National Innovation Foundation

PUNJAB INNOVATES

Honey Bee Network

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HONEY BEE NETWORK

Regional Collaborator
Janmeja Johl
Ludhiana, Punjab

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PUNJAB INNOVATES

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. Till date NIF has been able to scout innovations and traditional knowledge practices from 507 district across India.

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 Punjab. 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 Punjab 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 Punjab 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 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
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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 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.

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 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 from over 507 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.

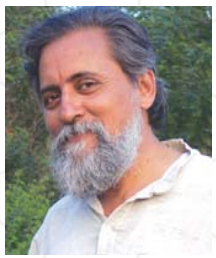
How can state government join hands with NIF?

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 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, 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 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 Punjab state. Tremendously rich knowledge of biodiversity, minerals and environment can be leveraged through the proposed association. We need to discover far more innovations and traditional knowledge from Punjab where our record so far is not very good.



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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

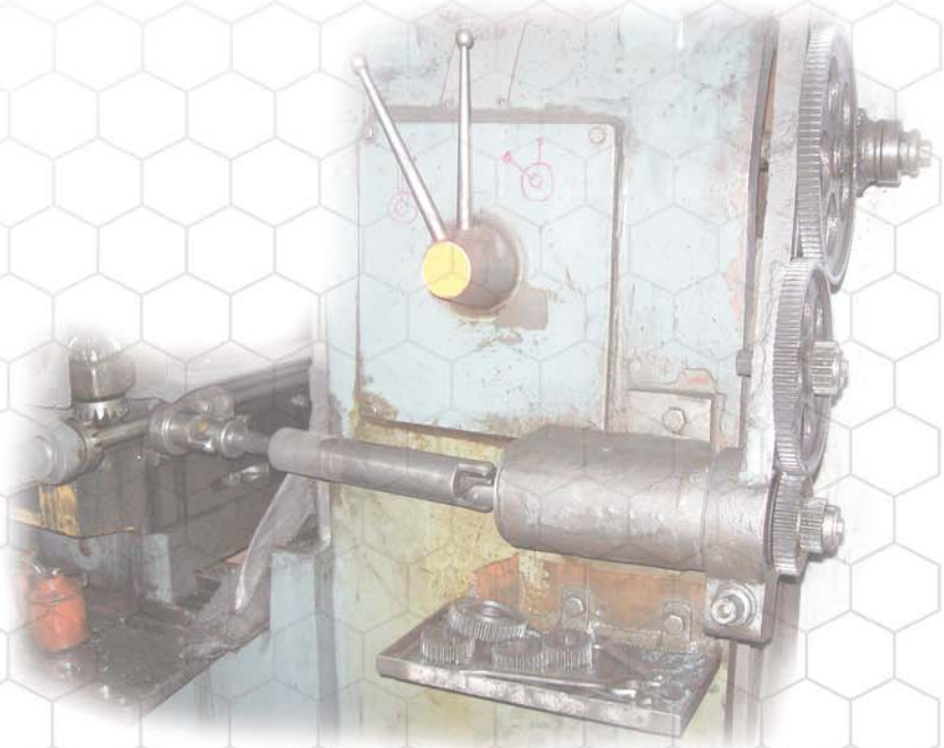
“By adapting public policy in support of grassroots innovators and traditional knowledge holders, we can make economic development process more inclusive and sustainable”.

- Dr. R.A. Mashelkar

PART I

INNOVATIONS
from PUNJAB

This section contains grassroots innovations originating from ignited minds of Punjab



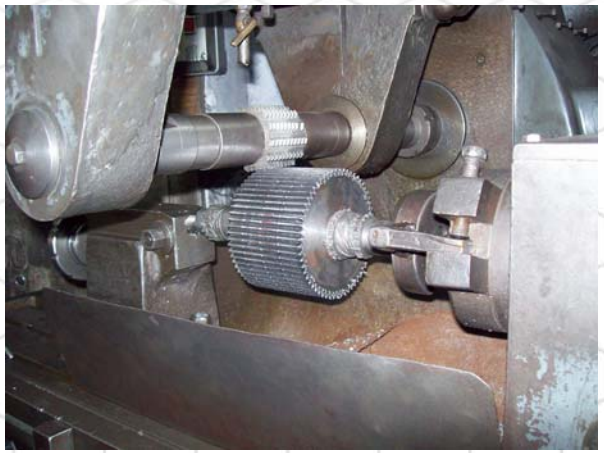
01

Balwant Singh
Ludhiana

Improvements to the automatic gear-cutting machine

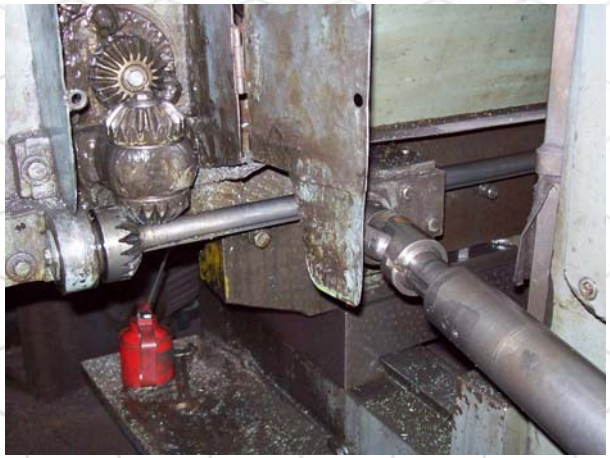
Balwant Singh is a Ludhiana technician who lives and breathes engineering and machines only. He has made a couple of innovations with regard to gear cutting operations. He has made improvements in the methods based on his long experience to improve productivity. He has also modified the machine tools used for gear cutting in order to improve the precision level of the gears manufactured.

A milling machine is invariably employed for cutting large-size gears, when the face width is more than about 1-1/2 inches. The other alternative is to use a milling machine fitted with a hobbing attachment. While this ensures reasonably high output, the machine can also be used for normal milling operations when there is no gear-cutting work but the output is limited because no more than two or three gear blanks can be machined at a



time. Mr. Singh pondered over the limitation of the design, which compelled frequent loading/unloading of component, which in turn caused loss of productivity. Through a process of trial and error, he replaced the universal-joint coupling with a bevel-gear mechanism. The new system consisted of three sets of bevel gears to transmit the spindle motion to the hobbing attachment. The bevel-gear system is inherently superior to the universal-joint coupling because the velocity of the output shaft remains uniform throughout. This avoids jerks that cause unacceptable vibrations.

For his contribution he won the consolation award in the second national competition of National Innovation Foundation.



Sardar Darshan Singh Tibiba
Ludhiana

Integrated farming

Darshan Singh Tibiba is a physically challenged person equipped with elementary education. He has contributed significantly for the increase of agricultural productivity through his innovative nature and managerial skills. He has integrated his agriculture with aquaculture, dairy, piggery, poultry, apiary, agro-forestry and horticulture. Darshan is not only a successful farmer but also a very good mechanic. He has indigenously devised a timer for water pump; low cost combine harvester; straw reaper; and a uniformly distributing fish feeder.

He has won 'Dr. Dhaliwal Best Farmer Award' conferred by Punjab Agricultural University, 'Jagjivan Ram Kisan Puruskar' by ICAR, New Delhi and many other awards.

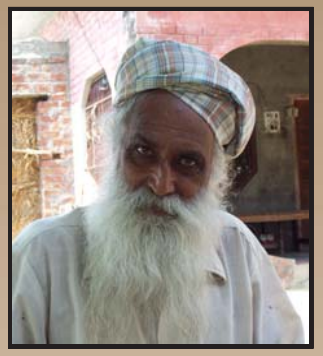
03

Milling machine modified from lathe

Gurdeep Singh Rehan
and Manjit Singh Rehan
Ludhiana

Gurdeep and Manjit are educated upto the 12th standard. At present they are running their engineering workshop for primarily making check nuts and auto parts. They were finding difficulties while doing miling job with the existing machines due to less production and poor output quality. They have modified a lathe in their workshop. A hybrid one with parts of a CNC machine and a self design cutting tool holder. The machine has a provision for automatic as well as manual feeding and automatic indexing.

04



Malkiat Singh 'Zero'*
Hoshiarpur

Modified two cylinder engine

Malkiat Singh is a graduate in arts and a mechanic by profession. He is adept in repairing all types of machineries and specializes in automobiles.

He observed knocking sound in two cylinder engines and thought of reasons behind this. He found out that this might be due to incorrect firing interval.

To correct the firing interval, he modified the design of the engine which has reduced knocking sound, fuel consumption and emissions considerably. The idea was conceived by him way back in 1982 but it took him more that two decades to finally come to a point where he is planning to start manufacturing. He plans this as soon as he obtains a process patent and design registration for the technology.

SRISTI (Society for Research and Initiatives for Sustainable Technologies & Institutions), Ahmedabad has honored him with SRISTI SAMMAN -2007 for his outstanding contribution.

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

05

Economical science lab for rural area (EPSRA)

Navdeep Sharma*
Jhalandar Cant.

Many students in the village primary schools still lack opportunities for practical studies in their school due to absence of laboratories. Mr.Navdeep Sharma, a teacher by profession not only thought about this problem but also came out with a solution. He developed a lab called as EPSRA. This lab can cover practical syllabus from class 3rd to 10th. He claimes that the total lab can be developed at a cost of two thousand rupees only. In addition this lab is compact and portable. Ideas of this kind need wider testing and diffusion.

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06

Mr. Pavitar Singh
Firozpur

Engine overheat protector (EOP)

Sometimes improper lubrication results an engine to overheat and seize. Mr. Pavitar Singh has developed a solution to protect the engine from overheating. The device continuously senses temperature of the engine and gives an audible alarm, when temperature reaches beyond the preset range. This buzzer indicates when to stop the vehicle, otherwise the device automatically stops the engine.

07

Low cost electric bike

Ranjit Singh Jagdev
Hoshiarpur

Annoyed by fuel guzzling, pollution creating motor bikes, Mr. Ranjit Singh wanted to provide an environment friendly bike within an affordable price range. He developed an electric bike successfully in 2003 at a cost of Rs. 6000/-. After scrupulous research and development he could develop a two seater electric bike in 2005; which costs Rs. 9000/- and which can run 40 km after a full charge.

When many international and large companies are introducing much costlier bike of this kind, should not state help such small scale producers in getting testing done and commercialise the technology. NIF will join such efforts.

08

Ramesh K Nobhoria*

Chandigarh

Sanjha-chula

The innovator wanted to develop an effective, smokeless, and energy efficient stove that can handle solid biomass: adapt itself to versatile cooking needs, and also achieve complete combustion.

Sturdily built in mild steel, with primary and secondary hot air flow for complete combustion, it has three sequential burning assemblies of different temperatures. It has minimal heat loss due to glass wool insulation and fire brick lining. With a heat exchanger, it has a 400W electric blower to feed hot air to the firing chamber for fast and complete combustion.

The unit has a chimney to take away the flue gases, with an attached temperature gauge to indicate the need to fire more fuel in the firing box. This unit has a built in feature for placing chapatti/tandoor tawa inside the first chamber. With a separate ash pot in the fire box, the unit also works with different fuels such as biomass fuel briquettes, wool, coal etc.

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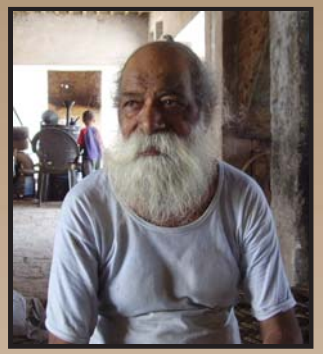
09

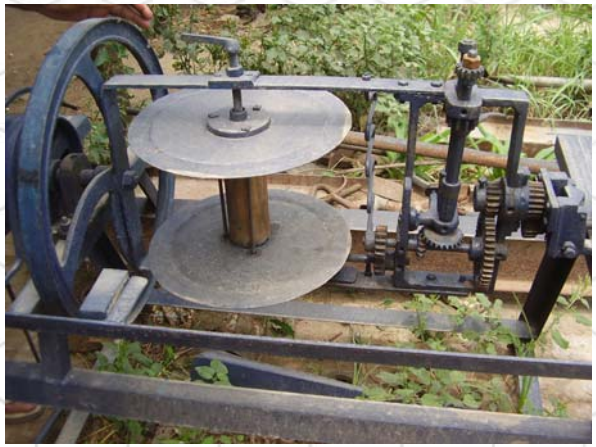
Rope making machine



Avtar Singh Daffoo
Navashahr

Avtar Singh Daffoo has studied up to the10th standard. The innovator has made mechanical devices for making ropes from various natural fibres like jute, coconut coir and other similar raw materials. He has also innovated some machines with which local grinding and other manual work by women are made easy, e.g. machine for making *seviyan.*

During 1952-53, a person from village *Saila Khurd* of Hoshiarpur district came to his village with a machine to make ropes, Avtar and his brother saw the machine and thought of developing something similar for themselves. They developed the model within a month and then showed it to Mr. Teruram, the original maker of the machine. He confirmed that the new design was different from the original one. For another three to four decades, their machine was well received by the villagers in and around Khatkar kalan and in the neighboring district of Ropar and Ludhiana.



Gurwinder Singh*
Moga

Automobile control through mobile phone

Nowadays theft of automobiles, especially motor-bikes is a very common problem throughout the country. Worried by these problems, Mr. Gurvinder Singh developed a mobile phone operated vehicle controller, which can switch on or off the vehicle by just dialing to a configured number.

It would be interesting to see if the vehicles can also be controlled by police control room. The innovator is keen to provide such system compulsorily in all the automobiles which can also be tracked by the police control room using this device.

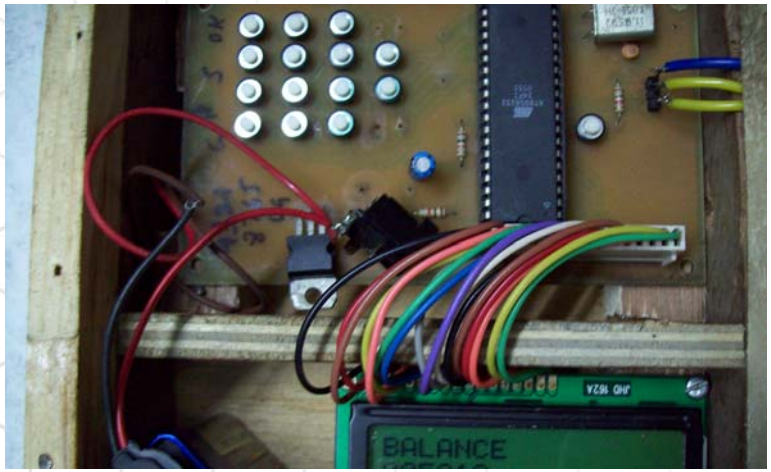
* Professional registered in NIF's Professional database. As per its mandate, NIF does not consider professionals for awards or financial support, but only helps in providing visibility or linkages.

11

Electronic purse

Kishan Kumar Raghuvanshi*
Patiala

Pick pocketing is very common in crowded or public places; people have to take extra care while carrying the cash and other vulnerable items. Mr. Raghuvanshi has developed a solution years ago, when people hardly knew about credit and debit cards. He has designed an electronic purse in 1995 for which he got a patent in 2003. He got a TePP support for developing this purse. The operation is similar to the debit cards prevalent today. In his innovative purse, a cable is used for transferring the money.



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12

Sukhbir Singh Hanspal
Ludhiana

Extruder thread making milling machine

Sukhbir Singh, educated up to 10th standard, has modified the milling machines. The modified machine can be used for making gear, facing surface (horizontal or vertical), drilling and for cutting threads. The thread cutting job can also be done on lathe but there is limitation in the number of threads, which is not there in the modified milling machine. Mr Singh developed the machine in 1997 and has sold over 20 machines in Faridabad, Baroda and Indore.

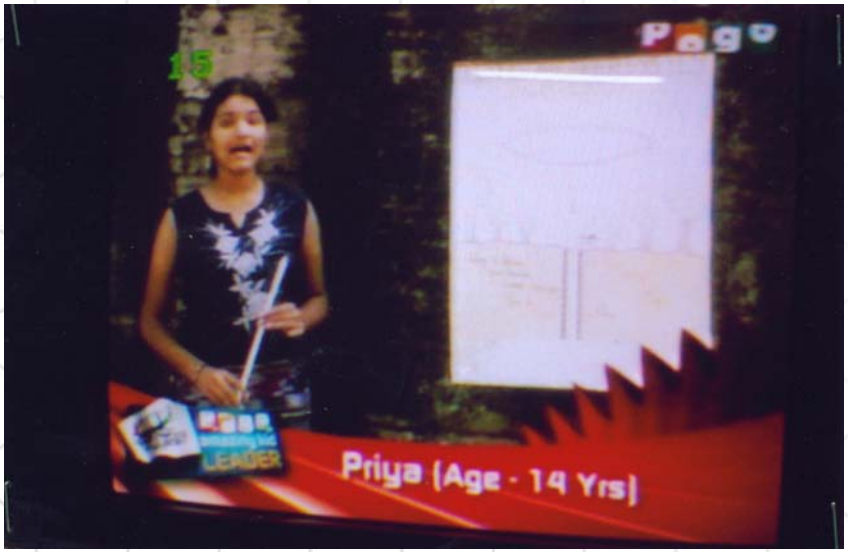
13

Student Innovator

Priya
Chandigarh

Fourteen-year-old Priya is a leading child artist and also an innovative scholar. From a tender age, she has several ideas like increasing ground water resources, management of soil fertility, generation of electricity in high rise buildings etc.

She has participated in several national and international conferences. Her first award was the International Child Excellence Scholarship Award in 1996, when she was only four years old. Apart from this she also won prestigious scholarships like Literary Award by the Readers and Writers Association of India, State Award from the Chandigarh Administration, Cambridge Young English Senior's Award from the University of Cambridge and a selection for Pogo Amazing Kids Award.



Royal Deep Singh, Arvind Atrri, Rahul Thakur, Navrish Kaushal
Ambala

Electricity generation through road transport

Worried of depleting energy resources and the consequent crisis which society may face in future, Royal and his friends Arvind, Rahul, and Navrish decided to optimize and prototype the various ideas for generation of electricity from vehicles travelling on roads.

The innovation consists of a series of parallel bars fitted on the road and having rubber stamping over them in such a way that these rods rotate whenever they come in contact with a rotating wheel. These bars are fitted with the chain and sprockets which transmit the rotation to an alternator thus generating electricity. National Innovation Foundation has supported the innovators for prototype development under mentoring of Dr. Tanuja Srivastava, Director, Bhai Gurdas Institute of Engg. & Tech, Sangrur.

15

Manual cum motorized washing machine

Mr. Amrik Singh*
Mohali

The innovator has developed a washing machine (with a provision of either manual or motorized operation) working on the principle of tumble wash. The free suspension of drum, provision of manual operation and its low cost makes it different from existing machines and also quite suitable for rural areas.

In his machine two blocks are provided opposite to each other inside the drum which hold the clothes for some time and then release them during rotation. This gives the effect of tumble wash. The arrangement of electrical devices is also made in such a way that it is kept outside the main assembly; thereby reducing the risk of shock in case of leakage. At present the machine does not have the provision of drying the clothes. The machine uses a 0.5 hp motor and has a capacity of about 15 kg.

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NATIONAL INNOVATION FOUNDATION, INDIA

The Sixth 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 **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