
Honey Bee Network
Manipur Innovates
National Innovation Foundation

MANIPUR INNOVATES

National Innovation Foundation

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HONEY BEE NETWORK

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Regional Collaborator
IIT Guwahati

CONTENTS

MANIPUR INNOVATES

PREFACE

National Innovation Foundation (NIF) has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. Till date NIF has been able to scout innovations and traditional knowledge practices from over 520 districts across India.

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

Despite various constraints, NIF has put together a small book celebrating creativity, innovation and traditional knowledge from Manipur. I am conscious of its limitation in terms of coverage and outreach. But if we could uncover at least a few examples of the ability of local communities and individuals to solve problems on their own without outside help, how much more can be done if state and private sector agencies join hands with NIF actively.

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

The book is divided in three parts. The mechanical innovations developed by innovators from Manipur 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 Manipur are given in part three.

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

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

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

This book on innovations has been compiled at the request of Dr. Vijay Kelkar, Chairman, Finance Commission and the Member, Governing Council of the National Innovation Foundation as a tribute to the creativity and innovation at grassroots. This presentation is part of a series of innovation compendium prepared for every State of India. We hope this will be followed up in the form of concrete policy and institutional initiatives in each State to empower creative people to improve the quality of life of common people and thus promote inclusive growth.

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

R. A. Mashelkar, FRS
Chairperson, Governing Council
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Building a Bridge with Grassroots Innovators in Informal Sector

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

Drawing upon this experience, National Innovation Foundation (NIF) was set up in 2000 with the help of Department of Science and Technology, Government of India to scale up the idea of learning from grassroots innovators.

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

How does NIF work?

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

[1] The Honeybee collects pollen from the flowers but they are not impoverished, in the process links one flower to another enabling cross-pollination. Similarly, the Honey Bee Network strengthens people-to-people contacts, learning and networking by pooling the solutions developed by individuals across the world in different sectors. The network acknowledges the innovators, traditional knowledge producers and communicators so that they do not remain anonymous.

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

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

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

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

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

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The Honey Bee Network strongly believes in sharing knowledge among the providers of innovations in their own language, which is achieved by publishing local language versions of Honey Bee newsletter. It also ensures that a fair share of benefits arising from commercial exploitation of local knowledge and innovations reaches the innovators and knowledge providers.

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

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

What has it done?

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1,00,000 ideas, innovations and traditional knowledge practices (not all unique, not all distinctive) from over 520 districts of the country.

NIF has filed 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.

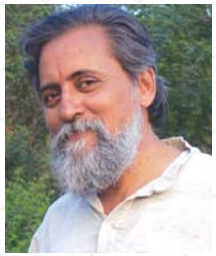
How can state government join hands with NIF?

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

source of innovative ideas and technologies and state government as partner in dissemination, value addition and even commercialization through incentives, promotion, subsidies, etc.

b. State government can join the national campaign for scouting innovations and traditional knowledge and motivate its grassroots functionaries to join hands with NIF in uncovering the talent at the community level.
c. Students in schools and colleges can be motivated to scout creative and innovative people in their neighbourhoods and send the entries to NIF (Post Box No.15051, Ambavadi, Ahmedabad 380 015, campaign@nifindia.org). Examples of innovations can also be included in the curriculum for the school and college education.
d. Demonstrations and trials can be organized at various regional research stations and KVKs (Krishi Vigyan Kendras) so as to create awareness about the creative potential of common people.
e. The research institutions can be mandated to add value to the knowledge of innovative people and help in protecting their knowledge rights.
f. On the state's website, link to NIF can be given and the innovations from the region can be displayed to put forward the creative face of the state before the people.
g. Some of the innovative people identified by NIF and/or state government could be awarded at district and state level besides giving them support for further work.
h. A nodal officer could be appointed to keep in dynamic touch with NIF to ensure that all the areas of possible cooperation are explored.

I hope that NIF would be able to develop a functional, fruitful and fulfilling relationship with the state of Manipur. Tremendously rich knowledge of biodiversity and environment besides numerous grassroots innovations can be leveraged through the proposed collaboration.



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“Innovation opens up new vistas of knowledge and new dimensions to our imagination to make everyday life more meaningful and richer in depth and content”.

- Dr. A.P.J. Abdul Kalam

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

- Dr. R.A. Mashelkar

PART I

INNOVATIONS
from MANIPUR

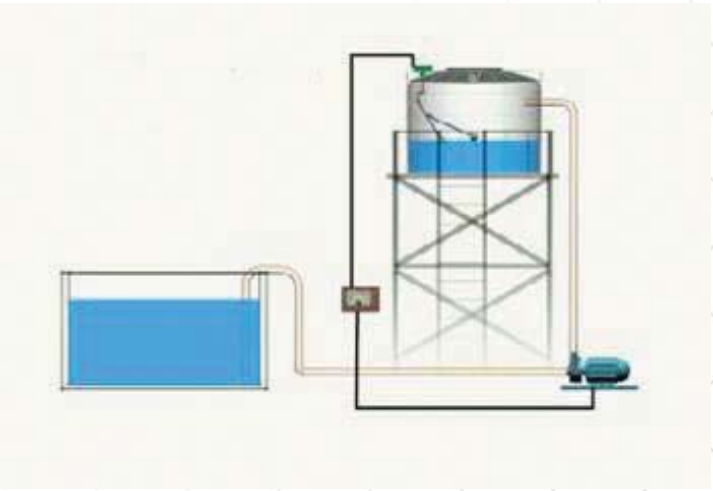
This section contains grassroots innovations emerging from the rural/urban areas of Manipur

M. Manihar Sharma
Imphal East

Automatic Pump Operator, dehydrator, *Agarbati Dhoop* making machine

M. Manihar Sharma (62), a high school pass, has solved many local problems. After dropping out of high school he worked as a local mechanic in a workshop from where his fascination with mechanical world began. His journey is diverse; he was a founder general secretary of The All Manipur Auto Rickshaw Owner's and Driver's Association. He also ran a hotel, served as assistant to his doctor friend and is now a full time innovator.

He has come up with a Automatic Pump Operating system (APO) with seven variants, which allows hassle-free household water management. Using a central control panel, the pump switches on automatically as soon as the overhead reservoir goes below the threshold level and switches off as soon it gets full. The same principle follows for the ground reservoir as well.



The innovator has also made a simple dehydrator with very efficient mechanism. Hot air is blown into the chamber with the help of normal heating rods and air blower from below. Every layer of trays is attached with an air guide, which provides uniform distribution of the hot air. On top of the machine, an exhaust fan continuously drains out the moisture from inside.

Manihar has also developed an *Agarbati Dhoop* making machine. The device has two blade arrangements, one for making small bamboo splints and the other for making small sticks. For stick making it has multi-bladed arrangements for different stick sizes. Both the blades are fixed on two sides of a small wooden bloke. Apart from the above solutions, the innovator has also innovated a micro drill for small operations.

Yenkhom Mangi Singh
Thoubal

Kouna mat making machine

Y. Mangi Singh, a 63 year old physically challenged person, has been able to provide the much needed impetus to the traditional *Kouna* (water reed) mat making industry in Manipur. *Kouna* is synonymous with the exotic craft tradition of Manipur; the unique feature is that Manipur is the only place where *Kouna* is grown and extensively used in local crafts. More than 4 lakh people in the unorganized sector are engaged in the state crafts industry and more than 180 items are made using *Kouna*.

This manual machine, which can even be operated by a low skilled worker or a physically challenged person can weave two mats per day. The quality of the mats produced is better than those produced by traditional methods.

The innovator has been financially supported for product development and market research. NIF has also engaged local designers, Nehru Yuva Kedra, Central Crafts office etc., for value addition and dissemination of this technology.

03

Domestic mini rice mill

K. Biren Singh*
Imphal

This innovative compact rice mill developed by Biren performs three different functions – husking, polishing, and vibration, for rice husking. The machine is run by a one HP motor with an average capacity of milling 100kg of paddy per hour. The unique feature of the machine is the conversion of a normally horizontal husking or milling apparatus into a vertical one saving space and making the machine compact.

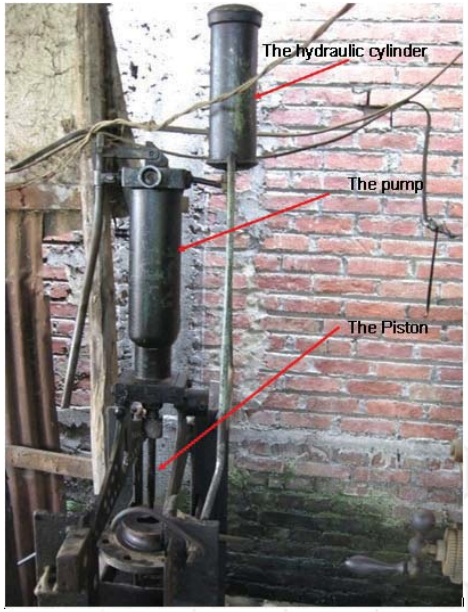
*As per its mandate, NIF does not consider such professionals for awards or financial support, but only helps in providing visibility or linkages.

04

T. Madhu Chandra
Imphal West

Vertical hydraulic pump

This is a hydraulic pressure pump for bending iron rods. Normally the available pumps are placed horizontally, which takes more space. This also creates a lot of problems for the user. As the piston moves horizontally, the iron rod to be bent has to be held tightly horizontally against the hydraulic force, which becomes quite awkward and uncomfortable for the user. The innovator has solved these problems by making the pressure pump vertical. He has also made a machine for cleaning engine valves, which can clean around twenty valves per day.



05

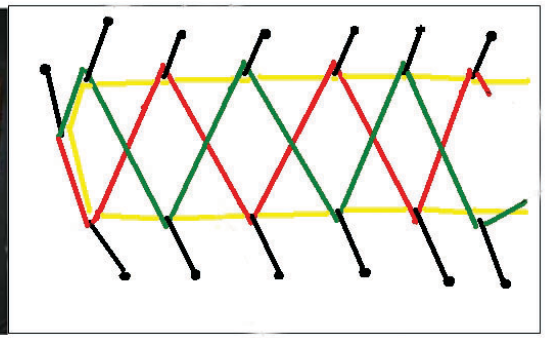
Woolen scarf knitting device

Moirangthem Manglembi Devi
Imphal

This is a very simple but useful innovation to knit woolen scarves. The device consists of a wooden rectangular base with nails fitted around an inner smaller rectangle. The space between the nails depends on the design of the pattern desired. The desired frill design is made by tying threads to the nails. Thereafter, based on the design, woolen thread is knitted over the nails. The threading of the woolen threads forms a net without any knots.

In each nail, there are two threads, one above the other. To make knitting continuous, the lower thread is picked, using a knitting hook, and put on top of the upper thread with a cross-over around each nail to ensure continuity of the knitted portion. The knitted part is pulled down from below, so that only one layer of knitted thread remains. Then the same process is followed until the desired length of the scarf is obtained.

This device makes knitting very easy for even the unskilled people and faster than traditional hand knitting. It can also make double layer pattern cloth or reversible design with no edge stitching.

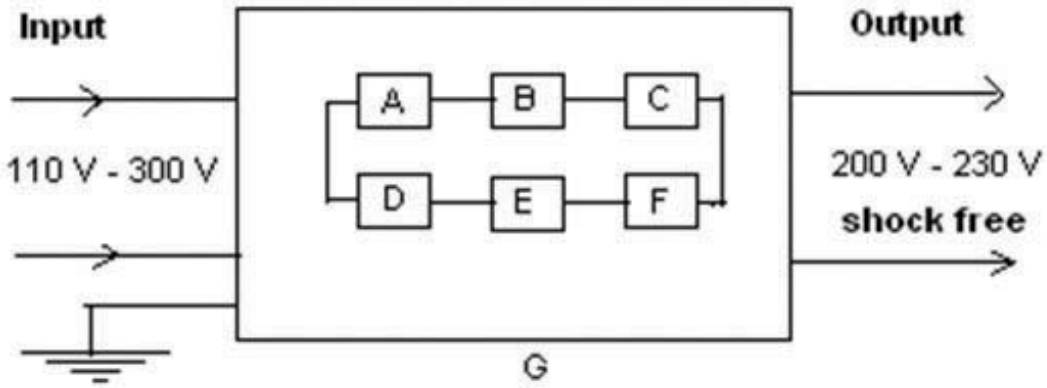


Kshetrimayum Nicholson Singh
Imphal

The shock-proof converter

An electric shock occurs when a person comes into contact with an electrical energy source. The present innovative device converts all electrical lines to shock-free power lines. This is a very useful device for every household/commercial establishment with electrical installation. The device can be installed just after the energy meter so that each and every connection in a household/commercial establishment gets connected to the device and becomes shock-free.

Nicholson is a prolific innovator and has many other innovations to his credit like the reuse of fused tube lights, longer lasting modified tube light choke, and movable solar energy panel.



07

‘Molom Angouba’: a traditional knowledge based herbal micro-enterprise

Smt. Konsam Shama Devi
Imphal

‘Molom Angouba’ literally means ‘White Ointment’. This is a medicinal ointment prepared using various local indigenous plants and materials. The paste is mainly used in treating burn injuries, but can also be used as an antidote for insect bites (especially bees), and as a crack cream.

The practitioner, Smt Konsam Shama Devi, inherited the formulation of the medicine from her paternal aunt, who had no male heir. Her aunt in turn inherited the knowledge from her grandfather. Her grandfather learnt the knowledge from a local medicinal practitioner named Luwangshangbam Maiba from Luwangshangbam, a small village in the northern part of Imphal, in the nineteen thirties. The ointment is supposed to cure any burn injury removing all scars and also offer instant pain relief.

Konsam claims to have treated and cured many patients who came out of hospitals un-cured from different parts of the state. The ointment has even been sent all the way to Delhi and other states to treat Manipuri patients who live there. NIF has provided financial assistance for scaling up her enterprise.

Iron mesh for drying fish

N. Indrakumar Singh
Toubal

N. Indrakumar Singh is a 70 years old carpenter who does agriculture work as well. He has no formal education but is a well informed person. He has developed quite a few machineries and specializes in making local loom machines.

Smoking or drying of fish is an age old practice. One such method, which is very popular in the state of Manipur, is using of an iron mesh for smoking or burning off the fish scales. In early days, people used to make different kinds of bamboo mesh for such purposes. Now-a-days iron mesh, which is more durable, has become more popular.

The present innovation is a simple treadle loom machine to make iron mesh. It is quite similar to any other normal treadle loom, except that the new loom has four wheels and moves along as one weaves along. The machine is the only one of its kind for making iron mesh. It is low cost, and doesn't need an expert hand to operate. Each machine provides employment to about 3-4 people.

Besides the iron mesh making machine, the innovator has also developed a small device to make patterns on charcoal chula, Frill making machine of iron mesh, Wood curving technique, etc. The innovator has been given financial assistance for product development and dissemination for his machine.

09

Herbal soap

Khumujam Jina
Imphal

Khumujam (56), only tenth standard pass, is a prolific innovator, a good craftsman and above all a good samaritan. She regularly provides training to various individuals, NGOs/ SHGs, institutions, etc., in various activities like soap making, agarbatti making, embroidery, bag making from recycled materials, etc.

Her home 'Our Rest House' is the work place and rest home for many widows, HIV+ women, old women, etc. Though endowed with very little material assets, her home is providing support and comfort to many women.

Khumujam has innovatively used several local herbs/plants, which are traditionally known to have positive health benefits in the old process of making soaps. She has made soaps from many local herbs/plants, milk, honey, etc., in different combinations. The notable one, which seems to be very popular among locals, is the one made of a local plant 'Nung-leishang', which is supposed to have high medicinal value.

Maishnam Maimu Singh
Bishnupur

Silk reeling machine

Maishnam Maimu Singh (73), a farmer from a small village called Thankgtek Makha Leikai, near Nambol town in Bishnupur district, Manipur, is a multi-faceted and enormously talented individual. He is a carpenter, sculptorist, artist, mechanic and above all a prolific innovator.

His talents, skills and creativity however, still remain unknown, unrecognized and unutilized. The only appreciation comes from his neighbors and relatives and from people whose problems he has solved in the past. He has developed more than 15 different prototypes of various machines sometimes on his own and sometimes in response to people's requirements.

Seeing the difficulty and wastage of time in reeling of silk/muga in traditional reeling method, he came up with a simple machine for silk/muga reeling. Likewise, he also developed a pounding machine with a cape, which prevents the pounded item from scattering. The most prominent among his innovations is the manual washing machine. The machine has become so handy in washing soiled or heavy/large clothes that even his neighbours borrow the machine to wash their soiled/ heavy clothes. Maimu has also developed a manual threshing machine, which simulates the hand threshing process. The residual advantage of the machine is that the stalks are not broken into pieces and still can be used as fodder and for roofing purposes. Maimu has also been helping students in developing prototypes for their school projects, many of which have won prizes at various competitions.

11

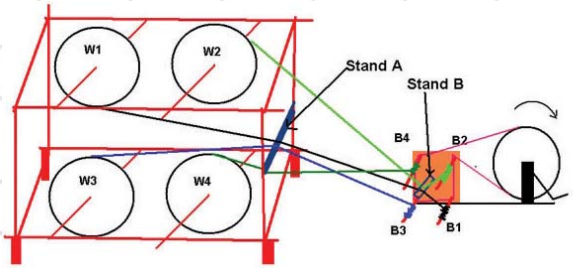
Multi bobbin charkha, portable inverter lamp and camera flash bulb

Hidangmayum Mani Sharma
Imphal

Hidingmayum Mani Sharma (35), tenth standard pass, is a serial innovator, lives in a sleepy village called Sangaithel, on the western foothills of Imphal valley. He and his younger brother are well known in the locality for their versatility in making new innovative items and improvising old machineries to meet the local requirements. Their activity/job list is endless – they run a motor repairing center, a small photo studio, a rice mill, carpentry workshop, fabrication workshop for small equipments, and till their farm with self designed power tiller.

Among other things, Hidangmayum has made a Multi-bobbin charkha, resembling a traditional charkha, which can reel/spin four bobbins at a time. There are no separate thread movable guides; it is done by hand holding the threads together. The machine is very simple in mechanism and does the work of four people using only one.

His other innovations include a portable inverter lamp, which is a big hit in his locality and surrounding villages, as a replacement to conventional kerosene hard-lamp. He has also modified a camera flash to be used for indoor shootings in studios and where there is no regular power supply.



Nameirakpam Jilatombi Singh
Imphal West

Penao: modifying a traditional musical instrument

Pena is one of the most popular musical instruments of the Meitei community and is used in a variety of social and cultural events. The uniqueness of *Pena* lies in its distinctive sound, which is quite different from any other fiddle and string instruments. However, unlike other modern musical instruments, *Pena* has limitations in playing some of musical notes, because of the use of a single bundle string. As a result, the instrument cannot be used to accompany with other modern musical instruments because of its limited notes capability.

Nameirakpam has modified the *Pena* into what he calls a *Penao.* The instrument consists of the main body (*Penamasa*) and the bow (*Pena cheijing*). The number of bundle strings (using horse tail hairs) has been increased. An improvisation has also been done in the bridge arrangement where instead of a single bridge; three separate bridges have been provided for each of the strings in a slanting position. This arrangement allows the *Penao* to play a wide range of musical notes, without losing the original and distinctive sound of the traditional *Pena*.

13

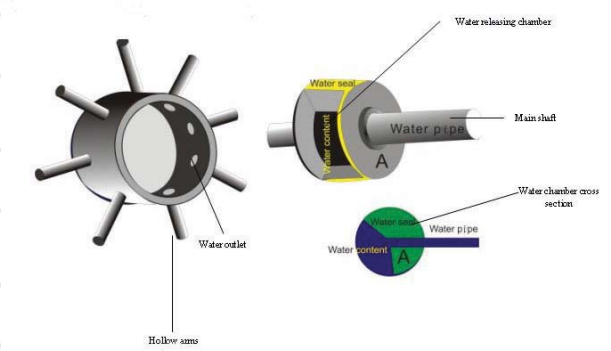
Mini-hydel power generator

Sorokhaibam Biren Singh
Bishnupur

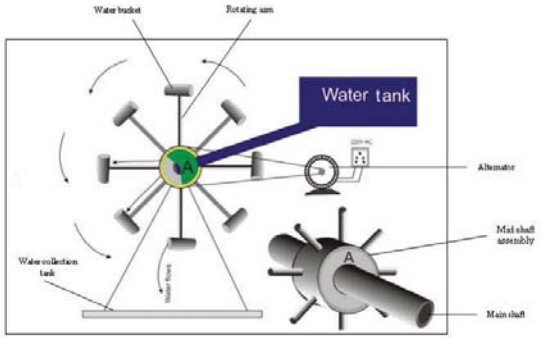
Using a low rpm alternator of a wind turbine, Biren came up with this mini-hydel generator around ten years ago at a cost of Rs. 27, 000. It needs a head of at least 3.5 ft. As the water flows the buckets at the end of the hollow arms start rotating due to the weight of the water.

The device with 2.5 inch diameter water inlet could generate up to 500 watts of electricity. Its main advantage is that with a single source of water, a series of devices can be run simultaneously. The only requirement is that there has to be a 5-6 ft difference of head between hydro turbines. It does not need a high velocity of water to exert pressure; since water tight chamber helps in that regard.

The innovator has also developed a modified power loom, using second hand parts, based on the model of the local shuttle loom. The loom is run by a 0.5 hp motor. The whole process is fully automated, except for changing bobbins in the shuttle.



The mid-shaft assembly and rotating arms



The mini-hydel machine assembly

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?

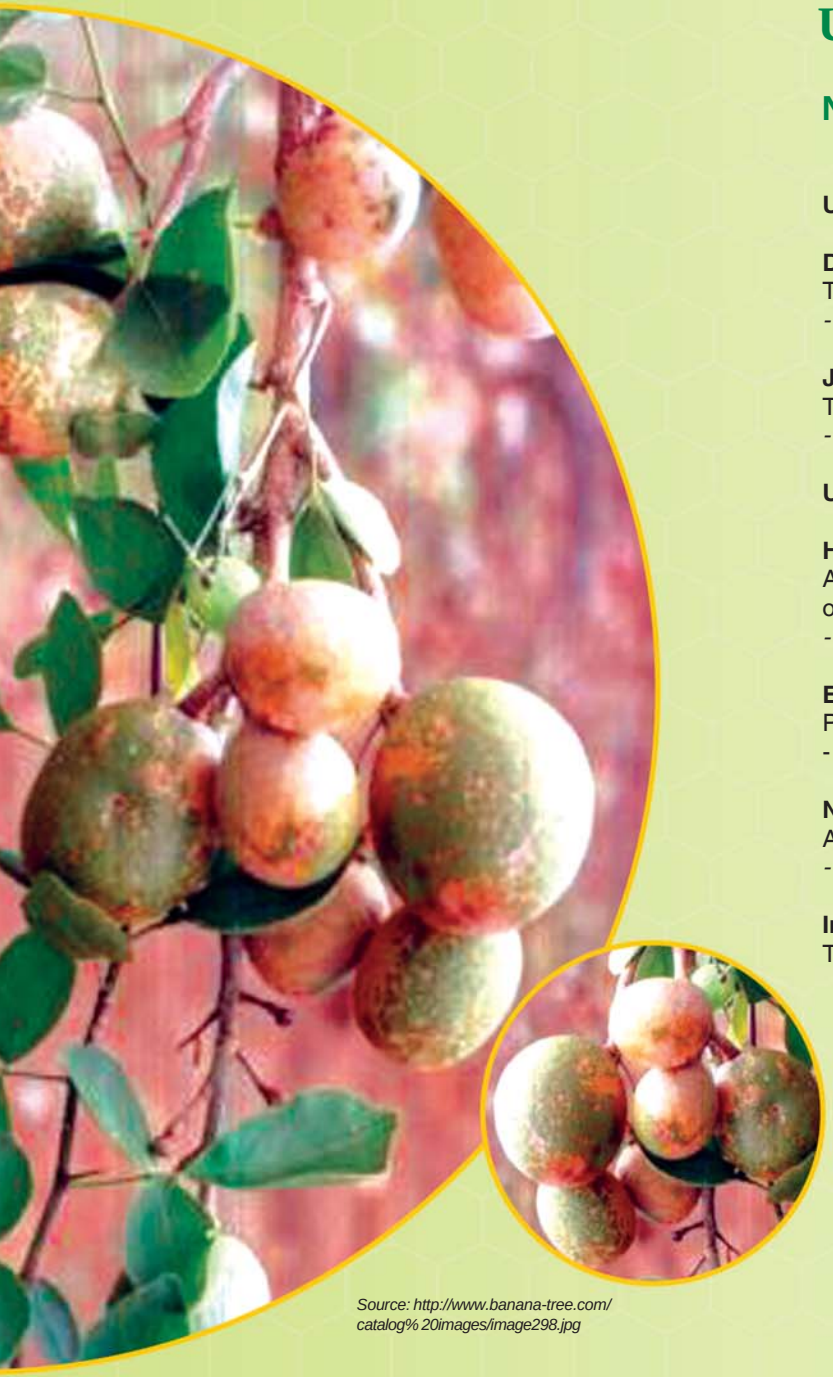
National Coordinator (Scouting & Documentation), National Innovation Foundation, Bungalow No. 1 Satellite Complex, Premchand Nagar Road, Ahmedabad 380015 Gujarat
Toll Free No 1800 233 5555 Fax: (079) - 2673 1903
email: campaign@nifindia.org; www.nifindia.org

PART II

HERBAL PRACTICES & PRODUCTS

This section contains details of herbal preparations used traditionally for various ailments and products based on such traditional knowledge.

Uses of *Aegle marmelos* (L.) Correa (Harikhagok)



Source: http://www.banana-tree.com/catalog% 20images/image298.jpg

NIF Database

Uses from Manipur

Diabetes
Take the root juice (150ml) orally
- Maibum Lolito Meitei, Bishempur, Manipur

Jaundice
Take the leaf juice or fruits orally
- Ngairangbam Santosh Singh, Imphal East, Manipur

Uses from other states

Headache
Apply the paste of the roots of harikhagok and the leaves of *Leucas aspera* L.
- Bhadi Ram Bharali, Guwahati, Assam

Eye diseases
Put two drops of the green leaf juice in the eye
- Kumari Nigar Pravin, Hazaribag, Jharkhand

Nasal bleeding
Apply the leaf paste on the nose.
- Puran Chand, Kangra, Himachal Pradesh

Intestinal worms
Take the green leaf juice orally
- Jagjeet Bahadur, Sitapur, Uttar Pradesh

Diarrhoea
Take the fruit pulp orally
- Jagjeet Bahadur, Sitapur, Uttar Pradesh

Menorrhagia
Take the leaf paste orally
- Rani B. Bhagat, Pune, Maharashtra

Uses in Classical Codified Literature

Burnt fruit pulp is used in rheumatic arthritis[1]; 10g fruit pulp is given before sleep to overcome morning sickness[2]; fruit rind is applied externally on hair to kill headlice[3]. 'Bael'[4], prepared from *Aegle* is used in diarrhoea, dysentery and GI disorders. It has digestive and carminative properties. Lukol's[4] tonic is made from this plant along with other plants. It improves uterine circulation, and its antimicrobial and astringent actions on the mucous membrane of the genital system also help control leucorrhoea. 'Bilwa'[5], a product of *Aegle*, is used as a medicine to cure a number of diseases. Fifty-three patents have been found on the medicinal applications of *Aegle* mainly for curing diabetes[6], gastric ulcer[7] etc.

Uses of *Centella asiatica* (L.) Urban (Peruk)

NIF Database

Use from Manipur

Diarrhoea
Take the whole plant juice with a pinch of salt orally twice a day for one week
- *Sapam Deben SIngh, Bishnupur,Manipur*

Uses from other states

Memory enhancer
Take the leaf juice orally
- *Savitri Devi, Kangra, Himachal Pradesh*

Toothache
Apply the paste of peruk leaves, onion and banana roots (taken in equal quantity) on the aching tooth
- *Anil Gogoi, Sibsagar, Assam*

Anorexia
Take the leaf juice orally
- *Gamaliyal Hembrom, Hazaribag, Jharkhand*

Stomachache
Eat the fresh leaves to get relief
- *Krishna Chand, Kangra, Himachal Pradesh*

Dysentery
Take the leaf paste along with black pepper orally
- *Dipali Borah, Sibsagar, Assam*

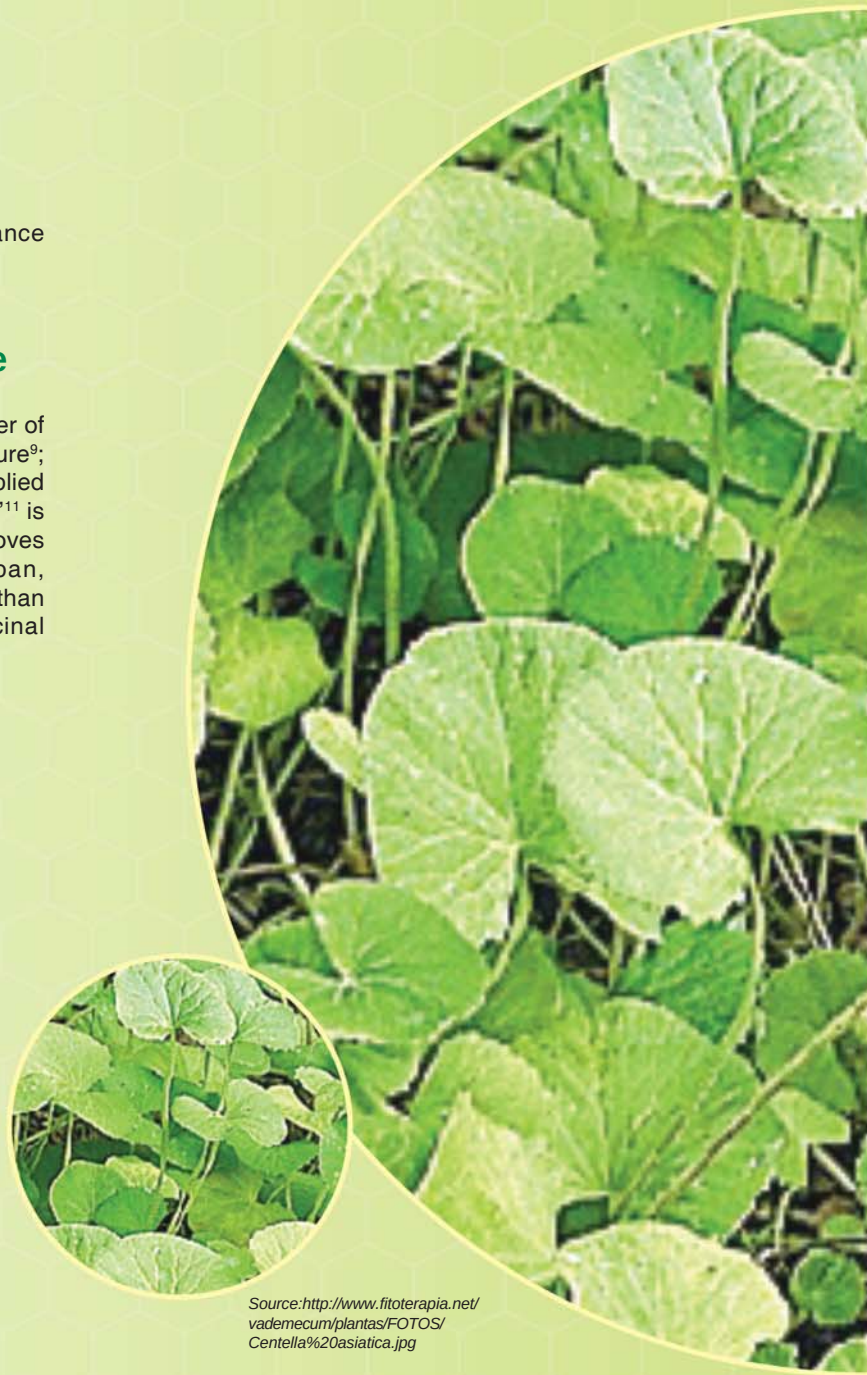
Skin diseases
Apply the leaf paste topically
- *Savitri Devi, Kangra, Himachal Pradesh*

Eat the plant regularly as vegetable
- *Bablu Bediya, Hazaribag, Jharkhand*

Herbal tea
Drink tea made from the plant's leaves to enhance immunity
- *Jasmit Singh, Hamirpur, Himachal Pradesh*

Uses in Classical Codified Literature

Juice of aerial parts is used as a brain tonic[8]; powder of aerial portion is taken to control high blood pressure[9]; whole plant is used as diuretic[10]; plant paste is applied as a poultice in case of bone fracture[10]. 'Herbal Tea'[11] is mainly indicated as a health drink. 'Mentat'[4] improves mental functions, mental quotient, memory span, concentration ability and stress threshold. More than three hundred patents were found on its medicinal applications mainly on anti-depressant activity[12].



Source:http://www.fitoterapia.net/vademecum/plantas/FOTOS/Centella%20asiatica.jpg

Uses of *Jatropha curcas* L. (Jatropha)

Source: NIF Database

NIF Database

Use from Manipur

Piles
Take the leaf juice orally
- Chingakham Binashaki Devi, Imphal West, Manipur

Uses from other states

Jaundice
Take one teaspoon of the mixture of the leaf and bark juice, and jaggery orally
- Dimbeswar Gogoi, Sibsagar, Assam

Tumor
Tie warm leaves smeared with oil on the tumor
- Madhav Shankar Rao Patil, Jalgaon, Maharashtra

Skin disease
Apply leaf paste topically
- Madhav Shankar Rao Patil, Jalgaon, Maharashtra

Thorn pain
Apply latex of the plant on the affected part
- Madhav Shankar Rao Patil, Jalgaon, Maharashtra

Agnail
Apply latex of the plant on the infected part
- Atilik Baruah, Sibsagar, Assam

Uses in Classical Codified Literature

Bark powder is taken orally with water to get cured from pyorrhea[13]; leaves are useful in ulcer[10]; young branches are warmed in fire and tied on the aching joint[14]; latex is applied at the site of burn[15]. 'Jatropha tincture'[16] is used as a disinfectant, antiparasitic and anticoagulant. Thirteen patents have been found mainly on the medicinal uses such as for cuts, burns and wounds[17].

Uses of *Juglans regia* L. (Heijugang)

NIF Database

Use from Manipur

Memory enhancer
Take one tablet prepared from the ground mesocarp of the fruit orally thrice a day
- Sapam Deben Singh, Bishnupur, Manipur

Uses from other states

Hair care
Apply oil on the scalp to reduce hair fall
- Joginder Singh Negi, Kullu, Himachal Pradesh

Tongue cleaning
Chew the bark along with the leaves of *Azadirachta indica* A. Juss.
-Shilpa Jain, Rajkot, Gujarat

Wounds
Apply the sap of fruit directly on the affected part
- Nasir Ahmed Sheikh, Anantnag, Jammu & Kashmir

Apply the powder of unripe fruit rind on the injured body part
- Mohd. Jamal Sheikh, Anantnag, Jammu & Kashmir

Swelling on body
Take the mixture of oil (50gm) with cow's urine (10gm) orally
-Shripal Singh, Bulandshahar, Uttar Pradesh

Knee pain
Eat a couple of fruits everyday to get relief
- Koushlya Kumawat, Sikar, Rajasthan

Uses in Classical Codified Literature

Poultice of fruit is applied externally on abscess[18]; the fruit is used as carminative[10]; oil extracted from fruit is taken to get rid of tapeworms[10]; the plant is used to cure rheumatism[19]. 'Fairness cream'[4] improves complexion, nourishes and makes the skin soft; 'Gentle exfoliating walnut scrub'[4] gently exfoliates dead skin cells. Thirty patents have been found on the medicinal applications of walnut in antitumor[20] medication, for haircare[21], etc.

Source: SRISTI Database

Uses of *Nyctanthes arbor-tristis* L. (Singarei)

Source: http://prathom.swu.ac.th/panmai/pic/7-10110-002-110.JPG

NIF Database

Use from Manipur

Fever
Take the leaf decoction orally
- R.K. Bheirosana Singh, Bishnupur, Manipur

Uses from other states

Hair fall
Apply the paste of seeds on the scalp
- Rani B. Bhagat, Pune, Maharashtra

Cough/cold
Take the paste prepared from three leaves and black pepper orally along with water
- Ashok Kumar Yadav, East Champaran, Bihar

Malaria
Take the leaf juice orally along with honey
- Prabati Kalita, Kamrup, Assam

Intestinal worms
Take two spoonfuls of the flower juice with a pinch of salt orally for two days
- Manoj Kalita, Kamrup, Assam

Diabetes
Take the decoction of the leaves orally for 40 days
- Shama Pravin, Gopalganj, Bihar

Wound
Apply the leaf paste topically
- Ranjeet Kumar, Sheohar, Bihar

Pain
Apply the leaf paste on fractured part to alleviate pain
- Ramsharan Dhruv, Dhamtari, Chhattisgarh

Uses in Classical Codified Literature

Dried fruits are taken orally to get relief from cough[22]; decoction of dried flower is given with jaggery as an anti-fertility agent in females[23]; leaf juice is applied externally on ringworm and other skin diseases[23]. 'Lupin'[24], is a medicine used for pain and inflammation associated with musculoskeletal and joint disorders. Six patents have been found on its medicinal uses such as in treating Leishmaniasis[25] and also for its natural property as a dye[26].

Uses of *Solanum nigrum* L. (Morokpan)

NIF Database

Uses from Manipur

Tonsillitis
Make tablets from the leaves of *Solanum* and *Alpinia galanga* Willd. Take one tablet orally twice a day
- *Yumnam Rajenkumar Singh, Imphal West, Manipur*

Stomachache
Take the fried leaves of *Solanum*, *Azadirachta indica* A. Juss. and *Vitex negundo* L. orally twice a day
- *Moirangthem Mani Devi, Imphal West, Manipur*

Uses from other states

Nasal bleeding
Boil dry fruit (25g) in mustard oil (100g). Filter the oil and apply on the nose
- *Sahim Ansari, Lohardaga, Jharkhand*

Mouth ulcer
Chew the leaves
- *Shripal Singh, Bulandshahar, Uttar Pradesh*

Cough
Take the root juice orally
- *Priyanka Kumari, Gopalganj, Bihar*

Fry the leaves of morokpan (200g) in mustard oil (20ml) and take them orally with a little salt
- *Sukhai Mali, Faridabad, Haryana*

Jaundice
Take the root juice orally
- *Suman Kumari, Gopalganj, Bihar*

Uses in Classical Codified Literature

Powdered fruit is given orally to reduce fever[14]; juice extracted from the whole plant is applied externally on the burnt part[27]; poultice of the plant is placed on the aching joint[28]; fruits are ground and taken orally to cure diarrhoea[29]. 'Herbolax'[4] made from *Solanum* along with other plants is used as gentle laxative in case of constipation and for electrolyte balance. Ninety patents were found on its medicinal uses mainly on hepatitis[30],[31].

Source: http://thebegavalley.org.au/uploads/tx_steverplantgallerySolanum_nigrum_02_black%20nightshade.jpg

Uses of *Solanum xanthocarpum* Schrad. & Wendl. (Leipung-khanga)

Source:SRISTI Database

NIF Database

Uses from Manipur

Mouth ulcer
Take the fruit juice orally with a little salt
- O. Ibobi Devi, Bishnupur, Manipur

Respiratory disorder
Take the ground fruit orally with honey thrice a day
- Thingbaijam Ongbi Romibala Devi, Bishnupur, Manipur

Fever
Take the fruit juice orally along with honey
- Shijagurumayum Sandhyarani Devi, Bishnupur, Manipur

Uses from other states

Eye pain
Put a couple of drops of the fruit juice in the eye to get rid of pain
- Kamlesh Patil, Jalgaon, Maharashtra

Throat pain
Take the root decoction orally along with honey
- Sanjay Singh Uplana, Nagda, Madhya Pradesh

Fever
Take the root powder orally to cure fever
- Kamlesh Patil, Jalgaon, Maharashtra

Ear pus
Put 2-3 drops of the root decoction in the ear
- Kamlesh Patil, Jalgaon, Maharashtra

Vomiting
Take the root juice orally with some honey
- Sanjay Singh Uplana, Nagda, Madhya Pradesh

Uses in Classical & Codified literature

Extract of dried flowers is administered orally to cure fever[28]; extract of fruit and seed is taken orally to combat cold[32]; the plant acts as a gastric stimulant[28]. Product 'Diakof'[4] and 'Koflet'[4] made from *Solanum* is beneficial for both dry and productive cough. Five patents have been found on its various medicinal uses such as bronchial asthma[33] and cancer[34] etc.

Uses of *Tinospora cordifolia* (Willd.) Miers ex Hk. f. & Th. (Gujro)

NIF Database

Use from Manipur

Piles
Boil, dry and ground whole plants (50g) and make a fine paste. Prepare tablets from it and take one tablet orally thrice a day for 3-5 days
- *Pukhram Angouba Singh, Bishnupur, Manipur*

Uses from other states

Migraine
Boil stem of the plant (250g) in water along with green gram (250g) and sesame oil (250ml) till half of the decoction remains. Apply it on the forehead
- *Stedimon Arackal Paul, Port Blair, Andaman & Nicobar Island*

Asthma
Take two spoonfuls of the leaf juice orally with honey for 40-42 days
- *Ramabandhu Mahajan, Jalgaon, Maharashtra*

Jaundice
Take the stem juice orally till the ailment gets cured
- *D. K. Phukan, Guwahati, Assam*

Chronic fever
Soak whole plant (50g) and leaves of *Ocimum sanctum* L. (11) overnight and make a paste the next morning. Take the paste orally with honey or sugar candy
- *Jagjit Bahadur, Sitapur, Uttar Pradesh*

Diabetes
Take fresh leaves (1-2) orally on an empty stomach
- *D. K. Phukan, Guwahati, Assam*

Take powder of the leaves (¼ spoonful) regularly
- *Patel Singh, Hissar, Haryana*

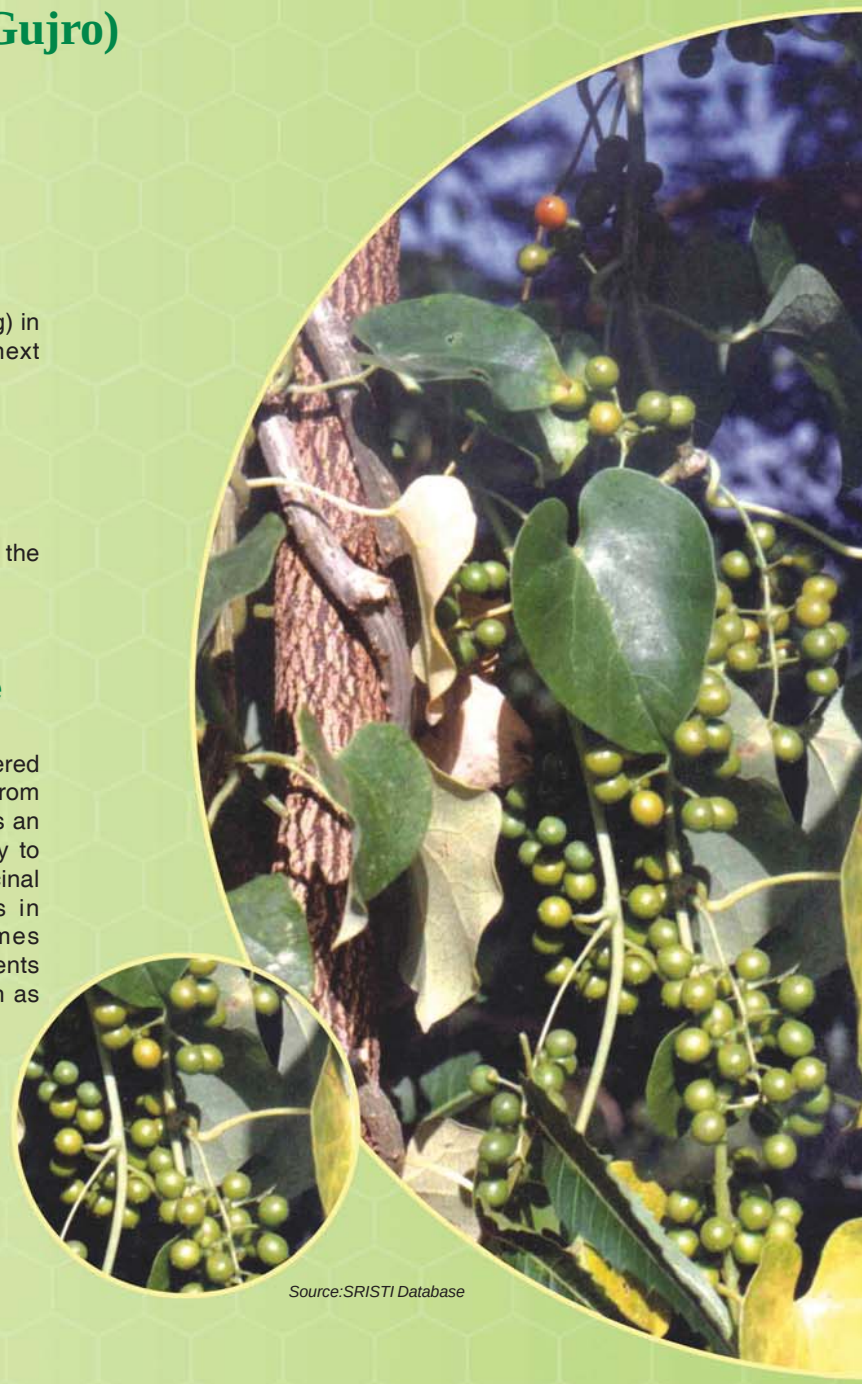
Rheumatism
Soak plant (25g), dry ginger (5g) and sesame oil (5g) in water overnight. Filter and take the water the next morning
- *Jagjit Bahadur, Sitapur, Uttar Pradesh*

Veterinary practice

Anestrous
Take the paste of the bark of *Cassia fistula* L. and the leaves of *Artocarpus heterophyllus* Lam. orally
- *Honnegowda, Bengaluru rural, Karnataka*

Uses in Classical Codified Literature

Powdered roots are taken for mouth ulcer[35]; powdered plant is administered orally with honey to get relief from stomach disorder[32]; the stem is bitter and is used as an anthelmintic[10]; decoction of the plant is given orally to cure diarrhoea[36]. *Tinospora* is a well known medicinal plant and used to cure a number of diseases in combination with other plants with brand names 'Geriforte, Diabecon[4]' etc. More than hundred patents have been found on its medicinal applications such as an antiallergic[37], for cancer[38] etc.



Source:SRISTI Database

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, without being harmful to nature as well as human beings. It also helps in controlling sucking pests like white fly, heliothis, aphid etc.

SRISTI KRUSHAK

Popatbhai Rupabhai Jambucha, Gujarat

It is an excellent remedy for leaf curl disease, which not only controls the disease but simultaneously increases the vigor of the plants by increasing its 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 is spread in the field, some times it is released in field with the flow of irrigation water. In some cases it is also drenched in the affected part of the plant as well as 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 also 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.

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 Livestocks and Poultry~

Coccicure

Sudakarbhai K. Gauli & Jeevalbhai M. Gauli, 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 immunity in poultry. 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 & 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 & 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). 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 MANIPUR

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

01

Karuna Kant Nath
Assam

Manual wood cutting

Cutting of wood effectively and efficiently is achieved by this machine. The equipment is cost efficient, and can be manually operated with both hand and foot pedal options. Most importantly it is portable, and can be taken to any worksite and has more productivity compared to manual sawing.

This equipment consumes lesser time and labour compared to available saws and has a mechanism and linkages similar to manually operated sewing machine. The work of three labourers can be done by one labour using this machine. The innovator has also developed a multi bobin *charkha* and a bamboo cross cutter. He has been supported under the *MVIF* scheme of NIF and has been doing modest business in the area.

Karuna was awarded during the Third National Competition of NIF.

02

Egg incubator

Milonjyoti Das
Assam

Eggs need controlled heat and humidity to incubate properly. The innovator has developed an incubator, which is made up of plywood lined with thermocol. The unit is divided into two chambers. It can be heated by electric light as well as the kerosene lamp. The kerosene lamp is used in case of power failure. There is a regulator to control the intensity of the light.

NIF has facilitated the marketing of a few units in the surrounding area and to DRDA, Sibsagar along with one unit to a NGO in Manipur. The innovator has also been supported under the *MVIF* scheme.

03

Nasim Ahmed
Assam

Bamboo polishing machine

Nasim has developed a machine that polishes bamboo sticks used for making bamboo curtains and mats. The bamboo sticks are rubbed mechanically for smoothing. It can polish 100 kg of bamboo sticks at a time within 90 minutes. It reduces labour cost many folds. Only one labour is required for running the machine and adjusting the bamboo sticks.

04

Multi purpose wood-working machine

Ghonakanta Gogoi
Assam

Small carpentry workshops have difficulty in purchasing and using multiple machines due to high initial costs, space constraints and maintenance considerations.

This multipurpose machine with minimal footprint, is built to address all major workshop needs, allowing completing the sequence of wood-working operations in one place, and allowing better control on finished product.

05

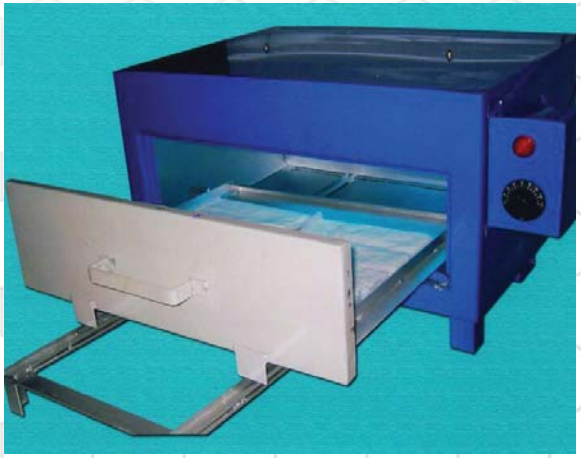
A. Muruganantham
Tamil Nadu

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.



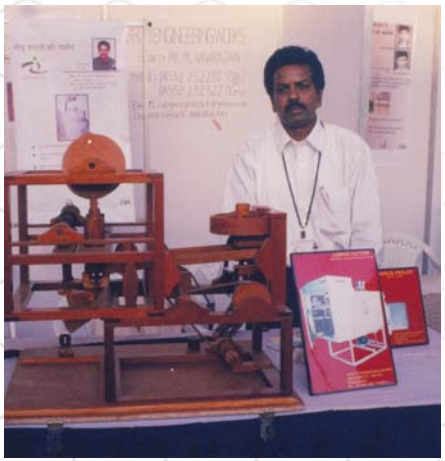
06

Garlic peeling and lemon cutting machine

M. Nagarajan
Tamil Nadu

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.



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.

08

Hand operated water lifting device

N Sakthimainthan
Tamil Nadu

An efficient way of pumping water to meet requirements in a cost effective way is always a challenge in rural India.

Developed from locally available materials, this hand operated water lifting device is simple in design, delivers high discharge and is low cost compared to conventional hand pump, bucket pump, and bicycle operated pumps.

The Innovation has been taken up for value addition at CMERI, Durgapur (WB) through the NIF-CSIR JIC Fellowship Scheme.

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.

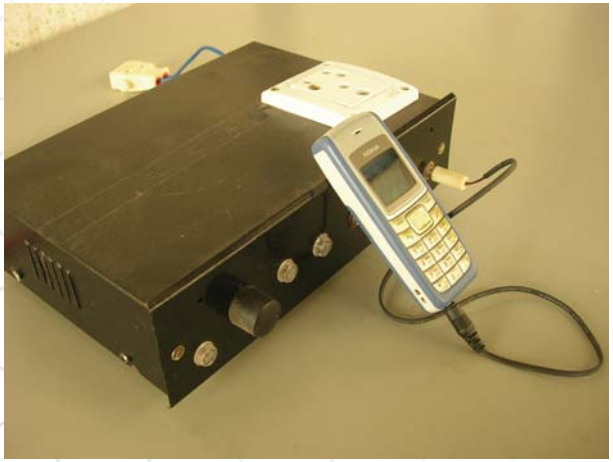
10

Mobile operated switch and multi-media poster

Prem Singh Saini
Haryana

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.



Arvindbhai Patel
Gujarat

Auto air kick pump

This innovation is a low cost, portable, compact aid to inflate tyre tubes/punctures of any vehicle having kick start or auto start mechanism so as to fix the problem on the spot and enable the rider to reach the nearby gas station or repair shop.

This device uses the existing air inside the compressor, so that, while kick starting, this air is utilized and transferred to the tube. A pinch of polymer granules is also inserted to seal the leakage in the tube.

NIF had facilitated sales of a few hundred pieces to customers in Assam and Arunachal Pradesh trough dealership technology licensing and local entrepreneurs.

12

Biomass gasification system

Rai Singh Dahiya
Rajasthan

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) has confirmed the uniqueness and over fifty users have confirmed its operational practicability. The innovator has sold over fifty units after getting *MVIF* Support from National Innovation Foundation through GIAN North.

13

Imli Toshi Namo
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.

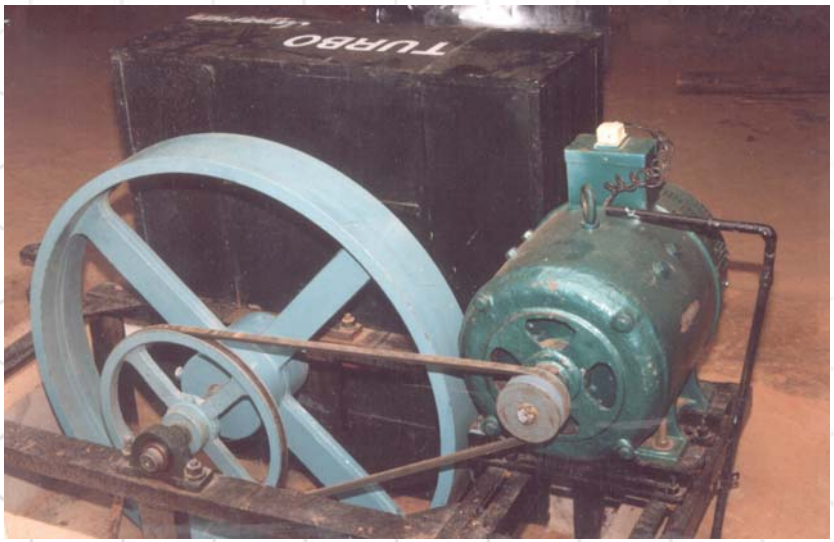
14

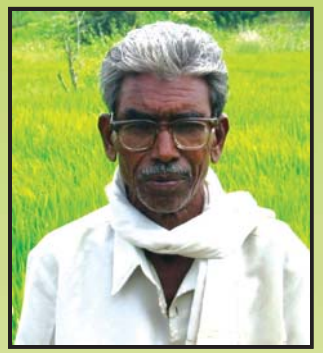
Modified hydro electricity turbine

G. K. Ratnakar
Karnataka

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.





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 varierty 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. 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.

16

Mysore Mallige: A unique paddy variety

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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 the first national award in the second national competition of National Innovation Foundation and was also honored with Beeja Mitra award from GREEN Foundation.

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