



National Innovation Foundation

## PUNJAB INNOVATES



Honey Bee Network

# PUNJAB INNOVATES



**HONEY BEE NETWORK**

Regional Collaborator  
Janmeja Johl  
Ludhiana, Punjab

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# PREFACE

National Innovation Foundation has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. 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

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

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

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

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

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



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

## Building a Bridge with Grassroots Innovators in Informal Sector

To make 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

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<sup>1</sup> 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

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

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.

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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

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

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

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

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

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

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

### **What has it done?**

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



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- 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](mailto: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.



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

**- Dr. A.P.J. Abdul Kalam**



**“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





**Balwant Singh**  
Ludhiana

## Improvements to the automatic gear-cutting machine

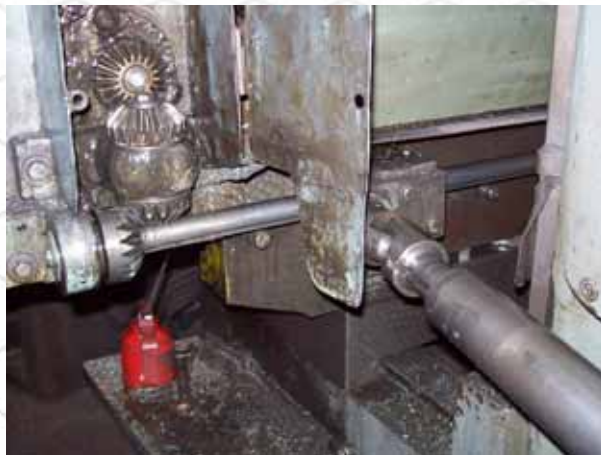
Balwant Singh is a Ludhiana technician who lives and breathes engineering and machines only. He has made a couple of innovations with regard to gear cutting operations. He has made improvements in the methods based on his long experience to improve productivity. He has also modified the machine tools 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 the 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 NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2002.





**Sardar Darshan Singh  
Tabiba**  
Ludhiana

## Integrated farming

Darshan Singh Tabiba 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.



## Milling machine modified from lathe

Gurdeep and Manjit are educated upto the 12<sup>th</sup> 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.



**Gurdeep Singh Rehan  
and Manjit Singh Rehan**  
Ludhiana





**Malkiat Singh 'Zero'**\*  
Hoshiarpur

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

## 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 the knocking sound, fuel consumption and emissions considerably. The idea was conceived by him way back in 1982 but it took him more than 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.

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





## Economical science lab for rural area (EPSRA)

Many students in the village primary schools still lack opportunities for practical studies in their school due to absence of laboratories. 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 3<sup>rd</sup> to 10<sup>th</sup>. He claims 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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**Navdeep Sharma\***  
Jhalandar Cant.



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**Pavitar Singh**  
Firozpur

## Engine Overheat Protector (EOP)

Sometimes improper lubrication results an engine to overheat and seize. 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.



## Low cost electric bike

Annoyed by fuel guzzling, pollution creating motor bikes, 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.



**Ranjit Singh Jagdev**  
Hoshiarpur





**Ramesh K Nobhoria\***  
Chandigarh

## Sanjha-chula

The innovator wanted to develop an effective, smokeless, and energy efficient stove that could 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 chapati/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.



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

## Rope making machine

Avtar Singh Daffoo has studied up to the 10<sup>th</sup> 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 districts of Ropar and Ludhiana.



**Avtar Singh Daffoo**  
Navashahr





**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, Gurwinder 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.



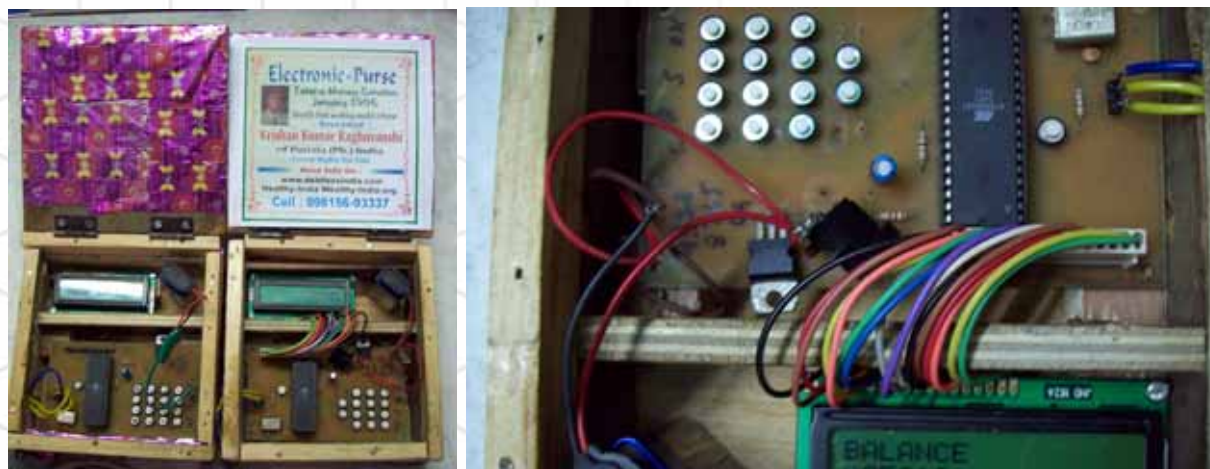
\* Professional registered in NIF's Professional database. As per its mandate, NIF does not consider professionals for awards or financial support, but only helps in providing visibility or linkages.

## Electronic purse

Pick pocketing is very common in crowded or public places; people have to take extra care while carrying the cash and other vulnerable items. 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 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.



**Kishan Kumar  
Raghuvanshi\***  
Patiala



\* 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.



**Sukhbir Singh Hanspal**  
Ludhiana

## Extruder thread making milling machine

Sukhbir Singh, educated up to 10<sup>th</sup> 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. Singh developed the machine in 1997 and has sold over 20 machines in Faridabad, Baroda and Indore.

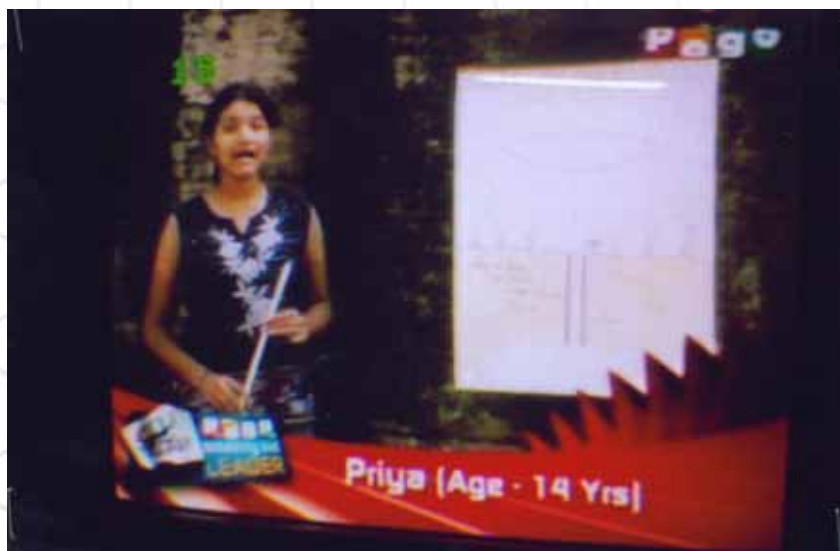




## Student Innovator

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.



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**Priya**  
Chandigarh



**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.



## Manual cum motorized washing machine

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.



**Amrik Singh**  
Mohali





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](mailto:campaign@nifindia.org); [www.nifindia.org](http://www.nifindia.org)

## PART II

# HERBAL PRACTICES & PRODUCTS

This section contains details of herbal healers, herbal medicinal and nutraceutical preparations based on traditional wisdom



## *Acacia nilotica* (L.) Del. (Babul)

### NIF Database

#### Use from Punjab

##### Abscess

Burn the fresh wood on fire and collect the fluid oozing out while burning, apply it on affected area  
- Somesh Singala, Patiala, Punjab

#### Uses from other states

##### Mouth sores

Take bark juice orally after adding a little sugar  
- Geeta Devi Kumavat, Jaipur, Rajasthan

##### Pneumonia

Boil paste of bark with little sugar and water. After cooling, filter it and take orally  
- Chen Singh Charan, Nagor, Rajasthan

##### Skin crack

Pound leaves with black pepper and cow's ghee. Apply the paste on skin cracks  
- Dansingh Laxmansingh Parihar, Junagadh, Gujarat

##### Burn

Mix the bark of the plant with mustard oil and boil it in water till it completely evaporates. Apply the preparation on affected body parts.  
- Jagadish, Hissar, Haryana

##### Dental care

Gargle the decoction of the bark to strengthen teeth and eliminate other dental problems  
- Geeta Devi Kumavat, Jaipur, Rajasthan

##### Diarrhoea

Extract the juice of the leaves and take orally  
- Omkarmal G Maur, Nagor, Rajasthan

### Uses in Classical Codified Literature

Paste made from fresh leaves is applied on the forehead for headache<sup>1</sup>; decoction of the bark is gargled to give relief from sore throat<sup>2</sup>; decoction of the bark is consumed to cure bronchitis<sup>3</sup>; and the dried bark powder is taken orally with water for diabetes<sup>4</sup>. Toothpaste is prepared from Acacia with the brand name 'Dental cream'<sup>5</sup>. Thirty patents have been found on its medicinal uses such as for dental plaque and gingivitis<sup>6</sup>.



Source: (<http://www.anbg.gov.au/cpbrtaxonomy/acacia-nilotica-cu-560.jpg>)

## *Calotropis procera* (Ait.) R. Br. (Madar)

### NIF Database

#### Use from Punjab

##### Migraine

Mix few drops of latex in ash of cow dung, inhale the smoke to reduce the pain

- Pushpa Agarwal, Patiala, Punjab

#### Uses from other states

##### Ear ache

Put the latex into ear to get rid of the pain

- R C Chowdhry, Nagor, Rajasthan

##### Stomach ache

Smear mustard oil on a leaf and warm. Apply it on the belly for immediate relief

- Chawda Chanduben Jawanji, Gandhinagar, Gujarat

##### Arthritis

Mix latex with turmeric powder, boil with sesame oil and then apply this paste on the aching joint

- Sanjay Singh Uplana, Nagda, Madhya Pradesh

##### Skin disease

Grind the bark into a fine paste. Apply it on the infected area

- Muralilal, Jaipur, Rajasthan

#### Uses in Classical Codified Literature

Plant extract is used to cure bronchodilator<sup>7</sup>; flower buds of *Calotropis*, mixed with black pepper seeds and salt are crushed to make pills the size of small peas. Two pills are taken twice daily for 3 days to get relief from malaria<sup>8</sup>; and warm leaves are applied on aching part smeared with oil to alleviate rheumatic pain<sup>9</sup>.

'Muscle & Joint Rub'<sup>5</sup>, a highly effective ointment for backaches, muscular sprains and joint pains. 'Arkavaleha'<sup>10</sup> made from this plant is given to get relief from irritation of the stomach, nausea, vomiting, diarrhea etc. Eight patents were found on its medicinal uses like for anti-tumor, anti-poisonous<sup>11</sup> and bronchial asthma<sup>12</sup>.



Source : SRISTI Database

## *Citrullus colocynthis* (L.) Schrad. (Indrayan)

### NIF Database

#### Use from Punjab

##### Stomach ache

Put ajwain seeds into one fruit and keep for 4 days. After drying, grind into fine powder. Give this powder along with water

- *Shakuntala Devi Jeyni, Ferozpur, Punjab*

#### Uses from other states

##### Ear ache

Boil equal amounts of seeds of the plant and castor in mustard oil till the mixture turns black. Use the filtered medicated oil as ear drops

- *Chaturbhuj Kumhar, Jaipur, Rajasthan*

##### Cough

Fry small pieces of stem and bulb of onion in mustard oil, add salt and take orally.

- *Ganga Devi, Chandava, Jharkhand*

##### Constipation

Chew the roots to get rid of constipation

- *Chenaram Banjara, Nagor, Rajasthan*

##### Piles

Powder the fruit along with fenugreek, thymol and salt.

Take one teaspoon of this powder orally

- *Durga Jethiwal, Nagor, Rajasthan*

##### Stomach disorder

Take baked seeds to combat the disorder

- *Jagadish, Hissar, Haryana*

#### Joint pain

Take powder of the baked seeds orally with water

- *Jagadish, Hissar, Haryana*

### Uses in Classical Codified Literature

Fruits are pounded and used to cure boils<sup>13</sup>; powdered roots are given orally to cure jaundice<sup>2</sup>; diabetics take dried fruit powder orally with water<sup>14</sup>; and the decoction of the fruit is used as diuretic<sup>15</sup>. Plant tincture is used in homeopathy for colic, abdominal pain and other gastric upsets<sup>16</sup>. Eight patents have been found on its medicinal applications like for dental plaques and gingivitis<sup>6</sup>.





## *Coriandrum sativum* L. (Dhania)

### NIF Database

#### Use from Punjab

##### Headache

Mix the powders of *coriandrum* leaves, mesocarp of two coconuts and roasted gram, add some ghee and jaggery to prepare *ladoo* (bolus) from it. Take one bolus orally per day

- Mukhi Bhaga Bania, Firozpur, Punjab

#### Uses from other states

##### Eye pain

Put two drops of the leaf juice in the eyes

- Shambhubhai Mangaldas Patel, Mehsana, Gujarat

##### Cough

Prepare decoction by boiling the leaves of *coriandrum*, *tulsi*, ginger and black pepper seeds in water. Consume the preparation orally

- Mrudula Sharma, Sikar, Rajasthan

##### Piles

Extract juice of the leaves, add some sugar and take it orally

- Kesarsinh Mathursinh Baria, Panchmahal, Gujarat

### Uses in Classical Codified Literature

Decoction of the plant is applied externally on ulcers<sup>17</sup>; juice extracted from the plant is given orally to check vomiting<sup>18</sup>; dried fruit powder is taken to combat diabetes<sup>19</sup>.

'Dhanya pancake, Dhanya catuska'<sup>10</sup> is an effective ayurvedic medicine for curing indigestion, anorexia, dyspepsia, diarrhoea, dysentery and intestinal worm infestations. 'Purehands'<sup>15</sup>, a multiherb formulation possesses antiseptic and antimicrobial properties, which are beneficial in eradication of harmful microorganisms; it also has moisturizing and deodorant actions. Thirty patents are available on its medicinal application mainly on gastric ulcer<sup>20</sup> and anti-inflammatory activity<sup>21</sup>, etc.



## *Eucalyptus globulus* Labil. (Nilgiri)

### NIF Database

#### Use from Punjab

##### Tooth cavity

Gargle the decoction of leaves  
- *Rajdip Kaur, Patiwala, Punjab*

#### Uses from other states

##### Headache

Apply fine paste of fruit on forehead  
- *Vidyasagar, Dhamtari, Chhattisgarh*

##### Stomach disorders

Soak fruits in a glass of water overnight. Next morning crush it with hands and take the filtered solution orally  
- *Maksudh Ansari, Giridih, Jharkhand*

##### Constipation

Extract juice from soaked fruit and take orally  
- *Vidyasagar, Dhamtari, Chhattisgarh*

##### Wound

Apply oil topically  
- *Taiyaz Ahmad, East Champaran, Bihar*

### Uses in Classical Codified Literature

Apply leaf paste on forehead to get rid of head ache<sup>22</sup>; use oil to cure skin diseases and to treat burns<sup>22</sup>; and apply leaf decoction to get rid of body ache and malaria<sup>3</sup>.

'Eucalyptus leaf aromatic water'<sup>23</sup> is excellent antiseptic and is used as inhalation for colds, sinusitis and general catarrh. 'Muscle and joint rub'<sup>5</sup> cream is prepared in combination with other ingredients for relieving pain in muscle and joints. Herbal Trim Skin Treatment<sup>24</sup> provides essential moisture benefits to smooth and soften chafed, chapped, and dry skin. Forty patents are available on its medicinal properties like as an ointment for burn<sup>25</sup>, and for anti-inflammatory properties<sup>26</sup>, etc.



Source: ([http://upload.wikimedia.org/wikipedia/commons/5/5e/Eucalyptus\\_globulus\\_flowers\\_leaves.jpg](http://upload.wikimedia.org/wikipedia/commons/5/5e/Eucalyptus_globulus_flowers_leaves.jpg))

## *Phoenix dactylifera* L. (Khajur)

### NIF Database

#### Use from Punjab

##### Headache

Boil fruits with milk and take orally before going to bed  
- Mukhi Bhaga Bania, Firozpur, Punjab

#### Uses from other states

##### Tooth ache

Boil leaves in water till the decoction turns red in colour and gargle for immediate relief  
- Rashmi Kumari Poddar, Sitamari, Bihar

##### Asthma

Grind fruit (500g) along with black pepper seed (100g) into a paste and prepare tablets. Take one tablet orally twice a day till the ailment cures  
- Vinati Kumari, Sitamari, Bihar

##### Cough/cold

Boil fruits with milk and take it orally to get rid of cough  
- Sohanlal Chhipa, Jhalor, Rajasthan

##### Intestinal worms

Take four spoonful of warm leaf juice orally along with honey  
- Susanta Kumar Manjhi, Birbhum, West Bengal

### Uses in Classical Codified Literature

Infusion or syrup or paste of dates administered for sore throat, colds, bronchial catarrh and fever; Gum exudates is given orally for treating diarrhea and genito-urinary ailments; Roots are used against toothache<sup>27</sup>.

'Kharjura mantha'<sup>10</sup> is simplest preparation, where the fruits are crushed and churned with water. This is extremely beneficial to athletes for quick energy regain. 'Kharjurasava'<sup>10</sup> is a commonly used preparation in the treatment of anemia, tuberculosis, piles, hepatitis and diabetes. 'Geriforte-aqua'<sup>5</sup> is commonly given for enhancing the immunity. Seven patents are available on the medicinal uses of *Phoenix* such as for reducing intoxication<sup>28</sup>.



source: [http://upload.wikimedia.org/wikipedia/commons/4/40/Dahab\\_Egypt\\_Phoenix\\_dactylifera.JPG](http://upload.wikimedia.org/wikipedia/commons/4/40/Dahab_Egypt_Phoenix_dactylifera.JPG)

## Herbal Formulations for Healthy Crops

### SRISTI SHASTRA

*Arkhiben Vankar, Ranabhai Kamaliya, Banidan Gadhvi, Gemal Rana, Rajnikant Patel, Ahmadbhai Kadivala, Gujarat.*

It flourishes the growth of the plant by increasing flowering as well as fruiting. Besides overall vegetative growth, it is not harmful to nature and human beings. It also controls sucking pests like white fly, heliothis, aphid etc.

### SRISTI KRUSHAK

*Popatbhai Rupabhai Jambucha, Gujarat*

It is an excellent remedy for leaf curl disease. Besides controlling the disease it increases the vigor of the plants by increasing overall growth.

### SRISTI SURAKSHA

*Community Knowledge, Gujarat*

It is a very efficient treatment for termite and acts as a vitaliser to the affected crops. To control termites the herbal formulation is mixed with sand and spread in the field. Some times it is released in the field along with the flow of irrigation water. In some cases, it is also drenched in the affected part of the plant and sprayed on the vegetation to repel termites.

### SRISTI PRAYAS

*Community Knowledge, Gujarat*

It is a highly effective formulation to act as a herbal growth promoter, which stops shedding of flowers as well as increases the overall growth of the plant. This formulation strengthens the plants internally and enables them to withstand extreme weather conditions. Constant use of this formulation increases the yield and reduces the toxic content in our daily diet.

### SRISTI SHAKTI

*Community Knowledge, Gujarat*

A herbal growth promoter, which helps in production of excellent quality organic food grain. Constant use of this formulation not only increases the yield but also reduces the toxic contamination in our food and environment.



## Herbal Formulations for Livestock and Poultry

### Coccicure

*Sudakarbhai K. Gaudi & Jeevalbhai M. Gaudi, Dang, Gujarat*

It is a unique herbal medication for prevention and curing of Coccidiosis (*Eimeria* sp infections) in Poultry. The primary function of the medication is to reduce the oocytes maturation and affects the life cycle of various *Eimeria* species.

### Poultmax

*Community knowledge, Valsad, Dang, Gujarat*

It is a unique herbal medication for promoting poultry immunity. It cures symptoms like greenish diarrhoea, conjunctivitis, nasal sputum, drop in egg production and respiratory distress in poultry. About 30g/100 birds for 0-4 weeks & 60g/100 birds for 4-8 weeks may be administered for seven days in stress or for three days before and three days after expected stress.

### Mastiherb

*Ukhardiyabhai S. Raot, Dang, Gujarat*

Mastiherb is a unique intramammary herbal medication for curing mastitis in animals. Clinical trials indicated efficacy of the medication over subclinical mastitis; clinical mastitis and chronic mastitis. It was also validated in case of mastitis due to *Staphylococcus aureus*. The dose rate was found to be single intra mammary infusion for minimum three days after adequate standardization.



These formulations are based on traditional knowledge of farmers and developed by Sadbhav-SRISTI Sanshodhan Laboratory ([www.sristi.org](http://www.sristi.org)). These products are licensed to Matrix Biosciences Pvt. Ltd, Hyderabad, Andhra Pradesh. The benefits are shared with the knowledge providers, communities, nature, those who add value and other stakeholders in the knowledge and value chain.



## PART III

# INNOVATIONS for PUNJAB

**This section contains details of national innovations,  
which are deemed suitable for introduction  
in Punjab**





**A. Muruganatham**  
Tamil Nadu

## Sanitary napkin making machine: An option for women entrepreneurship

Sanitary napkins, a universally needed product, have a very low penetration in India due to high price and the traditional trend of using cheaper but unhygienic old cloth pieces. The innovator has developed a machine that produces quality sanitary napkins at a low cost.

One can prepare sanitary napkins with industry standard raw materials while cutting down the cost in production. It requires three to four persons to produce two pads per minute. Costing less than half of conventional options, this machine produces sanitary pads @ Rs.1 to Rs. 1.50 per pad approximately.

The innovator prefers to sell the napkin making machinery only to self-help groups of women. He has also designed a napkin vending machine such that one can put a coin and get a pad. With the support from the *Micro Venture Innovation Fund* scheme of NIF, the innovator has been able to install over fifty units in seven states.





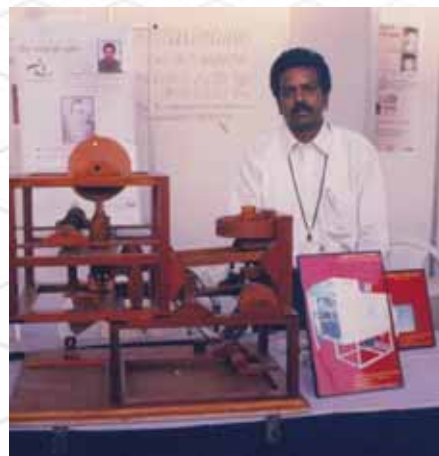
## Garlic peeling & lemon cutting machine

Faster peeling of garlic in an effective way is a major requirement in the pickle industry. This product is a food-grade, fully automated machinery designed for bulk quantity peeling of garlic. The machine ensures minimal damage and has wide application in making pickles and herbal medicines. The machine is energy efficient, saves labour, and has low capital and operating cost. It frees the industry from capacity constraints caused by shortage of labour in peak seasons.

The second product is also used in pickle industry, but for cutting lemons. It is a cost effective machine, having innovative design, with continuous feeding system. It performs precise and standard cutting of large quantity of lemons in uniform shape and size. It can be operated by one person and cuts lemon into eight equal pieces. The innovator has been able to run a good business with the financial support of MVIF and marketing effort of NIF. Nagarajan won a National Award in NIF's Third National Competition in 2005. NIF also filed patents of the machines on his behalf.



**M. Nagarajan**  
Tamil Nadu





**Raghav Gowda**  
Karnataka

## Manual milking machine

Safe milking of cows/buffaloes is a requirement across rural India and this product is an efficient step in that direction. The product is a low cost, manually operated device that helps farmers to milk the animal hygienically and also reduces drudgery in the process.

The machine has simple controls and can be easily operated by women as well. The creation of suction and low vacuum makes it suitable for other applications also. NIF has been giving marketing support to the innovator. As a result, this machine has also been sold to customers in Phillipines, Uganda and Ethiopia apart from India.



## Maruti jhoola - the health care chair

Modern life with its fast pace and sedentary lifestyle has created the need for solutions incorporating relaxation and invigoration. Maruti Jhoola is a unique health chair with multiple capabilities, functions and settings for various postures and seating dynamics.

It is ergonomically designed and serves the purpose of seating as well as exercising, with a capacity to accommodate a person weighing 120 kgs. It can double up as a hammock or a jhoola. The health chair has established itself as useful for people suffering from arthritis and joint ailments. To facilitate market, an entrepreneur has been engaged. Lot of cost was spent on packaging and transportation of the chair. It is now being redesigned and the cost may come down.



**Sakrabhai Prajapati**  
Gujarat





**Dharamveer**  
Haryana

## **Aloe vera gel Extractor**

The innovator has developed an effective multipurpose unit capable of pulverizing, steaming, and extraction of gel for herbal applications.

With this device, the innovator uses the specially designed pressure cooking chamber to extract the essence from *Aloe vera*. Being a compact portable unit, it can be quickly and easily transported and used anywhere even in the fields, to process herbs and deliver on demand. The present machine has a capacity to process 100 kg of *Aloe vera* per hour. The innovator was supported for production and commercialisation through GIAN North . One unit has been sent to Kenya on a pilot basis for application feasibility study in the country. Once the feasibility is confirmed, a contract order from the country is expected for more number of units.



## Mobile operated switch and multi-media poster

Imagine a village where the farmer has the luxury of being able to stay at home and switch his irrigation pump in the faraway field on or off as required during the day or at night. This is made possible by this innovation, which uses the power of mobile telephony to trigger electrical control switches.

The farmer can remotely know the status of the pump in his cell phone and turn the motor on or off by calling the particular configured number. It activates the switching by certain number of rings and hence incurs no call charges. Prem Singh has developed several other innovations, one of which is the viewer triggered multi-media poster. If any agency wants to communicate some graphic message with different language audios or videos, this multi-media poster can be very useful. NIF facilitated a mumbai based company to purchase two hundred units of the talking poster worth around eight lakh rupees for diffusion in various states. These were made available in five local languages.



**Prem Singh Saini**  
Haryana





**Yusuf Khan**  
Rajasthan

## Groundnut digging machine

Harvesting groundnut is a tedious process. While digging nuts, sometimes upto 20 percent of the pods are left underground. Complete digging out of all the groundnut pods from the soil is often not possible as manual labor is scarce, expensive and other means are not available.

The innovator has revolutionized groundnut digging with this sturdy rugged desert unit which is retrofitted on a standard 35HP tractor. As the tractor moves forward, the vanes at the bottom of this unit rotate, digging and scooping out the soil-groundnut mixture and dropping them into a vibrating storage bin. The bin has fine sieves at the bottom which lets out the soil while trapping the individual groundnut pods on the top. The hatch at the back of the unit is used to take out the groundnuts.

The unit consumes four litres of diesel per hour and completes digging of one hectare per day. The unit can run on uneven terrain and can also be used to sift out small stones, solid residue and garbage from fields and country roads.



The innovator has been supported under the 'Micro Venture Innovation Fund' of NIF for commercialising his innovation. In 2006, the technology was licensed to a Vizag based company, Ardee Hi-Tech Pvt. Ltd. This license was targeted for its application as a sea beach cleaner.

## Power generation through sewage / slow moving water

There is a search going around the world for solutions that harness alternate energy sources to generate electricity. The innovator has developed a system that generates energy from slow moving sewage or any other source of flowing water.

In this arrangement, electricity is generated when the slow moving sewage/water is passed through a cylindrical drum. The helical blades inside the cylindrical drum provide desired efficiency to the system in generating power. The capacity of the existing pilot unit is 30 kVA. This technology can have a tremendous impact on the generation of power from low velocity, high volume discharge of effluents from industries and civil sewage processing plants. NIF has been actively following up with national and international entities for partnership in taking this innovation forward and has also filed a patent for the technology in the innovator's name. Public agencies such as municipal authorities can particularly help in testing its utility.



**K. Balakrishna**  
Karnataka





**Madanlal Kumawat**  
Rajasthan

## Improved multicrop thresher

Farmers across India require a reliable machine that achieves threshing with minimal grain breakage, clean output for a variety of crops. The innovator has developed a versatile thresher that can meet these needs.

The modified farm implement reduces setup time to less than 15 minutes to switch over from one crop to another, and achieves minimal breakage. Its latest variant can also handle groundnut apart from threshing other cereals and pulses.

The innovator has been supported with working capital needs of his enterprise under the *Micro Venture Innovation Fund* of NIF. More than a hundred farmers have bought his thresher.





## Trench digging machine

While on a trip, the innovators noticed laborers manually digging the ground to make long trenches to lay telephone cables, taking months to complete the work. This inspired the innovators to build a mechanized equipment to dig trenches rapidly.

The trench digging unit developed by the innovators can be fitted to any tractor. The modified unit has a hydraulic lever to adjust digging depth and to maneuver the running unit, a planetary gear system and motion converter unit to achieve speed reduction and deliver power from the tractor.

The compact machine can dig narrow and deep channels evenly, on hard and soft soil conditions. In one hour, it can dig a pit 65 meters long, 5 feet deep and 14 inches wide, while consuming only 2.5 liters of diesel per hour. The equipment costs less than half that of imported models. It is even used by the local telephone department to lay cables.



**Radhey Shyam Tailor**  
**Nathulal Jangid**  
**Yusuf Khan**  
Rajasthan





**Sheikh Jahangir Sheikh  
Usman**  
Maharashtra

## Two-wheeler based spray painting device

The innovation is a painting device that can be easily mounted on a two-wheeler scooter and carried to a customer's place. Deriving power from the two-wheeler's engine to run the compressor, this device lends flexibility of usage to the painter. This innovation won Sheikh Jahangir, a consolation prize in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007. NIF has also filed a patent application for the same and has supported him through the Micro Venture Innovation Fund. He has also made a scooter mounted washing machine and a scooter mounted flour mill.



## Jayant sprayer

Cotton crop requires continuous spraying of insecticides during vegetative and reproductive growth to protect against the various pests. As plant height is more in cotton as compared to other crops during ball formation stage, it is very difficult to spray the field with conventional sprayers. The crop also requires high volume of insecticides, which with knapsack sprayer is tiresome and a time consuming process.

As a solution for the problems faced, Rameshbhai Bhalala has developed a sprayer cum inter-culturing equipment especially for cotton crops. A 10 HP diesel engine and three-piston sprayer pump is mounted at a height of 5 feet on the self-designed iron chassis. A flexible sprayer boom assembly of 15 ft length on each side having a total of 15 nozzles is provided to facilitate the spray. Provision has also been made to mount a small size harrow behind the rear wheels, which can be used for inter-culturing by attaching the harrow behind it. The machine costs Rs. 1.65 lakhs.



**Rameshbhai Bhalala**  
Gujarat





**Chinder Singh**  
Uttaranchal

## Multicrop combine unit

Harvesting of wheat and collection of chaff for feeding the animals is a time consuming process. The existing combines are fitted to tractors and need separate units to be fitted for harvesting of wheat and then for cutting of straw. Few farmers have the dual tractor-combine units and most small farmers have to wait for combine units to be available and pay necessary hire charges.

The innovator has developed a dedicated single unit which can simultaneously do both harvesting of wheat and generating the straw and depositing them in two separate tanks on either side. The machine also cleans grains, pulses and oilseed crops without breakage. Using an Ashok Leyland engine, with a compact footprint, it is a versatile option that can maneuver in tight zones with narrow plant interspacing. The machine can harvest wheat at the rate of one acre per hour.



## Bullet Santi-motorcycle based multipurpose plough

For small farms that lack access to tractors and can't keep bullocks, motorcycle driven plough, also called '*Bullet Santi*' is a low cost alternative.

Using the chassis, drive and power of an Enfield Bullet motorcycle in front, the innovator has retrofitted an attachment with two wheels at the rear with a tool bar to fit various farm implements. This meets various needs such as ploughing, weeding and sowing seeds. Being a unique local solution, the machine has proved to be cost effective and fuel efficient. Bullet Santi can plough an acre of land in half an hour consuming only two litres of fuel. Innovator has got a patent in India and USA. Given the fact, many other users and innovators copied this technology, he has appreciated the concept of '**Technology Commons**' implying no restrictions for other innovators to copy and adapt. But commercial firms will need license from members of the '**Technology Commons**'. NIF filed a patent on his behalf for the implement and also gave him a National Award in its First National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2001.



**Mansukhbhai Jagani**  
Gujarat





**Imli Toshi Namu**  
Nagaland

## Hydro generator using bamboo composite

Energy generation and pumping water for irrigation is a widespread rural need.

The innovator has used the bamboo powder, a by-product from the bamboo lathe machine invented by him, and mixed it with a resin to create a strong composite to fabricate the lightweight hydro turbine for generation of energy.



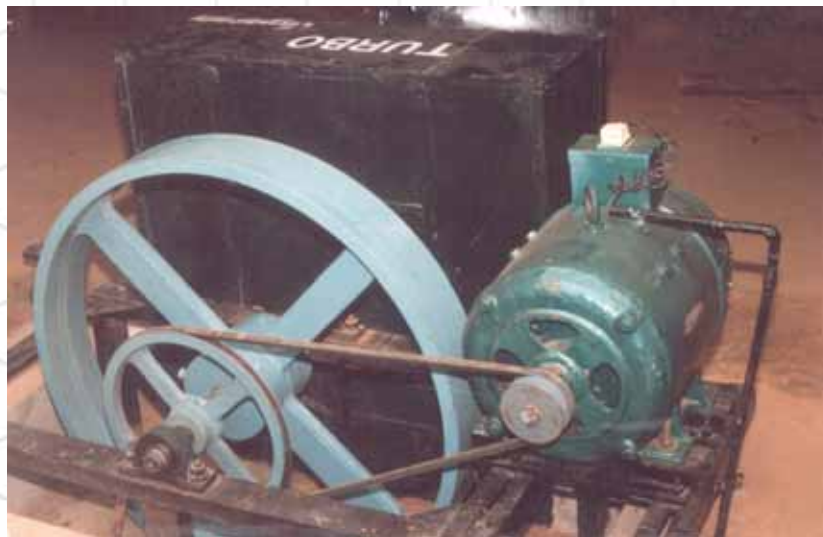
## Modified hydro electricity turbine

Electricity supply in the hills is always a problem with either the difficulty of access or distribution or disruption.

Hydro electric turbine is specifically designed for the hills. It costs Rs.30,000 and meets the individual electric needs of a rural household. The innovator has installed a few of these turbines in the hilly villages of Karnataka.



**G. K. Ratnakar**  
Karnataka





**Thomson Augustine**  
Kerala

## 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 per cent 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.





## Biomass gasification system

There are lots of villages in the country which are still not electrified or are receiving power erratically. Crude oil is not a very likely solution as it is depleting and the price is also going higher day by day. Use of biomass as a fuel therefore appears to be a good solution!

People using the biomass gas (producer gas) as a fuel generally complains of choking in the engine after running for a certain period of time. The innovator has changed the conventional design of gasifiers especially the filters and cooling unit to get clean gas, ensuring smooth operation of engine at low operational cost. On an average the biomass requirement is one kg/kW-h and the costs of 10 kW, 25 kW, 30 kW and 35 kW biomass gasifier system are Rs. 1,25,000, Rs. 2,00,000, Rs. 3,00,000 and Rs. 3,25,000, respectively.

Scientists from TERI (The Energy Research Institute) have confirmed its uniqueness and over fifty users have confirmed its operational practicability. The innovator has sold over fifty units after getting MVIF Support from NIF through GIAN North.



**Rai Singh Dahiya**  
Rajasthan





**Ishwar Singh Kundu**  
Haryana

## Herbal growth promoter

A herbal plant growth promoter, which is effective in protecting the plants from a broad spectrum of pests apart from providing necessary nutrition has been developed. It is named as “*Kamaal*” meaning wonderful, due to its performance. It is effective in field crops as well as in vegetable crops.

The main ingredients of the product are “*aak*” (*Calotropis gigantea*), “*reetha*” (*Sapindus trifoliatus*), “*dhatura*” (*Datura metel*), “*neem*” (*Azadirachta indica*), Tobacco (*Nicotiana tabacum*), and “*bhang*” (*Cannabis sativa*), etc.

The innovator won a consolation award in NIF’s Fourth National Biennial Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007. He has also been supported under the *Micro Venture Innovation Fund* of NIF for commercialising “*Kamaal*”. The product is a good hit in the local market and is fetching steady income for the innovator. This product has also been supplied for use in the gardens in the Rashtrapati Bhavan with encouraging results.



## Mango nipper

Farmers all over India need a simple device that can reach tall branches of trees to cut and harvest thousands of fruits per day. This innovative device with unique shape and cutting action can be used to harvest fruits quickly, saving time and increasing output.

The novelty lies in the design of replaceable cutting blades and hooking angle given to the oval shaped ring that assists in harvesting the fruits on upright branches. It is light weight, durable and suitable for harvesting fruits like mango, safota, guava, orange, etc.



**Madhav Mahajan**  
Maharashtra





**Jai Prakash Singh**  
Uttar Pradesh

## Virat (JP-6): An improved variety of pigeon pea

This new variety has coloured flowers, long leaves and bunchy type pods bearing at the top. The seed weight (19 – 20 gram/ 100 seeds), number of pods / plant (500 - 600), big size pods (3 – 5 inch), number of seeds/pod (5 – 6) and perennial yield (1st year 12 -14 quintal/ acre and 2nd year 14 – 15 quintal/ acre) is higher as compared to the local popular variety. This variety requires less quantity of seed (4 – 5 kg/acre) and maintenance as compared to other varieties grown in the region.



## Richa 2000: An improved variety of pigeon pea

This variety has big flowers, long leaves and bunchy type pod bearing at the top. Topping is done periodically, which results in bushy growth. This variety has synchronous maturity with higher yield (24 quintals/acre), more branches / plant (12-14) and more pods/plant (700 – 800) than other local popular varieties of the region. Rathore was given a consolation award in NIF's Fourth National Biennial Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007.



**Rajkumar Rathore**  
Madhya Pradesh





**Balasaheb Patil**  
Maharashtra

## Sushil Laxmi: An improved dual pod variety of chick pea

The most distinctive feature of the variety is that it bears two pods per axil as compared to single pod per axil, which is a common feature of most varieties that are available in the market. The plant variety is tall (50-60cm), spreading and has bushy type growth habit. The foliage is dark green and seeds are attractive, bold (25-30 gram/100 seeds) and brown in colour. The variety has been reported to be tolerant to wilting and insect pest attack in farmer's field, yielding on an average 14 - 16 quintals per acre under irrigated conditions and 12 - 13 quintal per acre in unirrigated conditions.



## Improved varieties of chilli and onion

An improved variety of chilli named Alakhpura selection has been developed, the seed quality of which is claimed to be very good with 95% germination. The fruit size is 6-9 inches, and it is said to be somewhat hot and pungent with thick skin texture. The powdered dried chilli imparts bright red colour. This variety grows well in sandy loam soil and the innovator has sold it to farmers throughout Haryana.

The onion variety developed by the innovator is commonly known in the innovator's village and neighbouring area as "*Balwan Singh ka pyaj*". It can be stored for around one year and the germination capacity of its seeds is claimed to be 98 per cent.



**Balwan Singh**  
Haryana





**Dadaji Ramaji Khobragade**  
Maharashtra

## HMT: An improved paddy variety

Khobragade selected and bred the HMT rice variety from the conventional 'Patel 3', a popular variety developed by Dr. J. P. Patel, JNKV Agriculture University, Jabalpur. He succeeded after five years of continuous study and research on a small farm owned by him without any support from the scientific community. This variety has an average yield of 40 – 45 quintals per hectare with short grains, high rice recovery (80 %), better aroma and cooking quality in comparison with the parent ones. Most remarkable feature of the variety is the thinness of grain. It has been included as a standard reference for thinness by Protection of Plant Variety and Farmers' Right Authority (PPVFRA).

He won the National Award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005. NIF has filed an application under PPVFRA 2001 to register his variety. Apart from HMT he has also developed six other paddy varieties namely DRK, Vijay Anand, Nanded Chinur, Nanded 92, Deepak Ratna and Nanded Hira. He regrets that local agricultural university took the credit merely for purifying the seeds and did not give him the due honour. HMT has diffused in more than one lakh acres in five states.





## Kudrat 9: An improved variety of wheat

The innovator believes that every farmer should get good quality seeds to deliver high yielding varieties of crops. He has developed a number of improved wheat, paddy, mustard and pigeon pea varieties, which are high yielding, robust stem, having bold seeds with good smell, taste and which are resistant to major pests & diseases.

“*Kudrat 9*”, an improved wheat variety, developed by him using simple selection is quite popular among the farmers in different parts of Uttar Pradesh, Madhya Pradesh, Chattisgarh, Maharashtra, Rajasthan, Gujarat and some parts of Bihar, Haryana and Punjab. This variety bears large number of ear bearing tillers with lengthy spikes and has a hardy stem. The grain has a good taste. The average yield of this variety is 55-60 quintals / hectares.



**Prakash Singh  
Raghuvanshi**  
Uttar Pradesh



**M. Lingamadaiah**  
Karnataka

## Mysore Mallige: A unique paddy variety

Shri Lingamadaiah, a graduate in law, is known for his variety '*Mysore Malligae*' in Karnataka, Tamil Nadu and parts of Andhra Pradesh. *Mysore Malligae*' developed through systematic recurrent selection by the innovator. It is an early bearing variety with a yield of about 36 quintals per acre (9000kg/ha). The innovator was facing pest and disease problem in paddy for many years and also getting low milling recovery. He started multiplying the new paddy variety by selection procedure to get pest and disease free variety with higher milling recovery. It yields more even without any extra input and is of short duration, resistant to lodging and milling recovery is about 80 percent. If grown organically, hardly any pest and disease attack is observed. He is growing this variety since 1994. It has covered 25-30% of paddy growing area in the region.

He won a National Award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2002 and was also honored with Beeja Mitra award from GREEN Foundation.



## New cultivars of lemon grass – “Hunar”

Shri Gurpreet Singh is an innovative farmer from Uttaranchal. He is a St Stephens graduate. He has cultivated a new variety of lemon grass with high citral content and also improvised on its extraction process making it efficient and purer. He worked in the tea industry for 10 years. His farming background, along with his experience in Tea industry provided him a mechanism of Scientific Agriculture, which was instrumental in this process of selection. SRISTI (Society for Research and Initiatives for Sustainable Technologies & Institutions), Ahmedabad has honored him with SRISTI SAMMAN -2007 for his outstanding contribution.



**Gurpreet Singh\***  
Uttaranchal



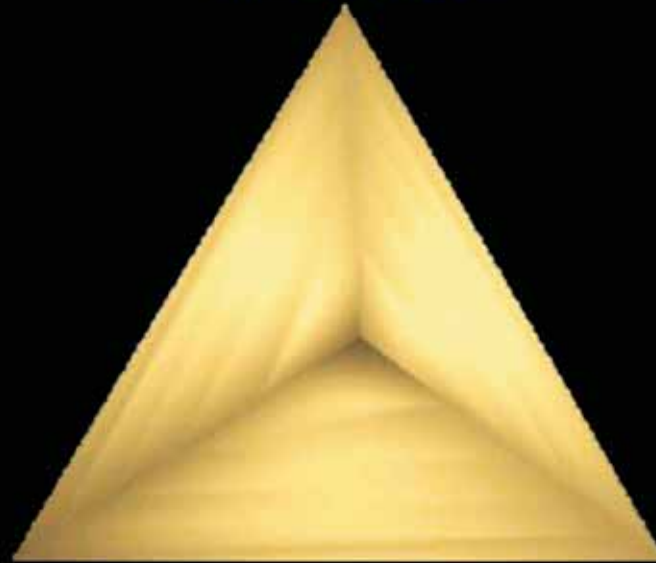
\*As per its mandate, NIF does not consider such professionals for awards or financial support, but only helps in providing visibility or linkages.

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