National Innovation Foundation

Kerala Innovates

KERALA INNOVATES

National Innovation Foundation

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HONEY BEE NETWORK

Regional Collaborator
Peermade Development Society
Idukki

CONTENTS

KERALA INNOVATES

PREFACE

National Innovation Foundation (NIF) 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. Till date NIF has been able to scout innovations and traditional knowledge practices from over 520 districts across India.

Thanks to the support of volunteers from 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, innovation and traditional knowledge from Kerala. I am conscious of its limitation in terms of coverage and outreach. But if we could uncover at least a few 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 Kerala 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 Kerala 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 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 the 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 every 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
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Building a Bridge with Grassroots Innovators in Informal Sector

To make the 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 just his/her 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, National Innovation Foundation (NIF) 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.

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.

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 a 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

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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 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 (not all unique, not all distinctive) from over 520 districts of the country.

NIF has filed 198 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.

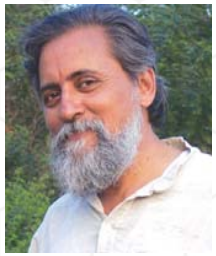
How can state government join hands with NIF?

a. NIF has no field extension unit nor does it want to have one. However, state government has several field functionaries in the area 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 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 for the school and college education.
d. Demonstrations and trials can be organized at various regional research stations and KVKs (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 in 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 State of Kerala. Tremendously rich knowledge of biodiversity and environment besides numerous grassroots innovations can be leveraged through the proposed collaboration.



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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 APJ Abdul Kalam

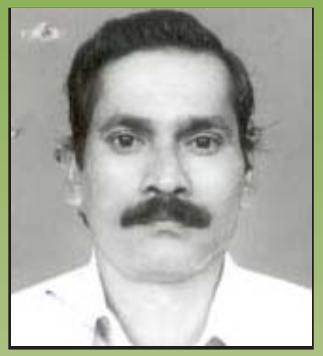
"The purpose of innovation is to create a new value for an individual, team, organization or for society at large".

- Dr RA Mashelkar

PART I

INNOVATIONS
from KERALA

This section contains grassroots innovations originating from ignited minds of Kerala



Late M J Joseph alias Appachan
Kannur

Tree climber: a grassroots innovation going global

M J Joseph had developed a device under the guidance of his father that helps in climbing coconut or areca nut trees. The palm climber consists of two metal loops that are meant for holding the legs. There is a film made on his innovation by Discovery Channel and is very popular on Youtube.com. Recently, both the innovator and his father unfortunately passed away. NIF gave him a Consolation Award in its 2nd National Competition for Grassroots innovations and Traditional Knowledge in 2002. NIF also supported him through its MVIF scheme and gave him marketing support. NIF facilitated sale of his climber to customers in USA, Maldives, Thailand, Australia, Brazil, Mexico etc. (Also see Honey Bee, 13(4): 5-9, 2002 and 17(1) & (2): 14, 2006).

02

Reversible reduction gear for marine diesel engine and Z- drive propeller

B Mohanlal
Alleypey

Mohanlal has a small workshop for repairing fishing boat engines. He used to observe the inconvenience of the local fisherman while fishing with the existing petrol start kerosene run engine. These had inbuilt gearbox and the diesel engines had long tail propeller system without gearbox. The kerosene run engines consume high amount of fuel and pollute the water, which affects the reproductive capacity of fish. On the other hand the diesel engines powered systems do not have gear system for better maneuverability. Apart from this the beach landing was very difficult while using the conventional inboard marine diesel engines.

After rigorous research and development he could develop a gearbox and manually tiltable Z-drive system for small capacity diesel engine to overcome the above said problems. The state fisheries body, MATSYFED, is now partnering with the innovator for promoting the product among local fishermen.

03

Mathew K Mathew
Kottayam

Solar mosquito destroyer

Mathew K Mathew was interested in developing an environment friendly mosquito destroyer since his childhood. Soon after completing his studies he started working on his dream. It took him more than a decade to come up with the solar mosquito trapper cum destroyer. This device makes use of the smell from the septic tank to attract the mosquitoes. Once the mosquitoes get trapped inside the device, the heat built up inside the device, as a result of direct sunlight exposure, kills them.

04

Rain water syringe: A novel approach of water conservation

K J Antoji
Cochin

Antoji lives in the coastal area of Cochin, where the ground water is saline and ground water level is almost same as sea water level. Once, while he was watering his garden the hose pipe fell down and pierced the soil up to 30 cm due to water pressure. This triggered a thought in him about developing a rain water harvesting technique using pressure of water. After doing several experiments he came up with his innovation. In his system the roof top rainwater is stored in a pressure tank and with the help of PVC pipes water is lowered to a depth below sea water level. The pierced water recharges and dilutes the groundwater. When required, the water can be pumped out from the recharged well.

Thomson Augustine
Thrissur

Cost effective tyre re-treading

Usually tyre re-treading is done using steam based heating system, which needs about 1.5 tons of firewood to cure a 14 kg of matrix. Proper vulcanizing requires about 150° C temperature and 80 psi steam pressure. The tyres are directly exposed to heat, which results in reduction in life also.

The innovator has developed an electrically heated matrix system for tyre re-treading. The system has coil heaters with ceramic beads, digital thermostat control and timer to maintain constant temperature throughout the process for balanced curing. One can complete the operation in 18-20% of the cost of the conventional process by using the innovation. The innovator has been supported through MVIF of NIF. He has been granted an Indian Patent and has also sold over 100 machines throughout the country. NIF facilitated the technology licensing to Eastern Threads, a group company of Eastern Masalas.

06

Banana slicing device

Joy Augustine
Kannur

Joy Augustine hails from an agricultural family in Kannur. He noted the difficulty of slicing banana and after a long period of hard work and effort, he made a crude prototype for mechanical slicing of banana. The device has five cylinders to hold a banana in each and with the help of a blade set attached to the lower part of the device, bananas are sliced. There is a mechanism to reduce or increase the thickness of the banana slices. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

A T Thomas
Kottayam

Arrowroot grinding machine

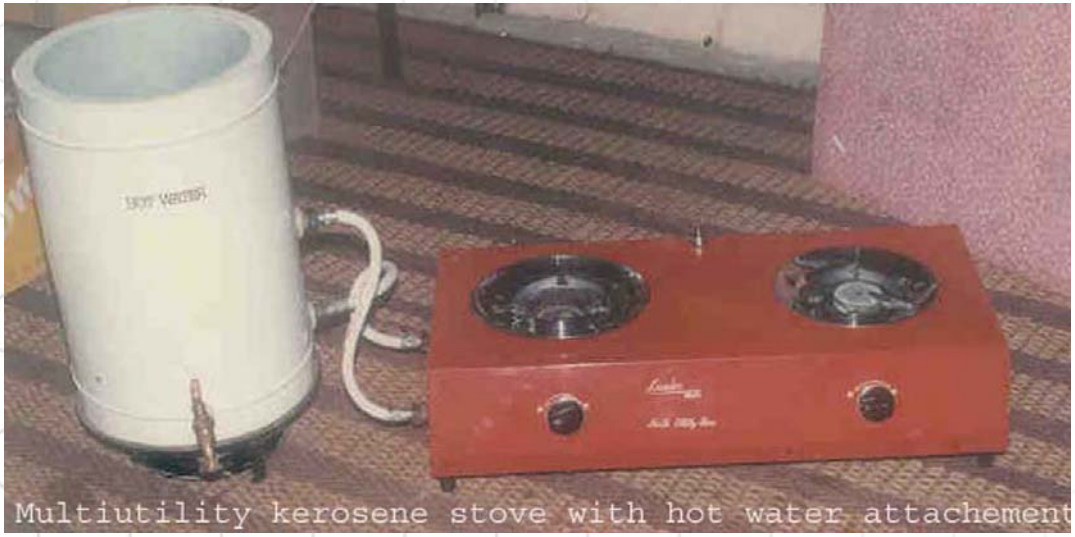
A T Thomas has plenty of arrowroot in his field, which he used to powder manually. However, he was not comfortable with the manual process as it was slow and hazardous. He pursued several experiments to develop a low cost, easy to use, hand operated processing machine. After several trials he developed a machine, which had a wooden roller with projections. The roller is powered by an electric motor. The arrowroot is crushed between the walls of the machine and the roller having projections to yield arrowroot powder. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

08

Multi utility stove

S J Joe
Calicut

S J Joe had developed a fuel-efficient multi-utility stove. Using this stove cooking can be done for 14 hours with one litre of kerosene. It has an in-built water jacket to generate steam, which can be used for cooking specific items. The stove comes with single, double and multi-burner units and gives a soft blue flame. Additionally, it is also smoke-free, which makes it very comfortable for the user. NIF gave him a National Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.



Multiutility kerosene stove with hot water attachement

09

Subha Rani Kurian*
Kottayam

Bicycle operated duplex pump

Subha has developed a bicycle operated duplex pump to meet the needs of high water table regions in the state, keeping the energy requirement within human capacity. Instead of hand operation the innovator has made the pump pedal operated as leg muscles are more powerful than hand muscles. The discharge of the pump was measured to be around 5000 lph while the stroke length was 14.3 cm. NIF gave her a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

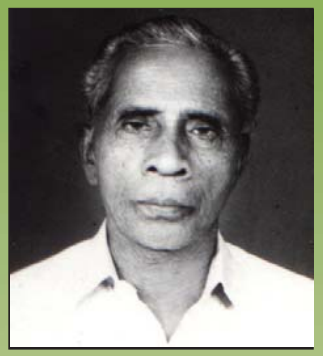
* Though awarded earlier, the innovator is a professional as per the present rules of NIF, which were redefined to specifically focus on innovations from the people of unorganised sector.

10

Machine for pulverizing red sandalwood

K X Benedict
Cochin

The idea for the innovation came when Benedict came across the sight of an old woman grinding sandalwood with a piece of rock to obtain a paste. The innovator spent three years researching and developing the machine completely unaided until he was funded by the Central Government of India to develop the final prototype. This device pulverizes the very hard red sandalwood to micro-fine (up to 50 microns) powder by feeding and rotating the timber against a revolving mill, which has thousands of cutters. It also generates very low sound while pulverizing. It does not require size reduction machines like cutters, slicers, disintegrators, etc. Through pneumatic force, the machine separates the micro-fine powder from the chips and wood particles that are poor in drug and colour value. The same machine can be used for very fine pulverizing of other hard timbers for Ayurvedic usage. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001 (also see Honey Bee, 12(3):15, 2001).



K Panickan
Kottayam

Insecticide for coconut trees

To prevent the attack of "*mandari*" (Eriophyid), a kind of insect that destroys tender coconuts, two plastic bottles of 200 mg capacity, filled with kerosene are hung with the help of a strong plastic yarn or twine yarn. One end of the plastic string is tied to the neck of one bottle, which should be kept open. The yarn is then placed at the neck of the tree, a little away from the flower bunch and tender coconuts, so as to allow the bottle to hang freely at one side. Another bottle should be tied to the other end of the string, standing at ground level. Approximately 75 per cent of the bottles are filled with kerosene, and by puling one side of the string the bottles will hang in the same height, just below the neck of the coconut tree. The string should then be tied up firmly onto the tree. The smell of kerosene generated by the swinging action of these bottles is enough to keep the mandari insects away.NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

12

Water level indicator in bore wells

E K Markose
Thrissur

For the effective use of groundwater, proper monitoring is essential. The method used to indicate the water level in bore wells before this innovation was rather primitive: a special tape with chalk marks was inserted into the well but the measurement lacked accuracy. The innovator developed a device that produces a beep sound and a visual indicator glows when a probe touches the water. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

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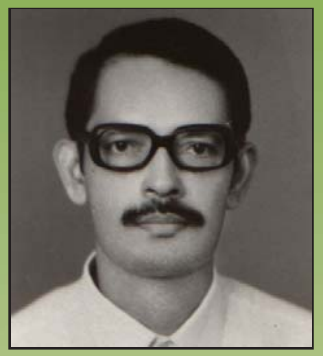


Dr P PThomas*
Thiruvananthapuram

Natural convection drier for agricultural products

To overcome the drawbacks of the conventional drier, the innovator created a machine in which the hot air is generated separately outside the drying chamber and is conveyed upward through a separate duct by natural convection. At the top of the duct an opening is provided for the entry of the hot air to the drying chamber where perforated trays are arranged one above the other. The hot air after entering the drying chamber tends to occupy the topmost layer just below the top covering sheet. As the hot air comes into contact with the wet material on the top tray, the temperature of the air drops, consequently, the density increases and the air flows down by percolating through the trays, where the wet material is placed. The cooler air, by the process of heat transfer, finally leaves the bottom of the drier. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

* Though awarded earlier, the innovator is a professional as per the present rules of NIF, which were redefined to specifically focus on innovations from the people of unorganised sector.

14

Floating toilet soap

C A Vincent
Thrissur

Vincent has been in the business of soap making for several generations. He observed many people taking bath in rivers and ponds loosing grip of their soaps, which often sink in the water. He conducted experiments in his soap manufacturing unit for about 14 years to develop this unique process of manufacturing soap that floats in water. The soap has a density of 0.878, TFM (Total Fatty Matter) as 73%, foaming stability as 0.1 cm and foaming power as 0.2 cm. Vincent has been doing quite a modest business by manufacturing and selling his soap.

K R Chandran
Alapuza

Easier, faster and economical husking

Though K R Chandran could study only up to the fifth standard, he became a highly skilled workshop mechanic through experience and hard work. Chandran felt the need for a machine specifically for threshing coconut husk. The conventional manual method of beating the husk is cumbersome and gives a very low output. It also damages the fibre while separating the pith of the husk. Spurred by the request of the former industries minister of Kerala, Susheela Gopalan, to develop the coir-husking machine during her tenure, Chandran developed it after putting in years of consistent effort. The machine devised by Chandran can husk about 3,200 coconuts in a day. Only two people are required to operate this machine, compared to 17 people needed for operating a conventional machine.

Chandran had earlier developed a machine for threshing paddy, putting in one and a half years of experimentation, which has already become very popular in the his district. NIF gave him a National Award in its 2nd National Competition for Grassroots innovations and Traditional Knowledge in 2002. He was also supported by NIF through its MVIF scheme (also see Honey Bee, 14(1):3-7, 2003).

16

Septic tank baffle system

Rajesh T R
Thrissur

The septic tanks used in the country are generally big and take a lot of time to construct. They also occupy a lot of space. Given the increasing pressure on land, smaller and more efficient septic tanks are needed. Rajesh, a small construction contractor, has done just that. He has developed an ingenious baffle for septic tanks using commonly available PVC pipes and bonding cement instead of the concrete baffles that are generally used in conventional septic tanks, which reduces the costs. The tank size is also reduced significantly. Its small, compact size and simple design makes this unit a cheap and efficient device, which is also environment friendly.

NIF gave him a National Award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005. NIF extended him MVIF support for testing in the early stage of the technology. The technology has been successfully transferred to GMI Zarhak Ltd., a company based in Goa. Through this partnership a portable ready to install roto moulded septic tank with baffle has been recently launched in the market (also see Honey Bee, 15(3):5-8, 2004).

V J Joseph
Kasargod

Fungal control in honey bee

In 1984, chalkbrood (a fungal disease) had nearly wiped out the honey bee industry in Kerala. The disease affects the honey bee larvae eventually killing them. The bees that do survive become listless, weak and darker in colour. The queen bee stops laying eggs, ultimately leading to the death of the colony. No medicine had proved to be effective. The only option was re-queening with resistant bee stock, which was often not successful. V J Joseph, involved in bee-keeping since 1980, felt that there had to be some way of tackling the disease. He developed an indigenous herbal medicine to combat chalkbrood. The cost of medicine for curing a diseased colony housed in one box is Rs 150. This is quite cost effective since during the peak season (December-April), one can harvest 15-20 kg of honey from one box and sell it at about Rs 60 per kg. NIF gave him a National Award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005.

18

Washing-cum-exercise machine

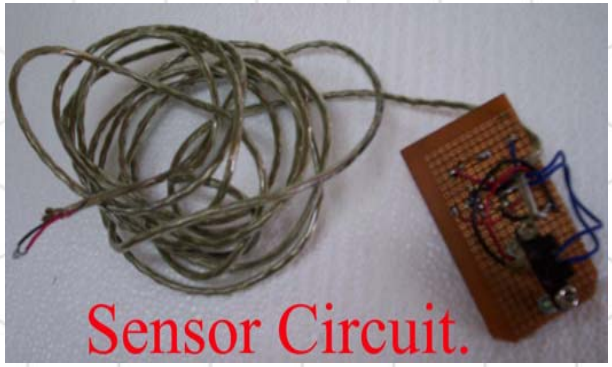
Remya Jose
Malappuram

Remya had to wash clothes when her mother had fallen ill. She thought of a simple, ingenious solution. She developed a washing machine after her Class X exams, which does more than just wash clothes. The washing-cum-exercising machine is made of metallic cabin, which has a perforated horizontal cylinder made of iron. The cylinder is connected to a pedaling system, which consists of a cycle chain, pedals and a seat. The clothes that are to be washed are put in the cylinder. The cabin is filled with sufficient water and washing powder is added. The clothes are left to soak for at least ten minutes. Subsequently, one needs to pedal for few minutes. This causes the cylinder to rotate with the clothes in it, cleaning them thoroughly. The water can be drained out and refilled and the process repeated. Finally, all water is removed. The clothes can even be dried (about 80% dry) by pedaling for some more time. NIF gave her an award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005 (also see Honey Bee, 15(4):4-9, 2004 & Honey Bee, 16(3):14-15, 2005)

P Krishnakant
Calicut

Speed restricting device

Since fourth standard, Krishnakant was so advanced in mathematics and had strong technical aptitude that he joined an institute for a 45-day electronics course intended for students in class ten or above. Since then, he has developed many projects such as a hydroelectric power plant, a transistor radio, an invisible intruder alarm, and a light activated switch. When he was in class XI, he developed the speed controlling device to limit the high number of accidents caused by speeding vehicles. This device is a microprocessor-based system, which limits the speed of a vehicle beyond a predefined value by restricting the fuel supply. When a driver increases his speed beyond a pre-set limit, he receives a warning from a buzzer unit and if he still persists, then the electronic valve blocks the fuel flow from the fuel tank to carburetor bringing down the speed. In the present innovation, an electronic solenoid valve is used, which has far greater precision and reliability than the mechanical based motor or actuator units fitted in conventional alternatives. NIF gave him an Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.



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Preventing accidents at a low cost: Side-stand gear lock system

K S Sudheer
Thrissur

Auto mechanic K S Sudheer developed a side-stand gear lock system to prevent two-wheeler accidents. His love for solving technical problems generated his interest in automobiles and innovation. Sudheer was inspired to build this side-stand gear locking mechanism after he witnessed a terrible motorcycle accident. An entire family was badly injured when their motorcycle side stand, which had not been pushed back after starting the vehicle, struck against an obstruction on the ground. Sudheer's retrofittable kit, costing just a few rupees, consists of a clamp, which restricts the engagement of gears when the side-stand is not removed. The interlocking mechanism is simple, easy to assemble, and affordable. Currently, this kit is configured for some models of Bajaj and Hero-Honda bikes, and it is also being developed for other models. NIF gave him a Consolation Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007. He was also supported through the MVIF scheme of NIF.

An improved disease resistant pepper variety -"*Kumpukkal*"

K T Varghese
Idukki

K T Varghese is an innovative farmer from Cheruvalikulam. In 1989, he faced severe incidence of quick wilt disease in his pepper plantation where almost all the plants got affected by the disease. He separated a few plants that remained unaffected and through vegetative propagation developed a disease resistant variety of pepper. It has a highly developed root system making it resistant to quick wilt and foot rot. It can also be grown in stony areas having less soil depth. The other advantages of the variety include stable yield, high oil content and more pungency than the local varieties.

Spices Board has also published about this pepper variety in its *Journal of Spice India*. The farmer has started diffusing the variety locally and in Malabar, Kozhikhode, Ernakulum, Punmudi, Trivandrum and parts of Karnataka and Tamil Nadu. NIF gave him a Consolation Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.

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"*Wonder cardamom*"- a new variety of cardamom

Sabu Varghese
Idukki

Sabu has developed a drought-resistant cardamom variety- "*Wonder cardamom",* which can also be grown in rubber plantations at lower altitude. He developed the variety using seeds collected from a morphologically different plant followed by vegetative multiplication. The specialty of the variety is that it has branched panicles.

The yield per plant is 3.0 to 4.0 kg of dry cardamom compared to 2.5-3.0 kg in *Njallani*- the most popular variety of the region. Other important features of this farmer-bred variety, which have caught the attention of the scientific community, are: a) higher adaptablility to planting at lower altitudes and lower rainfall regions, which are traditionally known as non-cardamom belts and b) use as an intercrop in rubber plantations. The variety has diffused among places like Wyanad, Idukki, Kottayam, Kodaikanal (Tamilnadu) and Madakkara (Karnataka). NIF gave him the State Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.

Francis PA
Kannur

Papachchan style of pepper cultivation

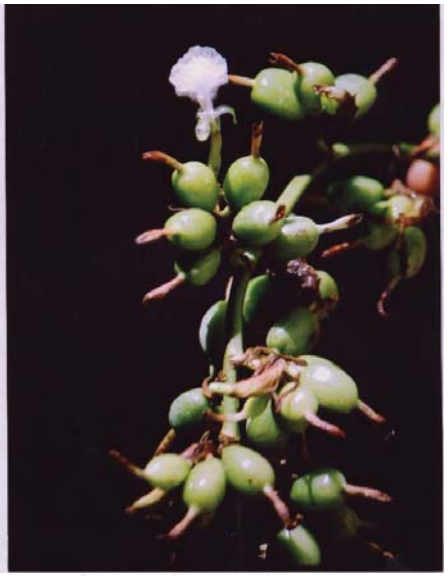
In Papachchan's agronomic practices, adequate natural drainage is considered best for pepper cultivation. He prescribes a two feet deep and one-foot wide trench along the border for isolating the pepper garden from other trees. No pits were taken up for planting. Pepper is grown as a pure crop in order to avoid intercropping losses. Planting material is prepared by cutting runners just below the nodes to restrict the plant to a single root. Jackfruit is considered as the best of the standards due to its timber value and manorial value of leaves. Saplings are planted close to standards so that the collar region is about three inches above the ground exposed to natural environmental conditions from the tender age so that the plants develop innate resistance. Mulching is used to reduce the erosion effects of raindrops and to conserve the soil. Mother vines are selected very carefully based on the past performance so as to obtain regular good yields, better growth and pest free cultivars. NIF gave him a National Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.

24

White flowered cardamom variety

K J Baby
Idukki

KJ Baby has developed a white flowered variety of cardamom from *Vazhuka* type of cardamom cultivars bearing purely white flowers. This variety has high productivity than other cardamom varieties in the region and can be grown in waterlogged areas as well. The variety has wider adaptability to different shade conditions apart from having higher production with good quality than other locally popular *Mysore* and *Vazhukka* cultivars viz., *Njallani*, *Green-bold*, *Palakkudi* and *Veeraputhara* varieties. It has sturdy plants, robust tillers and deep root system, which makes it resistant to various biotic and abiotic stresses. The variety has diffused among Idukki and Wayanad districts of Kerala, Chikmagalur district of Karnataka and some parts of Tamil Nadu. NIF gave him a National Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.



Sebastian Joseph
Idukki

New cardamom variety –"*Njallani*"

Sebastian Joseph, a marginal farmer, with the help of his son Rejimon Joseph developed a new variety of cardamom through selection from *Mysore* type of cardamom followed by multiplication through clonal propagation. He called his selection *Njallani* after the ancestral name. It was observed that the new variety had 120-160 capsules, which were larger in size too, as compared to 30-35 in the local variety. The ripe capsules could also be harvested in only two years compromising neither on quality nor on quantity of the yield. The industrious farmer has recently developed another cardamom variety, which is yet to be named, and which he says it can even be grown in the plains and not just hilly terrains. This variety is supposed to have made the largest contribution to Indian cardamom exports. NIF gave him a National Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001(also see Honey Bee, 12(2):11-16, 2001).

26

New Nutmeg variety – "*Kadukkamakkan Jathi*"

Abraham Mathew
Kozhikode

The new 'jaiphal' (nutmeg - *Myristica fragrans*) variety is the result of systematic selection from the seedlings planted at Kallanode from a collection of seeds originally procured from Sri Lanka in mid 1940s. The new variety bears large fruits. As compared to 150 dried nuts per kg of local varieties, the number in this variety is 90 dried nuts per kg. But more importantly, the quality of japatri or mace (dried fibrous aril, covering the testa of the fruit) obtained is much better. Further, since the tree is a dwarf type, farmers can grow 100 nutmeg trees along with 100 coconut palms in half an acre (0.2 ha) plantation area. He won the prestigious Kerala Kesari award from the Government of Kerala in 1995 as the Best Farmer. Besides this, he has also been awarded by NABARD as the best Model Farmer in the state and with KAMADA Krashaka award. He has received appreciation from several other organizations including All India Radio, Calicut. NIF gave him a National Award in its 2nd National Competition for Grassroots innovations and Traditional Knowledge in 2002.

K C Kuriakose
Palakkad

Propagation of rubber by budding

For Kuriakose farming has been a lifelong passion. He has standardized a technique of budding called as Young Budding. He got interested in budding after reading about it in an article. He persisted with different materials and methods and found that budding using buds from tender shoots of about 20-25 days old was very encouraging.

Budding success in Young Budded plants is 95-98% whereas in Brown Budding it is only 60-80%. In the Young Budding technique, the root system remains more or less intact, which ensures better growth and helps the trees resist strong winds. This also gives them greater protection against drying out in the initial years. The saplings become ready for planting in 10 months and the method saves labour as well as costs. The Budded plants become ready for tapping in five years as compared to the seven or more of Brown Budded plants. The technique is economically viable and can be applied on a commercial scale as a method of vegetative propagation in rubber.

There have been disputes about Kuriakose's claims to be the original innovator of the technique. However, The Rubber Research Institute of India vide their communication earlier commended the improvements made by him in the young budding technique and endorsed his claims. Subsequently, NIF gave him a National Award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005.

28

Kandakayam system - a new innovation in vanilla cultivation

George Mathew
Kottayam

George Mathew has developed a new method for the cultivation of vanilla in order to get more yield as well as some other advantages. Using this method the farmers can decide the exact place to grow the shoots and pods. The total length of the stem can be controlled to 18 metres thereby reducing the load on the supporting tree and since the stem is not entangled, the problem of disease is minimized. New unwanted sprouts and suckers are also averted. About 2500 plants can be grown per hectare. Supporting trees need not be interconnected for reinforcement and the expenditure on labour is also reduced. Lesser rainfall during November to February does not affect the yield adversely. The plants start yielding within one year, bunches of pods spring up from many nodes of the same branch and 20 to 25 fruits are obtained from each bunch. NIF gave him the State Award in its 2nd National Competition for Grassroots innovations and Traditional Knowledge in 2002.

Tom C Antony
Kottayam

A new nutmeg variety

Antony has been experimenting with patch budding in nutmeg trees for a long time. The high-yielding variety of budded nutmeg developed by him is a boon for the farmers, nutmeg is a perennial crop and low investment is required for cultivation.

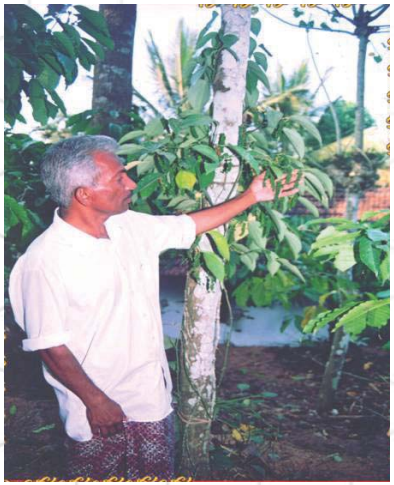
Usually it takes 100-120 nutmegs and 800 to 1000 nutmeg mace to weigh one kg. As against this, it takes only 80-100 nutmegs and 300-350 mace of the budded variety to weigh one kg. A 15-year-old tree yields 3500 to 5000 nutmegs in a year. The scion of nutmeg tree is budded to the stock of a forest variety and yields within four years. In the ordinary nutmeg, the sex can be determined only after flowering, which takes 6-8 years. This problem does not arise in the budded variety. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

30

Quick wilt resistant varieties of pepper

A Balakrishnan
Waynad

Almost after eight years of continued trial and observation, Balakrishnan has developed two high yielding pepper varieties *viz. Ashwati* and *Suvarana*. For developing both these varieties through crossbreeding a local variety *'Cheruvally'* was taken as the male parent and '*Uthrankotta'* and *'Karimunda'* as the female parent for *Ashwati* and *Suvarna* respectively. The *Ashwati* variety gets matured at 7 months and S*urvarana* at 8 months after flowering. The number of berries per spike are 200 and 90 for *Ashwati* and *Survarana* respectively. Dry yield per vine (5kg) and dry recovery (50%) are same for both the varieties and they are resistant to wilt and tolerant to drought.



31

Joy Peter
Idukki

New cardamom variety- "*Panikulangara Green Bold No.1*"

Joy Peter has developed a high yielding variety of cardamom from land race *Vazhukka* type of cardamom through selection followed by vegetative multiplication. This variety, which matures at 75-80 days after flowering, is less prone to disease and pests. Its green and dry capsule yield are 1500 kg/acre and 375 kg/acre respectively. The percentage of flower dropping is also found to be lesser than the traditional variety. The capsules are bolder and the ripe ones retain green colour and size even after drying. These characters help to fetch good market value. Based on the performance, the former Director of Spices Board officially released the variety for distribution with the name: *Panikulangara Green Bold No. 1.*

32

New variety of white gourd resistant to Yellow Mosaic Virus

The innovator has developed a yellow mosaic virus resistant white gourd variety by crossing a local variety with a resistant variety developed by Kannichaye Narayanan, a farmer staying near his village. The viral disease in plants grown by Narayanan, appeared only at the fag-end of the plant's life span. This variety is claimed to be 90-95 per cent resistant to viral disease. The average yield ranges between 240-250 q/ha and is suitable for summer season.

Joy A S
Thrissur

33

Biju Varghese
Kottayam

Retrofitted car for physically handicapped

While traveling with his friend, Biju, at the age of 20, was hit by a speeding bus. He ended up with a damaged spinal cord and both legs totally paralysed. One day on National Geographic channel, he saw how the huge sophisticated US President's plane, 'Air force One' being navigated by the pilot just by using his hand. He observed that mere fingers were controlling all the major operations. This triggered a thought in him to devise the modification kit for car. After discussing it with local car mechanics he came up with this device. With this new device, the retrofitting, brake, accelerator and clutch controls can be actuated with a single hand. The clutch is operated with the palm making it possible to apply full strength downwards. The accelerator is operated with the forefinger, while the middle as well as adjoining finger takes care of braking. NIF gave him a National Award in its 4th National Biennial Competition for Grassroots innovations and Traditional Knowledge in 2007.

34

Reciprocating hydraulic prime mover for water lifting

Noushad K T
Malappuram

The idea of utilizing the energy in streams and brooks came to Noushad's mind after he went to a science fair while in school. There he saw a model showing the rain water just draining off into the sea through the streams and brooks. Ever since, he thought of utilizing this free energy, which was simply being wasted. He worked upon this and came up with a reciprocating hydraulic prime mover for water lifting. A tank is placed or a dam is made in any small stream or brook. Inside this there is a float, which is made of two aluminum dishes welded together. When the water level in the tank reaches a certain height, water enters the float through four valves, which open when two wheels at the back of the float strike against certain iron sheets attached for this purpose. Filled with water the float sinks. Once it reaches the bottom, due to the force of gravity and atmospheric pressure a siphonic valve at the bottom of the float opens and water in the float is pushed out of the float and the tank through a pipe and the float rises up again. The whole process is repeated. The force produced by this motion up and down can be used for lifting water to a certain height. This device works automatically as long as water level is maintained. NIF gave him a Consolation Award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005.

P K Ravi
Idukki

Pepper thresher

Once Ravi was faced with a financial crisis and the work in his workshop came to a standstill. To supplement his income he developed a pepper thresher for farmers in his region, which has a large number of pepper plantations. The electric powered thresher developed by Ravi consists of a feeding hopper made of iron sheet, a rotating wire-loop type threshing drum and a concave metal sheet with perforated bottom, all of which are mounted on the main frame. The harvested pepper spikes are directly fed to the hopper, in the rotating drum. The threshed pepper passes down through the perforations and gets collected at the berry outlets. The machine also has the facility of manual operation.

The Spices Board (Ministry of Commerce and Industry, Govt. of India) has recognized his innovation and included it in the Board's subsidy scheme. NIF gave him a Consolation Award in its 3rd National Competition for Grassroots innovations and Traditional Knowledge in 2005. He was also supported through the MVIF scheme of NIF.

36

Low-cost manual milking machine

V A Johny
Ernakulam

In order to reduce human effort in milking the cows, need of mechanization was felt by Johny. He looked for the available machines for milking the cows and found that the prices were beyond the limit of small farmers. He developed a simple manually operated machine, which works on the principle of vacuum. It consists of a pump with a valve, plastic tubes and rubber bushes. One end of the pump is attached to the udders of cow and the other to a milk container. It helps milking the cows without causing them any irritation. Another innovator, Raghav Gowda from Karnataka has also developed a similar machine with slightly different design and set of materials. NIF gave him the State Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

Narayana Namboothiry*
Alappuzha

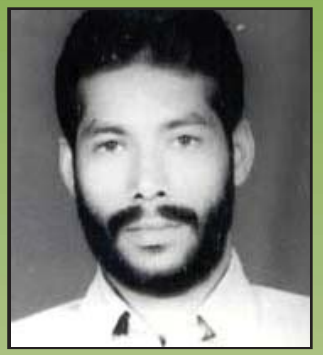
Multipurpose prime mover

Narayanan Namboothiry has been developing cost effective technologies for solving day to day problems from locally available scrap materials. One of his innovations is a multi-purpose prime mover powered by a 1.5 hp electric motor. It can be used for cutting heavy and light wooden pieces, for grinding metals and wood, buffing/polishing metal and wood, carving, turning, drilling and rimming in wooden or light metallic jobs. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

* Though awarded earlier, the innovator is a professional as per the present rules of NIF, which were redefined to specifically focus on innovations from the people of unorganised sector.

38

Low cost handpump



Ouseppachan Anchukandathil
Idukki

The innovator was in search of a cost effective hand pump for lifting water from the water reservoir to the overhead tank of the house. After working on his requirement for days he came up with the present low cost hand pump, which can deliver water up to a height of 200 ft through a one inch diameter pipe. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

Mathew V Mathew
Ernakulam

Kerosene stove with gravity feed fuel tank and cylindrical wick

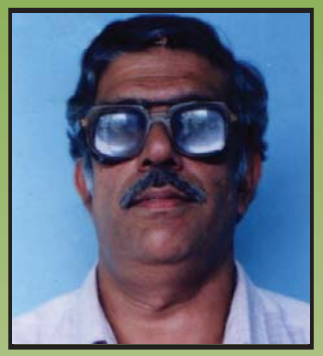
Existing kerosene stoves work through pressure generated by pumping or by keeping the fuel tank at a higher level than the stove. Mathew was worried about the accidents caused due to explosion as a result of pressure and pollution due to smoke, sound and odour. To prevent this he developed a kerosene stove, which consists of a burner set with gravity feed fuel tank and cylindrical wicks. This has also reduced in the fuel consumption. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

40

Development of a new coagulant

K K Thomas
Thrissur

Thomas could study up to the 6th standard only due to the poor financial condition of his family but he continued on carrying out chemical experimentations and reading informally. His thirst and vigor for doing something new resulted in his development of a new coagulant for rubber latex. He has invented a new coagulant i.e. Formalic acid for rubber latex coagulation in a very cheap way. The technology is now used by many natural rubber latex producers and as a result a large number of rubber planters have benefited. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.



P J Abraham
Idukki

Cardamom drying chamber

Abraham had to stop his studies in 10th standard due to the financial problems of his family. Even after this he did not give up his inquisitiveness and curiosity and learned a lot by conducting experiments informally. As a result of this he came up with a cardamom drying chamber, which is very useful for farmers. During drying in this chamber, cardamom can retain its natural green colour. Cardamom is just filled in a container and not spread over a large area. It therefore saves time, space and labour. The main part of the drying chamber is an air blower run by a 1 hp motor. NIF gave him a Consolation Award in its 1st National Competition for Grassroots innovations and Traditional Knowledge in 2001.

42

Automatic bathroom cleaner

Adarsh B and Suresh
Calicut

Adarsh and Suresh noticed that the public bathrooms remain perpetually dirty because the users don't flush water after using the toilet. This happen sometimes unknowingly or unwillingly due to users being in a hurry. Sometimes it is also because of the reason that regular cleaning is not done properly. The system developed by Adarsh and Suresh can clean the urinal system automatically after use. It also wipes the surface with brushes incorporated in the system. Thus the device cleans the public bathrooms automatically and without involvement of much labour.

Beam balance for blinds

Hemayan AK,
Sruthi ME, Vishnu R
& Sanjay M
Kozhikode

For taking part in a science exhibition held in their school, the students developed a beam balance for blinds. In this balance a semi-circular plastic tube containing some mercury is attached to the balance. Due to the difference in the weight, tilting of the balance to either side results in the movement of mercury column to that side. If the weight becomes equal on both the side of the balance, the mercury column comes in the center. This results in the completion of the circuit facilitated by a nail pin and an alarm is rung. Likewise, movement of mercury column to either sides of the balance also results in alarms via completion of circuit facilitated by the nail pins attached to the circular tube at different position on the tube.

16th Shodh Yatra
27 December 2005 to 2 January 2006
Kumuly to Kattappana, Idukki

Shodh Yatra is a walk through the villages in 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 may be 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 16th Shodh Yatra, over the period of seven 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, students, innovators, farmers, scientists, journalists and traditional knowledge holders from different parts of the country (also see Honey Bee, 17(1) & (2): 9-13 & 30, 2006).

NATIONAL INNOVATION FOUNDATION, INDIA

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

Co-sponsors

Honey Bee Network

CSIR

SRISTI

IIM-A

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 Seventh National Competition started on February 1, 2009 and the entries will be accepted till December 31, 2010.** 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