



Honey Bee Network



Manipur Innovates



National Innovation Foundation

MANIPUR INNOVATES



National Innovation Foundation

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PREFACE

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

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

Despite various constraints, NIF has put together a small book celebrating creativity, innovation and traditional knowledge from 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

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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 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
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Building a Bridge with Grassroots Innovators in Informal Sector

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

Drawing upon this experience, National Innovation Foundation (NIF) was set up in 2000 with the help of Department of Science

and Technology, Government of India to scale up the idea of learning from grassroots innovators.

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

How does NIF work?

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

¹ The Honeybee collects pollen from the flowers but they are not impoverished, in the process links one flower to another enabling cross-pollination. Similarly, the Honey Bee Network strengthens people-to-people contacts, learning and networking by pooling the solutions developed by individuals across the world

in different sectors. The network acknowledges the innovators, traditional knowledge producers and communicators so that they do not remain anonymous.

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

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

The Honey Bee Network strongly believes in sharing knowledge among the providers of innovations in their own language, which is achieved by publishing local language versions of Honey Bee newsletter. It also ensures that a fair

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

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

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

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

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

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

What has it done?

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

NIF has filed 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

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- source of innovative ideas and technologies and state government as partner in dissemination, value addition and even commercialization through incentives, promotion, subsidies, etc.
- b. State government can join the national campaign for scouting innovations and traditional knowledge and motivate its grassroots functionaries to join hands with NIF in uncovering the talent at the community level.
 - c. Students in schools and colleges can be motivated to scout creative and innovative people in their neighbourhoods and send the entries to NIF (Post Box No.15051, Ambavadi, Ahmedabad 380 015, campaign@nifindia.org). Examples of innovations can also be included in the curriculum for the school and college education.
 - d. Demonstrations and trials can be organized at various regional research stations and KVKs (Krishi Vigyan Kendras) so as to create awareness about the creative potential of common people.
 - e. The research institutions can be mandated to add value to the knowledge of innovative people and help in protecting their knowledge rights.

- f. On the state's website, link to NIF can be given and the innovations from the region can be displayed to put forward the creative face of the state before the people.
- g. Some of the innovative people identified by NIF and/or state government could be awarded at district and state level besides giving them support for further work.
- h. A nodal officer could be appointed to keep in dynamic touch with NIF to ensure that all the areas of possible cooperation are explored.

I hope that NIF would be able to develop a functional, fruitful and fulfilling relationship with the state of 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

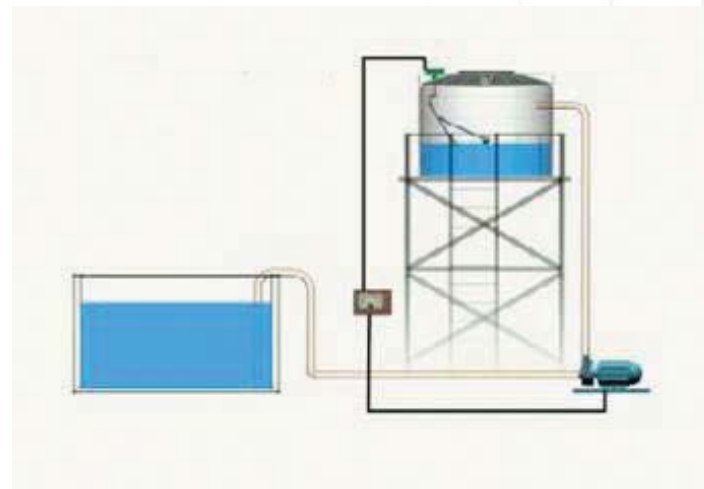


M. Manihar Sharma
Imphal East

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.



Domestic mini rice mill

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.



K. Biren Singh*
Imphal

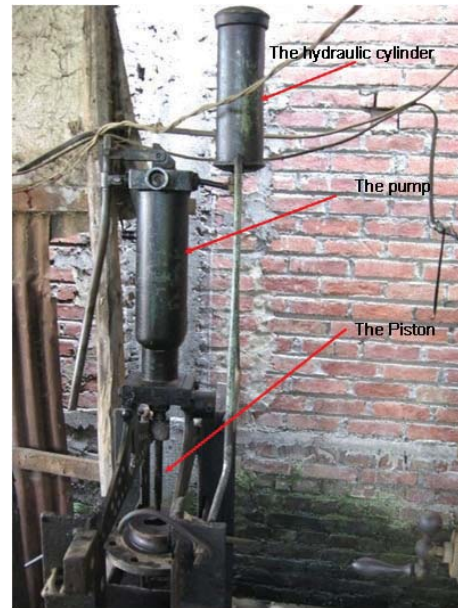
*As per its mandate, NIF does not consider such professionals for awards or financial support, but only helps in providing visibility or linkages.



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.



Woolen scarf knitting device

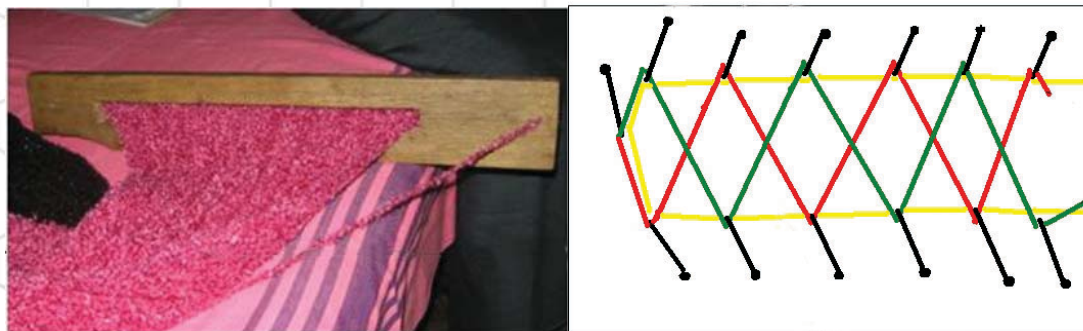
This is a very simple but useful innovation to knit woolen scarves. The device consists of a wooden rectangular base with nails fitted around an inner smaller rectangle. The space between the nails depends on the design of the pattern desired. The desired frill design is made by tying threads to the 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.



**Moirangthem
Manglembi Devi**
Imphal



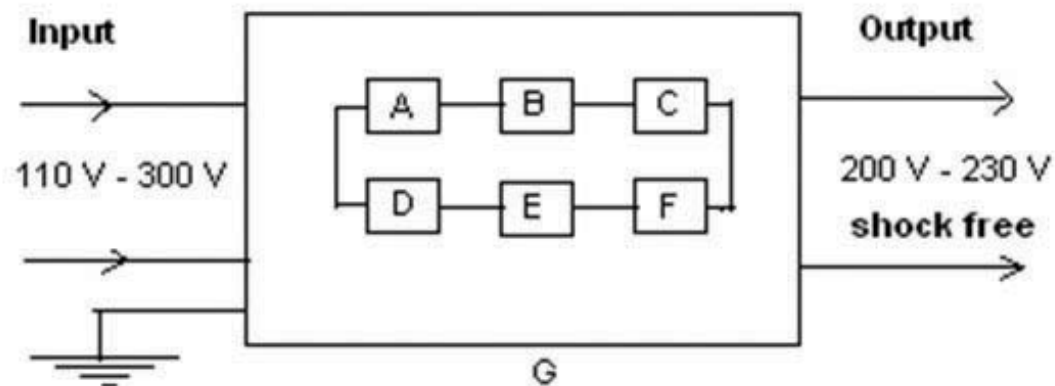


**Kshetrimayum
Nicholson Singh**
Imphal

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.



'Molom Angouba': a traditional knowledge based herbal micro-enterprise

'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 uncured 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.

07



**Smt. Konsam Shama
Devi**
Imphal

N. Indrakumar Singh
Toubal

Iron mesh for drying fish

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.



Mesh weaving in progress



Welt

Herbal soap

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.

09



Khumujam Jina
Imphal



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.

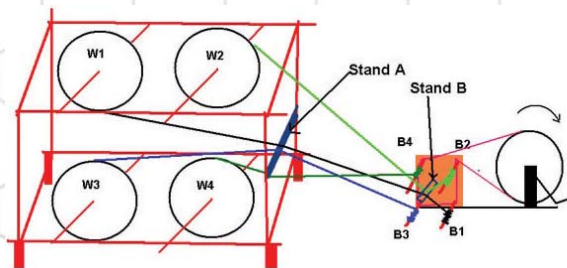


Multi bobbin charkha, portable inverter lamp and camera flash bulb

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, Hidingmayum 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*.

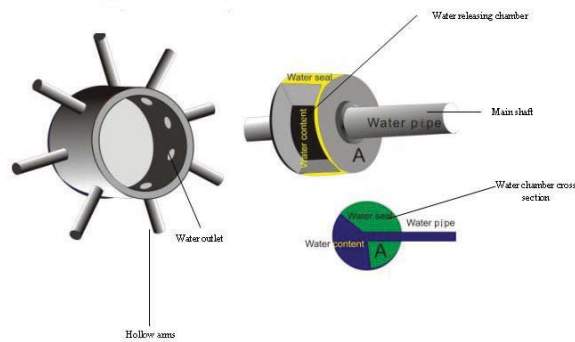


Mini-hydel power generator

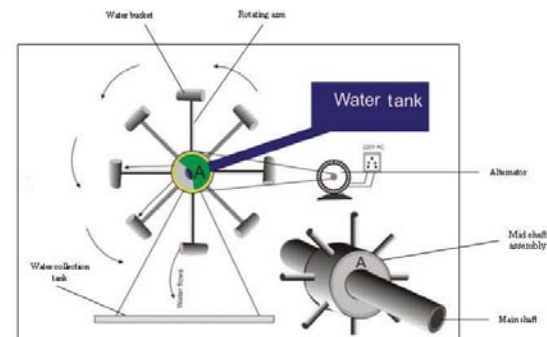
Using a low rpm alternator of a wind turbine, Biren came up with this mini-hydel generator around ten years ago at a cost of Rs. 27, 000. It needs a head of at least 3.5 ft. As the water flows the buckets at the end of the hollow arms start rotating due to the weight of the water.

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

**Sorokhaibam
Biren Singh**
Bishnupur



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