



National Innovation Foundation

Kerala Innovates




Honey Bee Network

KERALA INNOVATES



National Innovation Foundation

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HONEY BEE NETWORK

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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

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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.



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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.

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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 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

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

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- 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).



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

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.



B Mohanlal
Alleppey



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.



Rain water syringe: A novel approach of water conservation

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.



K J Antoji
Cochin





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.



Banana slicing device

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.



Joy Augustine
Kannur





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.

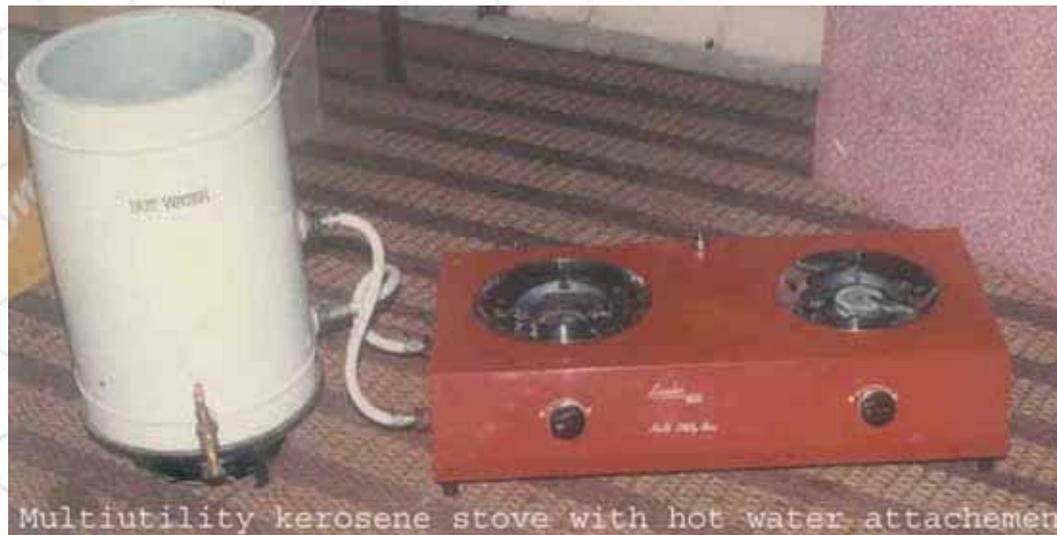


Multi utility stove

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.



S J Joe
Calicut



Multiutility kerosene stove with hot water attachment



Subha Rani Kurian*
Kottayam

* 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.

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.



Machine for pulverizing red sandalwood

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 X Benedict
Cochin



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 pulling 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.

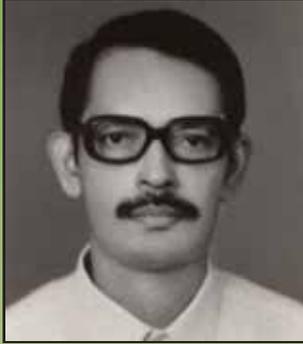
Water level indicator in bore wells

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.



E K Markose
Thrissur





Dr P PThomas*
Thiruvananthapuram

* 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.

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.



Floating toilet soap

Vincent has been in the business of soap making for several generations. He observed many people taking bath in rivers and ponds losing 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.



C A Vincent
Thrissur





K R Chandran
Alapuzha

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 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).

