, twenty years ago to scout, spawn and sustain the unaided innovations and outstanding traditional knowledge from the informal sector of our country.

Drawing upon this experience, NIF (National Innovation Foundation) was set up in 2000 with the help of Department of

Science and Technology, Government of India to scale up the idea of learning from grassroots innovators.

Under the inspiring leadership of Dr. R. A. Mashelkar, Chairperson NIF and former Director General, Council of Scientific and Industrial Research (CSIR), NIF has taken major initiatives to serve the knowledge-rich, economically poor people of the country. It is committed to make India innovative by documenting, adding value, protecting the intellectual property rights of the contemporary unaided technological innovators, as well as of outstanding traditional knowledge holders. It aims at promoting lateral learning among local communities to generate low cost affordable solutions of the persistent and emerging problems, and enhance the diffusion of innovations on a commercial as well as non-commercial basis.

How does NIF work?

Primarily, NIF has five functions: (a) Scouting and documentation, (b) Value addition and research and

¹ The Honeybee collects pollen from the flowers but they are not impoverished, in the process links one flower to another enabling cross-pollination. Similarly, the Honey Bee Network strengthens people-to-people contacts, learning and networking by pooling the solutions developed by individuals across the world

in different sectors. The network acknowledges the innovators, traditional knowledge producers and communicators so that they do not remain anonymous.

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development; (c) Business development and Micro Venture, (d) Intellectual Property Rights protection and (e) Dissemination, database development and IT applications.

NIF has been entrusted with the responsibility of building a National Register of Grassroots Innovations and Traditional Knowledge. It is not enough to document or disseminate the innovations or outstanding traditional knowledge. Value addition is very important for harnessing the full potential of the idea. NIF has entered into MOU with CSIR and Indian Council of Medical Research (ICMR) besides other organizations. CSIR has allocated funds to support research on grassroots innovations in CSIR labs. Similarly, ICMR supports research on such herbal healing knowledge, which has not been documented in the classical texts and formal institutional literature. NIF also helps in generating a very large pool of open source / public domain technologies. A small number of innovations are also protected by patents and other IPRs.

The Honey Bee Network strongly believes in sharing knowledge among the providers of innovations in their own language, which is achieved by publishing local language versions of Honey Bee newsletter. It also ensures that a fair

For most innovators, attracting risk capital for converting innovations into enterprise is very difficult. They neither can offer much collateral nor are they able to develop business plan or deal with formal R&D system.

A Micro Venture Innovation Fund (MVIF) has been set up with the help of SIDBI to provide risk capital for technologies at different stages of incubation. Under single signature, innovators are trusted and investments are made to help them commercialise their innovations. Most innovators do not make good entrepreneurs. For entrepreneurship, one has to make consistent batch by batch production of products. Innovators are often incorrigible improvisers. They seldom make two things alike. NIF has helped such innovators to license their technologies to third party entrepreneurs. Most of the licenses have been given to small entrepreneurs and in a few cases, to medium enterprises.

A very elaborate benefit sharing system has been developed, governed by the Prior Informed Consent (PIC) of the knowledge

share of benefits arising from commercial exploitation of local knowledge and innovations reaches the innovators and knowledge providers.

providers. Attempt is made to share benefits not only with the innovators but also with their communities and for nature conservation. In addition, a small part is kept for contingency support to needy innovators, for R&D stakeholders, promoting women's innovations and meeting overhead costs.

It is remarkable that grassroots innovations are generating global demand, as evident from inquiries from around fifty-five countries for various technologies, NIF has succeeded in commercializing products across countries in six continents apart from being successful in materialising thirty cases of technology licensing with the help of partner agencies.

What has it done?

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1,00,000 ideas, innovations and traditional knowledge practices from over 500 districts of the country.

NIF has filed 182 patents in India and seven in US and one PCT application. Out of these, 33 patents have been granted to grassroots innovations in India and four in US. NIF has funded 113 projects under MVIF to the extent of Rs.1.3 crores. Hundreds

of technologies have diffused through farmer to farmer social network.

NIF has proved that Indian innovators can match anyone in the world when it comes to solving problems creatively. Where they perform better than rest is in generating more affordable sustainable solutions by using local resources frugally.

Those who see poor only as the consumer of cheap goods, miss the knowledge richness at the grassroots level. The Poor can be the Providers also.

The Grassroots to Global (G2G) model that NIF is propagating is all set to change the way the world looks at the creativity and innovations at grassroots.

How can state government join hands with NIF?

- a. NIF has no field extension unit nor does it want to have one. However, state government has several field functionaries in the field of agriculture, education, industry, rural development, women and child care, forestry, etc. There can be a very fruitful partnership between NIF as a source of innovative ideas and technologies and state

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- government as partner in dissemination, value addition and even commercialization through incentives, promotion, subsidies, etc.
 - b. State government can join the national campaign for scouting innovations and traditional knowledge and motivate its grassroots functionaries to join hands with NIF in uncovering the talent at the community level.
 - c. Students in schools and colleges can be motivated to scout creative and innovative people in their neighbourhoods and send the entries to NIF (Post Box No.15051, Ambavadi, Ahmedabad 380 015, campaign@nifindia.org). Examples of innovations can also be included in the curriculum of the school children.
 - d. Demonstrations and trials can be organized at various regional research stations, KV/Ks (Krishi Vigyan Kendras) so as to create awareness about the creative potential of common people.
 - e. The research institutions can be mandated to add value to the knowledge of innovative people and help in protecting their knowledge rights.
 - f. On the state's website, link to NIF can be given and the innovations from the region can be displayed to put forward the creative face of the state before the people.
 - g. Some of the innovative people identified by NIF and/or state government could be awarded at district and state level besides giving them support for further work.
 - h. A nodal officer could be appointed to keep a dynamic touch with NIF to ensure that all the areas of possible cooperation are explored.
- I hope that NIF would be able to develop a functional, fruitful and fulfilling relationship with the government of West Bengal state. Tremendously rich knowledge of biodiversity, minerals and environment can be leveraged through the proposed association.



Anil K Gupta
Executive Vice Chairperson, NIF, Ahmedabad
Professor, Indian Institute of Management,
Ahmedabad
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“Innovation opens up new vistas of knowledge and new dimensions to our imagination to make everyday life more meaningful and richer in depth and content” .

- Dr. A.P.J. Abdul Kalam



“The purpose of innovation is to create a new value for an individual, team, organization or for society at large” .

- Dr. R.A. Mashelkar

PART I

INNOVATIONS from WEST BENGAL

This section contains grassroots innovations emerging from the rural/urban areas of West Bengal





Nitai Das Gupta
Murshidabad

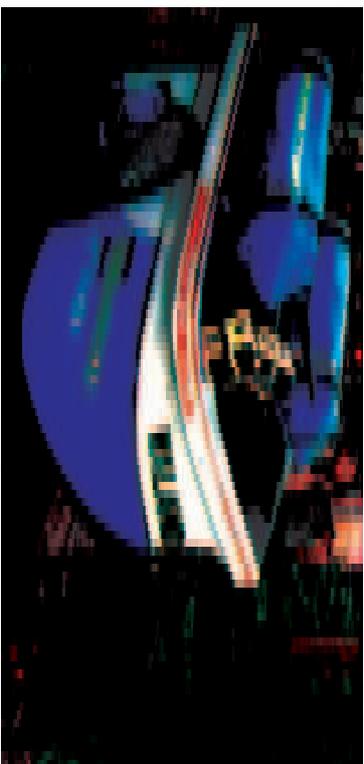
A Life Dedicated to Innovations

Waland- Amphibious Cycle Rickshaw

This boat shaped rickshaw, which can accommodate four persons, was developed by the innovator in 1954. The direction of this rickshaw is controlled by a handle attached to the front wheel. The speed in water and on land is estimated to be 8 km/hr and 30 km/hr respectively.

5-Gear Bicycle

This innovative bicycle having five gears was developed by the innovator in 1958. Two persons can ride this bicycle. Of the five gears, two gears were specially incorporated to enable a comfortable ride on hilly terrains.



Motor Cycle Driven Ambulance

Transport of the sick and injured persons to health facilities in rural areas is a major concern due to the lack of motorised ambulances. Methods currently used such as carrying on a crude stretcher or in wheel barrows or carts, are slow and uncomfortable, leading to unnecessary delays and discomfort of the patients.

To address these problems, the innovator came up with a motorcycle driven ambulance way back in the seventies. The ambulance, which has all facilities of a conventional one, can be easily detached from the motorcycle.

Four Wheeler Vehicle Driven By Four Persons

The innovator developed this vehicle in 1997 when he was requested to come up with a special manual vehicle that can carry four persons, for a road show in south India. The vehicle consists of four wheels and two frames and has eight non-changeable gears. The steering and a brake, which applies to all four wheels simultaneously, are provided in front to the driver on the left.





Mrinal Kantil Bandopadhyay*
Kolkata

* Though awarded in NIF's Second National Competition in 2002, the innovator is a professional as per the present rules of NIF, which were redefined 2003 onwards to specifically focus on innovations from the people of unorganised sector.

Energy Saving Battery Driven Motorcycle

Understanding the need to have battery powered vehicles to check the high pollution levels in cities, the innovator came up with such a motor bike almost a decade ago.

The motor bike uses two 12 volt, 75 ampere/hour lead acid batteries. It achieves a maximum speed of 40 km per hour under normal riding conditions. The innovative feature of the vehicle is that an aerodynamic fiber sheet is fitted to the handle bar of the motor cycle, which decreases the battery consumption when speed increases beyond 25 km/h. Other modifications, including redesigning the front portion, altering the size of chain-sprocket and the front wheel, have also been done by the innovator. He has also attached a display to indicate the status of battery consumption. This enables the rider to decide when to recharge the batteries or how far to go.



Pressure Type Kerosene Stove

After sustained efforts of many years, in the year 1993, the innovator was able to develop a superior stove, which had oil savings of 40-60 percent over the regular stove. The improved stove offered better combustion, enhanced safety and reduced operating noise.

According to the innovator, the stove has the potential to save hundreds of tones of valuable fuel a year, which is surely impressive in a country that carries the reputation of being the world's least efficient energy user.



Usha Shankar Bhattacharya*
Kolkata

* Though awarded in NIF's First National Competition in 2001, the innovator is a professional as per the present rules of NIF, which were redefined 2003 onwards to specifically focus on innovations from the people of unorganised sector.



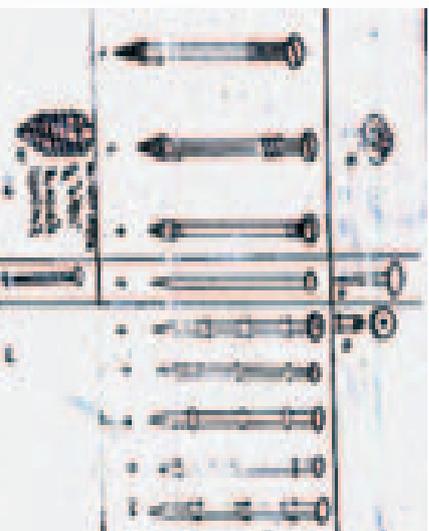
Mahabir Choubey
Purulia

Novel Screw Design

The innovation is a screw, which has combined the features of the conventional wooden screw (threaded conical front) and metal stud (constant pitch intermediate thread). The novel screw thus comprises a head portion provided integrally with the body portion. The screw is tapered at the tip and the remaining portion possesses constant diametrical threaded pitch like the conventional metal screw/stud.

This screw has an advantage of cutting its own threads when it is being screwed in for fastening purpose. Due to the use of Seller's /ACME type of threads, stress concentration becomes less and thus reduces subsequent failure (cracks) that occurs in the wood.

The screw does not become loose after some time, as it is broader at its tip and the cross sectional wedges around the screw (3-4) give it a better locking mechanism or grip. NIF, through its Micro Venture Innovation Fund, supported this innovation for commercialisation.



Cycle Operated Pump

This invention relates to a pedal water pump, which is particularly useful for pumping water from the canal for irrigation purposes and to draw water from wells, tube wells and reservoirs.

This novel pump is portable and can be taken and installed on site at will. The novel twin cylinder system with connecting rod/gear/flywheel arrangement ensures constant delivery of water without any dead stroke. There is constant steady output with lesser biomechanical load while using for longer time. This innovation makes it easier to pedal than pumping by hand especially for people with heart ailments, elderly, women and children.



Nasiruddin Gayen
South 24 Parganas



Dharridhara Mahato
Purulia

Pedal Operated Paddy Thresher

The innovator has come up with a pedal operated paddy thresher that is available at less than one-fifth of the cost of conventional paddy threshers, while delivering twice the output. Using this thresher, a person can thresh 1000-1200 kg of paddy in a day, which makes it quite efficient for village use.

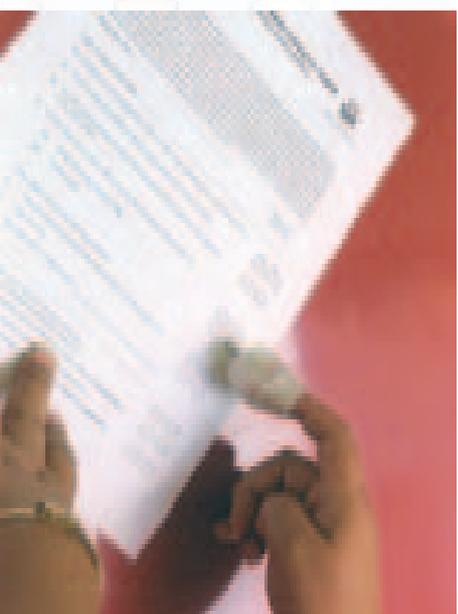


Single Finger Pen

This innovation is a very simple one. A small refill-based pen is attached to a ring worn on a single finger. This innovation could be useful for physically challenged people who do not have a thumb. It could also be useful for the normal people for ticking a sheet or just writing. NIF has supported the innovator from its Micro Venture Innovation Fund for test marketing.



Arindam Chattopadhyay
Bankura





Ranjit Ghorai
Bankura

Par-Boiled Paddy Distributor

Conventionally the spreading of par-boiled rice is done manually using a tray. The par-boiled paddy is very hot and labourers get burn and blisters many a time.

The innovator has developed a simple but very effective par-boiled paddy spreading machine. This machine can spread about 800 kg par-boiled paddy in five minutes. The machine is a trolley having a sluice gate kind of opening at the bottom where the size of the opening can be adjusted. While carrying the par-boiled rice to a different site for drying, the opening is kept closed.

It can also be used for spreading cow dung compost in the farm field, and there is no need of hiring any labour for this purpose.

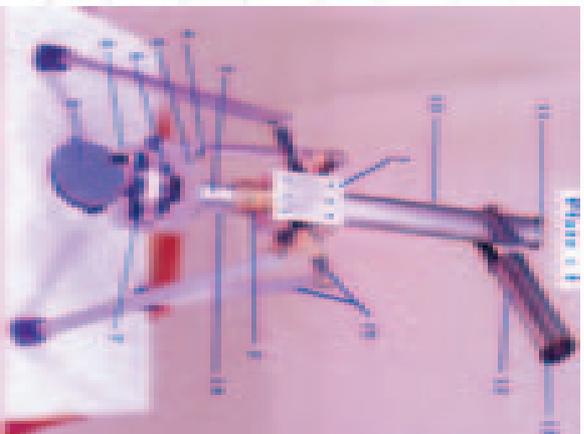


Mini Microscope

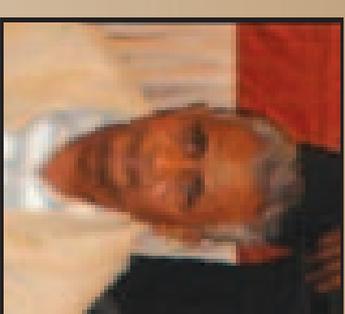
Many times students need to carry microscopes for field work. The conventional microscopes are bulky and tedious to carry.

To solve this problem, the innovator has come up with a handy lightweight microscope that looks just like a conventional microscope. It weighs only 250-500 gm (depending on material of frame) and has a magnifying capacity of 450 to 675X. It is very useful for fieldworkers who otherwise need to carry ordinary microscopes with them.

Apart from the microscope, the innovator has also developed a three-in-one fish reproductive chamber and multiple arc projector.



09



Chand Narayana Bairagya*
Burdwan

* Professional registered in NIF's Professional database. As per its mandate, NIF does not consider professionals for awards or financial support, but only helps in providing visibility or linkages.



Biswajeet Sutradhar
Purulia

PART I : INNOVATIONS FROM WEST BENGAL

Wooden Bicycle

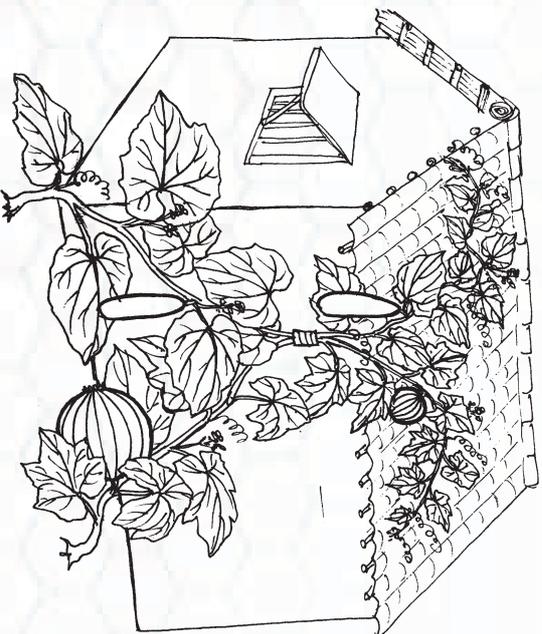
This innovation is a bicycle made entirely from wood. Great to look at and ride, this bicycle has a shining teak finish. The innovator has modified the chain and sprocket system slightly to suit his 'wooden' needs. He was scouted during the 20th Shodh Yatra in West Bengal.



Pumpkin-Bottlegourd Vine Fusion (a kind of air layering)

The innovator utilised the different timings of maturation of bottlegourd and pumpkin to increase his yield. He observed that pumpkin flowered a month earlier than the gourd. So when pumpkin needed more nutrients, it took from the gourd vine and vice versa.

He planted a bottle gourd and a pumpkin sapling closely and then fused them at one place. Due to this both plants started yielding more fruits.



Bijay Pramanik
Purulia



Arun Kumar Ram*
Howrah

* Professional working in a NGO. As per its mandate, NIF does not consider professionals for awards or financial support, but only helps in providing visibility or linkages.

Human Mask to Prevent Tiger Attacks

Tiger attacks on human is very common in the Sunderbans. Being a keen student of nature, Arun observed that the tiger seldom attacks from the front. He looked at several other prey—predator relationships and got further confirmation.

Having this understanding, he designed a human mask and tied it on the back side of the head. The thought was that the tiger would get the illusion that the back was actually the front side of the person and hence would not attack. The Forest Department liked the innovation and replicated it on a large scale without attributing any acknowledgement to Arun, the person from whom the idea originated. The result of the experiment was very positive and the number of cases of attack by the tiger came down drastically.

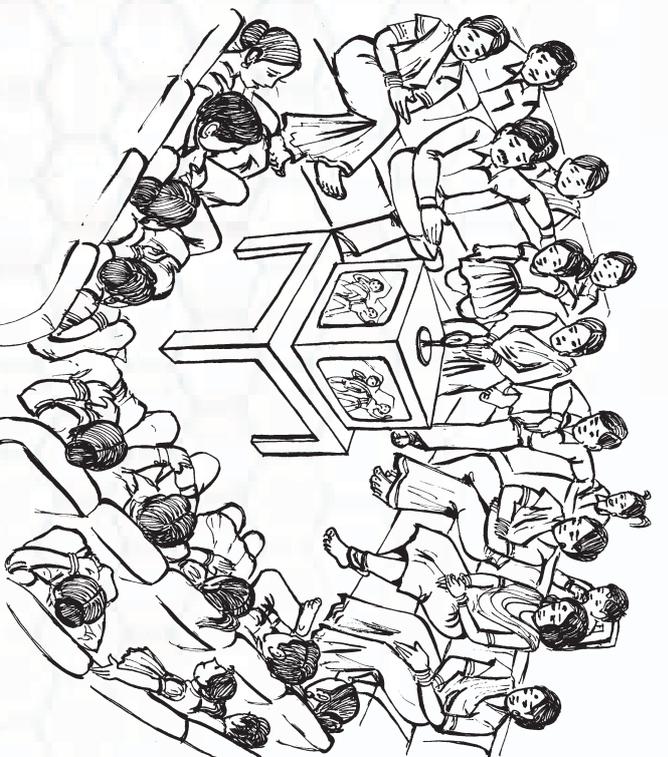
Arun, being quite humble, is happy and content that his innovation has saved so many lives.



Idea of a Four-sided Television

In most of the meetings in rural areas, people prefer to sit in a circle so that they can look at each other and at the same time, enjoy a bonfire in the winter or a folk theatre performance. At present, all modes of visual communication require people to sit behind each other and face other persons' backs.

The suggestion from Bappi was of a four-sided television, which would make it possible for people to sit in a circle and watch programme, while having frontal view of each other.



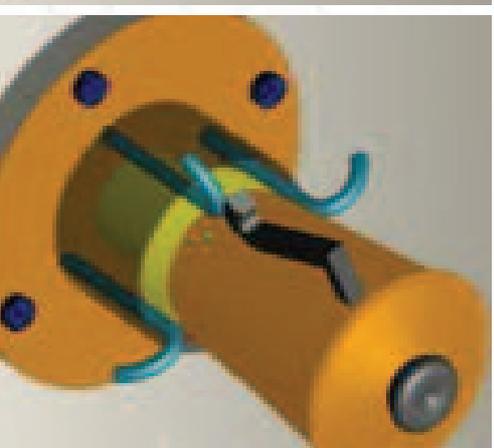
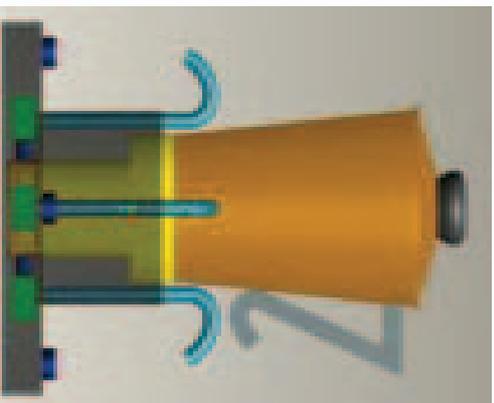
Bappi Roy
Bankura



Sukomal Basak
Cooch Behar

Self Dispensing Apparatus for Liquids

This innovation is a container and a dispenser that pours liquid as soon as a glass is kept below the dispenser. The main container with four dispensers (on four sides) is kept on a stainless steel base. Below each dispenser, on the platform, are four switches. These switches are connected to a valve, which gets open when the switch gets pressed due to the weight of the glass placed on it. As a result, the liquid from the main container flows out through the dispenser into the glass. The innovator was supported by NIF for product development.



Automatic Urinal Clearing System

In order to promote better sanitation in public lavatories, the innovator has designed a purely mechanical device for urinal cleaning. This system does not require electricity for running and is economical both in construction and operation. It utilizes a simple self-designed pump for operation resembling an injection system. Incorporation of a such a system will make the public services friendlier and hygienic for the people.



Pulak Pal
Murshidabad



Narayan Das Jethwani
Darjeeling

Temperature Regulated Fan Speed Control System

Many times at night the temperature lowers and one has to physically get up and reduce the fan speed, which is quite irritating. The innovator has come up with an electronic system that will automatically adjust the rotational speed of the room fan according to the room temperature enabling a person to sleep peacefully and comfortably.

Ajooba Tube Light Frame

This system is a tube-light frame with out any choke and starter. The product is capable of using even 80 percent fused tubes, which are considered as waste and thrown away. The power consumption is low and as there are no chokes or starters used, the overall cost is also quite less. Another interesting part of the system is that the luminosity of the tube can also be controlled.

Through its Micro Venture Innovation Fund, NIF has provided the innovator with working capital for commercialisation of his innovations.



Apparatus to Lift Surface Water from River

The apparatus comprises six aluminum hollow tubes attached to a rotatable wheel, which is mounted on a metallic stand. At the end of each tube a plastic funnel is attached. Due to the flow of the river water, the wheel along with the funnels starts rotating. Water, entering the funnel, passes through the tube to an outlet pipe. This water can be stored, purified and used for drinking purposes or can directly be used for irrigation.

This system offers a low cost, environment friendly solution for supplying potable water to riverside villages or for using water for irrigation or even industries.



Jaydeep Mandal*
Murshidabad

* Professional registered in NIF's Professional database. As per its mandate, NIF does not consider professionals for awards or financial support, but only helps in providing visibility or linkages.



20th Shodh Yatra

December 26, 2007- January 2, 2008

Patamda, East Singhbhum & Purulia to Bankura, West Bengal

Shodh Yatra is a journey on foot in the search of knowledge, creativity and innovations at grassroots.

It is an attempt on the part of SRISTI, a Honey Bee Network partner based at Ahmedabad and NIF along with other network partners to reach out to the remotest part of the country with a firm belief that hardships and challenges of natural surroundings are one of the prime motivators of creativity and innovations.

Shodh Yatra aims at unearthing such traditional knowledge and grassroots innovations that have not only simplified the lives of men, women and farm labourers but have also significantly contributed towards the conservation of bio-diversity.

The yatris, during the 20th Shodh Yatra, over the period of eight days, travelled through the rural areas honouring innovators, traditional knowledge holders, experimental farmers and centenarians on the way. Many biodiversity and recipe contests were also organised at various places. The Shodh Yatra saw the participation of people from all walks of lives, scientists, students, innovators, farmers, journalists and traditional knowledge holders from India and abroad.

The Sixth National Biennial Competition for Green Grassroots Unaided Technological Innovations and Traditional Knowledge



Co-sponsors



Honey Bee Network



CSIR



SRISTI



The competition

The NIF, set up by Department of Science and Technology, GOI, seeks entries of unaided technological innovations and traditional knowledge developed by an individual or group comprising farmers, artisans, fishermen and women, slum dwellers, workshop mechanics, students, local communities etc., in managing natural and/or other resources. The innovations can be in machines, gadgets, implements, or processes for farm operations, household utility, transportation, energy conservation or generation, reduction in drudgery, creative use of biodiversity, development of plant varieties, generation of herbal remedies for human or animal health or developing new or any other low cost sustainable green technology related to various aspects of survival in urban and rural areas. Creative ideas for innovative technologies which have not yet been reduced to practice are also welcome. Communities developing People's Biodiversity Register (PBR) or People's Knowledge Register (PKR) are encouraged to register/link their knowledge base with the National Register at the NIF.

The awards

The best three innovations and traditional knowledge practices will be awarded Rs 1,00,000, Rs 50,000 and Rs 25,000 each in different categories. In addition, individuals and/or organizations that make extraordinary contributions in scouting grassroots innovations and traditional knowledge may also get awards worth Rs 50,000, 25,000 and 15,000 respectively besides recognition to many others. There will be several consolation prizes of Rs 10,000 each in different categories depending upon the number of entries and incremental inventiveness and potential social and environmental impact. Three most outstanding innovative ideas may be given prizes of Rs 50,000, 25,000 and 15,000 in addition to consolation prizes of Rs 5,000 each. There are special prizes for innovations by or dealing with, physically challenged people. The

innovations/ideas of professionally trained persons are not considered for award or financial support. There are special awards for journalists writing about grassroots innovations and/or traditional knowledge and creating greater awareness about NIF's missions. *The award money may be revised in due course.*

Students

Young inventors and innovators are invited to send their ideas or innovations for a special category of awards for them. These should be unsupervised, an outcome of their own creativity, without any support from their teachers or outsiders. There will be prizes worth Rs 15,000, 10,000 and Rs 7,500 for the best three entries and several consolation prizes of Rs 5,000 each in this category.

How to participate

Individuals or groups may send as many entries as they wish on plain paper providing a) genesis of the innovation and traditional knowledge b) its background and c) educational qualification and occupation, accompanied by photographs and/or videos if possible and any other information that may help in replicating the innovations/traditional knowledge. Herbal entries may be accompanied by dried plant samples to enable proper identification procedure. **The Sixth National Competition started on February 1, 2007 and entries would be accepted till January 31, 2009.** Every entry should include the **full postal address** to facilitate further communications.

Where to send entries?

National Coordinator (Scouting & Documentation), National Innovation Foundation, Bungalow No. 1 Satellite Complex, Premchand Nagar Road, Ahmedabad 380015 Gujarat
Toll Free No 1800 233 5555 Fax: (079) - 2673 1903
email: campaign@nifindia.org; www.nifindia.org