
National Innovation Foundation
Assam Innovates
Honey Bee Network

ASSAM INNOVATES

National Innovation Foundation

Bungalow 1, Satellite Complex
Premchand Nagar Road
Vastrapur, Ahmedabad 380 015
Gujarat, India
Telephone: +91-79-2673 2456/2095
www.nifindia.org
Email: info@nifindia.org

HONEY BEE NETWORK

Regional Collaborator
IIT, Guwahati

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ASSAM INNOVATES

PREFACE

National Innovation Foundation has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. Till date NIF has been able to scout innovations and traditional knowledge practices from 507 district across India.

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

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

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

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

By no stretch of imagination, could we claim that we have achieved a great deal. We have merely made a simple point. There are a large number of knowledge rich people who may not have been educated much, may in fact be

economically poor also, but still have the ability to solve a few problems so well.

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

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

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

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

Building a Bridge with Grassroots Innovators in Informal Sector

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

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

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

How does NIF work?

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

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

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

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

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

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

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

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

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

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

What has it done?

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1,00,000 ideas, innovations and traditional knowledge practices from over 507 districts of the country.

NIF has filed 182 patents in India and seven in US and one PCT application. Out of these, 33 patents have been granted to grassroots innovations in India and four in US. NIF has funded 113 projects under MVIF to the extent of Rs.1.3 crores. Hundreds of technologies have diffused through farmer to farmer social network.

NIF has proved that Indian innovators can match anyone in the world when it comes to solving problems creatively. Where they perform better than rest is in generating more affordable sustainable solutions by using local resources frugally.

Those who see poor only as the consumer of cheap goods, miss the knowledge richness at the grassroots level. The Poor can be the Providers also.

The Grassroots to Global (G2G) model that NIF is propagating is all set to change the way the world looks at the creativity and innovations at grassroots.

How can state government join hands with NIF?

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

even commercialization through incentives, promotion, subsidies, etc.

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

I hope that NIF would be able to develop a functional, fruitful and fulfilling relationship with the Government of Assam state. Tremendously rich knowledge of biodiversity, minerals and environment can be leveraged through the proposed association. We need to discover far more innovations and traditional knowledge from Assam where our record has been good . This has been possible largely because of the generous support of IIT Guwahati. We hope that this cooperation will grow in times to come.

Anil K Gupta
Executive Vice Chairperson, NIF, Ahmedabad
Professor, Indian Institute of Management, Ahmedabad
anilg@nifindia.org

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

- Dr. A.P.J. Abdul Kalam

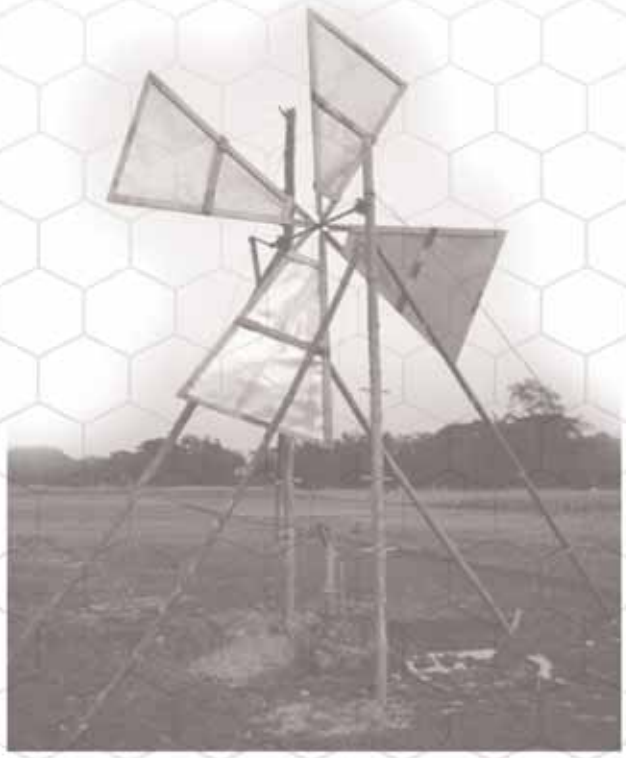
“By adapting public policy in support of grassroots innovators and traditional knowledge holders, we can make economic development process more inclusive and sustainable”.

- Dr. R.A. Mashelkar

PART I

INNOVATIONS
from ASSAM

This section contains grassroots innovations originating from ignited minds of Assam



01

Late Bhubaneshwar Barthakur
Sibsagar

A life full of creativity: Machines for agricultural processing, wood processing, public and personal utilities

Barthakur undertook research in the field of improvement of rice milling in 1961. There are four areas in which the innovator developed innovative technologies in his life long pursuit of greater efficiency.

a) Agricultural processing: The innovator developed a modern rice mill which had emery and rubber roller sheller with very low wear and tear; sliding cone polisher imparting uniform pressure for paddy; drier for parboiled paddy and other grains; machine for parboiling of paddy under pressure; improved process for the parboiling of paddy in which water soaking time was reduced and thereby fermentation was eliminated. In addition he also developed a high frequency stirrer; soluble tea manufacturing process; device for separating light materials by oscillation and impact; grading of paddy with conical rollers; Oil extractor; cattle driven power tiller; thresher using belt, grain sheller with variable speed rollers of abrasive; sheller for husking paddy by variable speed abrasive and rollers with posed grain feeder, etc.

b) Wood processing: The innovator developed a saw mill and timber seasoning plant.

c) Public utility equipment: An overhead dumping platform for the reloading of solid materials to carriers in bulk; holder for tram; bus and other thin tickets; controlling system for railway unmanned crossings; oscillating frame saw; and composing systems for printing press.

d) Household equipment: An improved safety razor assembly; improved hand loom equipment; improved water taps; small sewing machine; new equipment for tobacco intake to replace cigarette smoking.

NIF honored him posthumously with a life time achievement award at the hands of former President, Dr APJ Abdul Kalam. Stories like his should be part of the school and college curriculum to inspire the youth to become innovative. A museum of his innovations, may be along with other legendry innovators, could also have been built to provide real life examples to youth.

Kanak Das
Morigaon

Bicycle which runs faster on the bumpy roads

Normally speed of the bicycle reduces when there is a bump on the road. But the bicycle developed by Kanak Das uses the rider and terrain induced forces to propel it forward. He has also developed a kit which can be retrofitted to any normal bicycle. Most shock absorbers are designed to dissipate the energy. In this cycle, the energy of the springs is harnessed as supplemental force to propel rear wheel.

Using the same principle the innovator has also developed an E-bike, a modified electric bicycle that utilizes terrain induced force (movement), for charging the battery.

Kanak Das is a serial innovator who has a lot of other innovations to his credit. He has also developed other innovations like a power tiller, wrench for unlocking the fly wheel of diesel pump etc.

He was given the National award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2002 and was supported for a year under the NIF-CSIR Fellowship scheme. He could easily become a role model for others in his region, if supported properly. He could in fact be a hub of an 'innovator based incubator' model in which he could provide fabrication and design support to many other innovators of his region.

03

Low cost bamboo windmill

Mohammad Mehtar Hussain and Mushtaq Ahmad
Darrang

Looking for a low-cost alternative to pump water in the fields for the winter crops, the brothers devised the simple windmill made up of bamboo and tin sheets. NIF facilitated its testing at IIT Guwahati. They were supported under the MVIF scheme and also under the micro incubator scheme. A few units were also installed with farmers in the surrounding villages. The innovators were awarded in NIF's Fourth National Competition or Grassroots Innovations and Traditional Knowledge Practices in 2007.

Looking at its potential in Gujarat, Grassroots Innovations Augmentation Network- West (GIAN –W) has installed several units in the salt farming area of Kutch in Gujarat for pumping up brine water and also for simple farm irrigation purposes. The designs have been considerably improved with the help of innovators and other experts. It is an excellent example of transfer of technology from north east to western tip of the country.

Uddhab K Bharali
North Lakhimpur

A serial inventor: Pomegranate de-seeder, arecanut peeler, bamboo splitting machine and other innovations

Bharali is a serial innovator who has achieved a lot in life notwithstanding the constant challenges and struggles that life has thrown at him. When he started his engineering degree ocurse, the Assam agitation started and he had to drop out. after a few months. When he had barely finished part 1 of his AMIE in Chennai, his father expired and he had to go back to N Lakhimpur and take over his debt ridden workshop to look after the family. From then on as a result of his grit, creativity and perseverance he has managed to reach the position that he is in today.

A few of his innovations from a list of 100 are:

Pomegranate De-seeder: Bharali has designed and developed a pomegranate deseeder, which separates the granules of pomegranate from the outer cover and thin inner membrane without damaging the seeds. It has a capacity of deseeding 50-55 kg of pomegranate per hour. The machine has been exported to two countries, viz. Turkey and USA. DSIR, GoI has provided support to the innovator for developing value added product under TePP scheme through National Innovation Foundation, Ahmedabad.

Arecanut Peeler: Annoyed by the injuries caused while peeling the areca nuts manually, the innovator has designed and developed an areca nut peeling machine. The machine

has a capacity of peeling 100-120 nuts per minute. The technology has been licensed to entrepreneurs based in several states.

Cassava peeler: The cassava peeling machine developed by Bharali is a portable electric machine that can process up to five kg of cassava in as many minutes. NIF facilitated the technology licensing to a Guwahati based entrepreneur. One unit has even been sold to a customer based in Kenya.

Bamboo processing machines: Bamboo processing by hand is a very time consuming and difficult process. Looking at this need Bharali has developed an assembly of machines that can perform operations from splitting long lengths of bamboo, sizing, surface finishing and polishing etc. These units have been installed with the help of NIF in CFC (Common Facility Centre) of the NERCRMP (North Eastern Region Community Resource Management Project) at North Cachar hills.

The innovator has also come up with a garlic peeling machine, tobacco leaf cutter, paddy thresher (licensed to an entrepreneur based in Guwahati), safed musli peeling machine, Jatropha de seeder, passion fruit juice extractor, trench digger, chopper for cattle and fisheries feed and portable *dheki* among other innovations. For many of his innovations the innovator was supported under the *MVIF* scheme of NIF.

He is an excellent example of public spirited innovator whose experience can easily inspire technical and non technical students all over the country.

Mohammad Aminuddin Ahmed
Sibsagar

Dual security alarm and mobile phone based systems for industrial establishments and infra-red signaling device for railways

The dual security alarm is a two-way alarm system, which signals from a main station to sub stations and vice versa. It can also give simultaneous alarm signal to any other desired remote location. Once the alarm is set off, only the operator in the main station can switch off the alarm, signaling that the message has been received. The system is specifically designed for oil drilling sites and can be very useful for the sites where loud noise and congestion problems persist. With the assistance from NE cell of NIF, innovator has supplied 15 units to ONGC. This was funded through MVIF. For this innovation he was awarded in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007.

A lot of train accidents occur due to missing signals or not receiving signals due to fog and sometime due to carelessness. The solar power operated automatic audio-visual alarm system developed by Ahmed is to solve this problem. Out of the three units, one is placed near the level crossing and rest two are placed about 3 - 5 km away from the level crossing on either side of the railways track. When an approaching train crosses any of the units placed along the track, it sends a signal to the unit placed at the level crossing, which switches on the hooter and the flasher to alert the level crossing users. The hooting and flashing continues till the train completely crosses the level crossing.NIF has facilitated evaluation of this technology at North East Frontier Railways. He has also developed mobile phone based vehicle security system to prevent unauthorized starting/ theft incidence.

06

Modification in engine to make it more fuel efficient

Sibsankar Mandal
Kokrajhar

The innovator has modified the engine, transmission system and wheels of auto-rickshaw to make it more efficient. The intake air and charge are preheated using exhaust gas. The gear ratios and wheel size have also been changed to improve the efficiency of the vehicle. Facilitated by National Innovation Foundation Ahmedabad, IIT Guwahati has tested the modified engine and has confirmed that it gives around 35 per cent higher mileage than the conventional engines.

He was invited to make a presentation at a workshop organized by IIMA at TATA Innovation Awards.

Sibsankar with the help of his brother Jaysankar has also developed a helical spring shock absorber for rickshaws and noodle making machine.

Deepak Bharali
Kamrup

Extra-weft insertion in handloom fabric ornamentation device

Conventionally the task of the insertion of weft threads needed to make a variety of designs is done manually by tying knots, which is tedious, cumbersome and time consuming. The thread is also wasted in the connection between one motif to another.

The device consists of three components; base frame, magnet-bearing shaft and specially designed bobbin. These components can be fitted to any handloom Jacquard machine.

The innovation reduces the time required for making designs to one third of the time required in traditional way.

IIT Guwahati has been looking into the design issues in this technology and it is likely to make a major impact on the similar looms in coming years.

08

A maverick inventor: Hover craft, amphibious craft, rumble strip for generation of electricity, car run with compressed engine

Kanak Gogoi
Kamrup

The innovator is a 47 year old self made business man who attained his present status in life due to his grit and hard work and a 'never say die attitude'. After setting up his family in a comfortable financial position, he started a workshop in 1996 at his house to fulfill his childhood dreams of pursuing creative experimentation. He employed three workers and dedicated his workshop fully to R&D works only. From then on he has come up with a lot of innovations to his credit.

Some of the important innovative devices developed so far are: Hover craft, amphibious craft, rumble strip for generation of electricity, small three wheel car TrigoX, gravity bicycle, treadmill bike, hybrid car (electricity, solar and petrol), car run with compressed engine etc.

The innovator has received offers from countries like the United States for possible technology transfers for his technologies. With the assistance of NIF the innovator has also attended a conference around Fab Lab organized by the Massachusetts Institute of Technology at Chicago USA in 2007.

Umesh Chandra Sharma
North Lakhimpur

Interlocking bricks

Umesh Chandra is a simple metric pass who makes a living by selling sand stone chips, cement etc., to villagers for constructing houses.

At the time of constructing his own house, Sharma had to face a lot of problems with the masons. Hiring them was not only expensive but also very problematic as they often went out to look for better opportunities.. He then started thinking of a simple way to make bricks without the help of these masons. After a series of trial and error process, he developed the interlocking bricks of several designs. He constructed his and neighbors compound walls using the interlocking bricks.

The materials used for making the bricks are concrete, cement and sand of specific shape and size, taken in required proportion and mixed with water to form a homogeneous mass.

Interlocking is achieved by projections and depressions in the blocks on the upper and lower faces of the brick. The utility of the interlocking bricks is that it facilitates construction even by unskilled labor, reduces consumption of mortar, labor and construction time.

NIF facilitated a visit by faculty from Design dept. IITG along with a few students who made suggestions for improvement on quality and design. The innovator was supported through the MVIF scheme of NIF for enterprise formation.

10

Production of soft *muga* silk

Dulal Choudhary*
Kamrup

The innovator has mechanised the process of *muga* silk weaving by way of making modifications in the conventional mechanised loom. *Muga* silk weaved with the device becomes soft as well as blocks UV radiations up to 80 per cent as per laboratory tests at Tezpur University.

The innovator has made various products like shirts, belts, caps etc. with the *muga* weaved from this loom. He has also made an umbrella out of this material which is durable, stain free, and water proof. It has a pleasing golden shine which illuminates colour, better than that offered by conventional umbrellas.

NIF had facilitated the technology transfer of this *muga* umbrella to Assam Silk Development Centre.

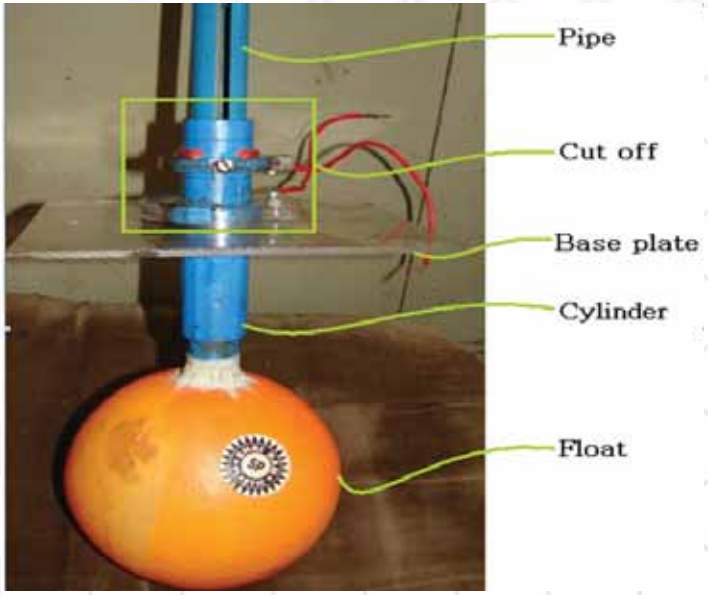
*As per its mandate, NIF does not consider such professionals for awards or financial support, but only helps in providing visibility or linkages.

Subhash Das and Amlan Bhattacharya*
Nagaon

Badminton stroke practicing machine

The beginners require assistance in playing badminton without having to pick up the shuttle cock every time it falls. Looking at this requirement, the innovators have developed a simple machine for practice which does not require an additional player on the opposite side of the net. The innovation essentially includes a motorized belt mounted on pulley with grooves holding shuttle cock in each groove. Once the belt goes on the top and moves downwards, the shuttlecocks fall one at a time to be hit across the net.

Apart from this innovation, Subhash has also developed a modified water pump operating system.



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12

Transmitting music signals through power lines

Trilokya and Champak Bora
Kamrup

Trilokya and his brother wanted to hear the same song at the same time but in different rooms with a very short deck cable. The only solution of their problem was to transfer signals to the other room.

Trilokya and Champak developed an adapter through which the neutral line and earth line of conventional electrical system are used to transmit audio signals within the house. Audio output from a tape recorder or radio is connected to a plug adapter in which the live point is disconnected. The output of the audio signals is collected through the adapter and connected to the audio output device like speakers at any other location within the house. The cost of the adapter is only Rs. 15. It can provide a high fidelity sound at low cost without having a network of additional cables in a building.

The brothers have also modified a simple electronic calculator by attaching a visual light sensor to perform counting operations. It can be used to count how many people or industrial products have moved across it. The brothers were awarded in NIF's Third National Competition of Grassroots Innovations and Traditional Knowledge Practices in 2005.

Karuna Kant Nath
Darang

Manual wood cutting machine

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 bobbin *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 in NIF's Third National Competition of Grassroots Innovations and Traditional Knowledge Practices in 2005.

14

Egg incubator

Milonjyoti Das
Kamrup

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.

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Nasim Ahmed
Kamrup

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.

16

Multi purpose wood-working machine

Ghonakanta Gogoi
Dhemaji

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.

Sondhan Saharia
Darrang

Paddy huller and manual rice flakes machine

The conventional huskers utilize electric power or diesel engines for operation. However poor electric-supply and costlier fossil fuels are the limitations. To solve this problem Saharia innovated this device which is manually run and ensures very low extent of breakage of grains.

The device has a handle and crank mechanism at the upper end and small openings in the rollers from which grains can pass onto the collection chamber at the lower end. The movement of the rollers results the grains pinched and the husk is torn off from a grain particle, leaving the internal tissue intact.

The manual rice flakes machine can powder rice and make flakes from rice and corn.

18

Innovative fan blades made of bamboo

Nipul Bezbora & Bipul Bezbora
Jorhat

The innovators have developed a double-layered four blade fan for blowing air. They had originally made the fan in order to separate rice and husk in the winnowing machine. It is a unique fan with specific geometry, size, number and the offset arrangement of the blades with respect to each other. Unlike normal fans having set of blade circumferentially on the axis, it has two set of larger and smaller blades located circumferentially on the same axial shaft. Vortex created by this fan seems to have much higher power than the conventional fans.

Department of Energy, Tezpur University, showed that its performance is almost at par with that of the conventional pedestal fans (electrically operated) of higher sweep. The brothers were awarded in NIF's Third National Competiton for Grassroots Innovations and Traditional Knowledge Practices in 2005. The brothers, popularly known as *'Vishwakarma'* in their village, have also come up with a bamboo rickshaw, bamboo umbrella and a locking arrangement for power tiller.

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Ganesh Ghimire
Sonitpur

Solar boat

The innovator had seen solar boats but found many inadequacies in their functioning. He developed a submersible motor attached with propeller for the solar boats with lighter material like aluminum instead of iron. He has also modified the steering control system. The modifications have improved the transmission efficiency of the boat.

NIF helped the innovator to fabricate a 10 seater model for Lumbini Water Parks in Bangalore. Renewable energy being so much in need, such innovations require a lot of encouragement.

Ganesh Ghimire has also developed an 'auto walker' which runs with the help of two small battery operated 36 watt DC motors. The device has been provided with a three way speed control and runs smoothly at a comfortable speed.

20

Zero head water turbine and portable *Muga/Eri* reeling machine

Nripen Kalita
Kamrup

The innovator worked on the basis that the conventional turbines have poor efficiency due to partial submergence of blades. To improve it, he arranged the blades spirally keeping the axis of the turbine parallel to the flow direction. The turbine is completely submerged below the flow of water. The water passing through the turbine forces the turbine to rotate with low speed but at a high torque. A generator is used to extract the electrical energy. A submersible pump is also coupled in the turbine set for irrigation purposes. For this innovation the innovator was awarded in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

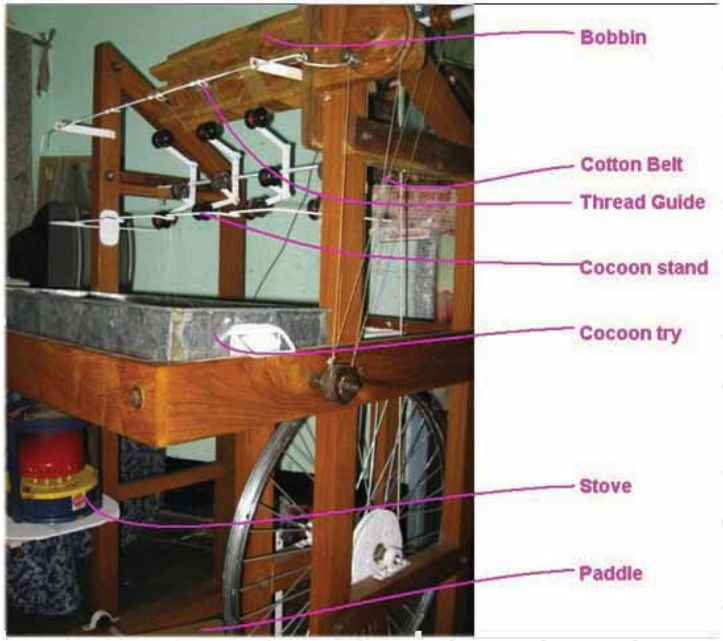
NIF facilitated the technology license to a Tinsukia based businessman. The deal though did not work out well and further improvements in the technology are called for.

The innovator has also developed a portable *Muga/Eri* reeling machine. It works similar to the traditional spinning of 'drop needle' or '*charkha'.* For this he was supported under the *MVIF* scheme of NIF. NIF helped in the standardization of design at the Design Dept. IIT Guwahati.

Weft thread making machine

Probin Kalita
Kamrup

Weaving involves the interlacing of two sets of threads at right angles to each other i.e. the warp and the weft. Generally it has been done through a tedious manual process. Prabin Kalita innovated a wooden machine, with which yarn can be reeled efficiently for making the weft of Muga cloth. The Cotton belt reduces breakage and tearing of threads while processing.



22

L–drop auto protector: the two-way anti-locking device

Late Gobinda Chandra Gogoi
Kamrup

After reading about a reported burglary case at Guwahati, where burglars locked inmates inside a room (having L-drop) from the outside, while ransacking the house in 2000, the innovator came up with the two way anti locking device as a solution. The device prevents the door being locked from outside or from inside depending upon the user's wish. It can be used by a person whether he is inside or outside the room and can be adaptable for all types of doors. The innovator claimed that it is very helpful for the rooms/ toilets used by mentally challenged patients and persons suffering from epilepsy as unauthorized/ accidental locking can be prevented. The innovator was awarded in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

23

Dilip Bhagabati
Nagaon

Monkey trap

Sometimes monkeys destroy the crops, kitchen garden and even the grocery of kitchen. To get rid of this, the innovator has developed a trap. The naughty monkey can be trapped and released in the dense forest.

24

Bamboo auto rickshaw

Bobby Mant
Dibrugarh

The innovator used to make sculptures from his childhood. With the expertise so gained, he made an auto rickshaw completely out of bamboo components with exception of the engine. He used a scooter engine for the auto rickshaw. He has named his vehicle as “Marvelous Three Wheeled Car”, weighing around 70 kg.

25

Md. Mustafa Ali
Darang

Innovative use of recycled tyre

After seeing cots in local *dhabas* made of jute, the innovator thought of experimenting with the tyre strips. He started making cots with tyre strips nets. These cots last for seven to eight years. These cost much lesser than the other normal jute rope cots. Due to elasticity of tyre stripes, these are much more comfortable to the users.

26

Bamboo motorcycle

Dhaniram Phukan
Tinsukia

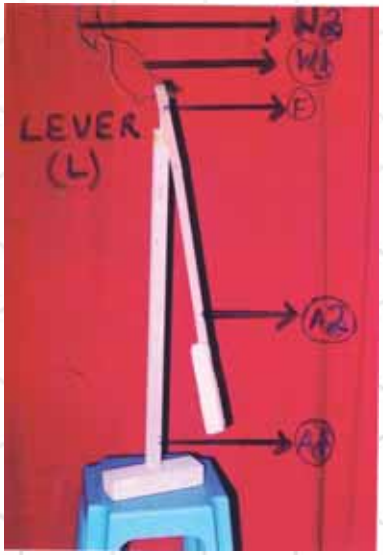
Dhaniram wanted a motorcycle but could not afford one. In order to realize his dream, he started experimenting with various materials. Looking at the abundant availability of bamboo in his area, he fabricated the frame and chassis of his motorcycle with the same. He then salvaged an engine of an auto rickshaw and fitted it to the frame. Using locally available electrical wires and bulbs, etc., he put an entire motorcycle together.

As of now Dhaniram proudly rides his self fabricated motorcycle around his locality.

Automatic water level controller

Dhirtiman Talukdar
Kamrup

Dhritiman a student of 10th standard (in 2005) has a very strong interest in making innovative things. He wants to become a science teacher or a scientist. He has come up with dozens of innovations. The water level controller was developed to monitor the level of water in overhead tank. He observed that most of the times the pump was not switched off promptly after water tank was full resulting in unnecessary overflow and wastage of water. The water level controller works on the simple float valve based switch system.

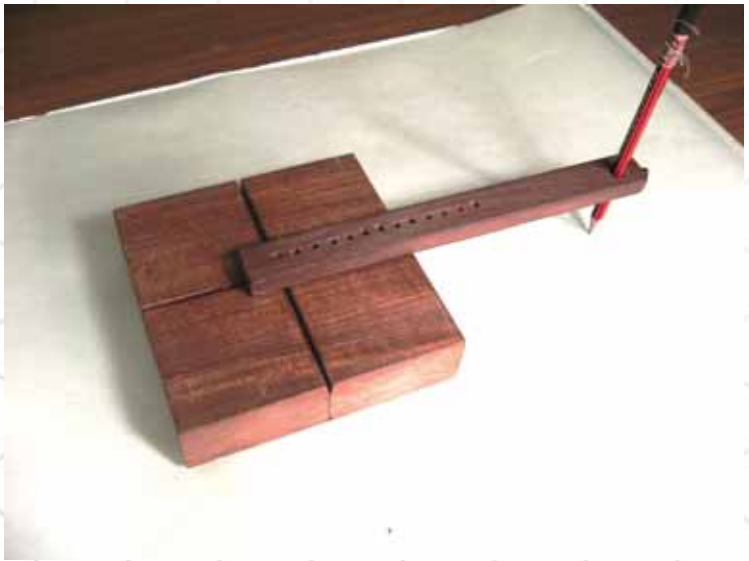


28

Oval compass

Durlabh Kachari
Dibrugarh

The conventional compass is meant for drawing circles, but not the oval designs. For designing oval shapes craftsman has to calculate and measures point to point or draw it in computer first and then copy it in the glass or wood. The innovator has developed a compass which can draw the oval shapes in wood or glass.



Ravi Jyoti Deka
Kamrup

Low pollution bullet motorcycle

Deka, a commerce graduate, has a keen interest in the field of Automobiles. He has installed double spark plugs in the existing Enfield bullet motor cycle by removing the cylinder. Decomposition valve position is converted in to second spark plug and decompressor is shifted to the bottom of the cylinder head. Exhaust push rod, ignition coil and circuit have also been modified to adjust the spark plugs. Oil seal is fitted in valves to reduce the oil consumption. With this, he has overcome the problems of low mileage and high pollution.

It is interesting to note that the same concept has been adopted in new motorcycles launched in recent times by the established players in the country without any credit to him, of course.

30

Bamboo torch

As a part time *mali* in a North Guwahati school the innovator was in need of a torch at night but could not afford one. Utilizing his dexterity with his hands and locally available material viz. bamboo, he fabricated a bamboo torch for his self use. Though the bulb and the batteries are the normal ones, the other components are made entirely from bamboo.

As an appreciation of his creativity he was given a job as a full time *mali* at the Faculty School in North Guwahati. This design was also appreciated and a few units purchased by visitors when NIF took him to participate at a design festival at IIT Mumbai.

Jawaharlal Rai
Kamrup

31

Mahendranath Datta*
Kamrup

Floating water wheel for harnessing the energy from rivers

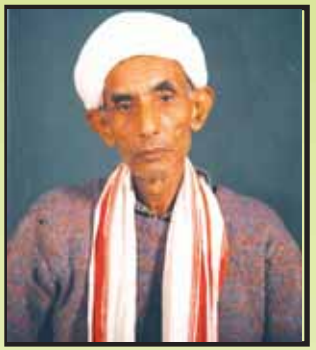
Coming from a poor background, the innovator had always thought of making a water wheel for harnessing energy. During his college days he developed his first model out of bamboo and produced electricity by fitting a cycle dynamo. After his retirement from the Assam Govt., he developed a refined version of his innovation.

The innovation has been tested with the help of the inland water transport dept. and a report has also been given to TERI (The Energy Research Institute), New Delhi.

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

32

Preserving a dying craft – ‘Sâncî paat’ & development of herbal ink



Bishnuram Handique
Jorhat

The ancient long–forgotten practice of using inner bark of the agar or aloe tree locally known as the ‘sâncî’ as writing material was revived by the innovator. For the preparation of the paper, the bark of a local tree called Sâncî gosh is removed; it is dipped overnight in water and taken out the next day to dry. After drying for one night, the bark pieces are pressed in a screw press and dyed with various locally available organic dyes. He has also developed herbal ink for writing on the Sâncî Paat.

The innovator was awarded in NIF’s Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

Akhil Chandra Mandal
Nagoan

Vertex cutting of areca nut

Akhil Chandra Mandal has studied up to higher secondary and his main occupation is agriculture. He came up with an innovative practice for cultivating areca nut. When shoots of areca nut tree are around two inches after planting, its upper portion is removed. Then vertex or head is cut off when the same plant is three years old, leaving aside 2-3 branches at the extreme lowest region.

The plants treated this way mature ahead by two years as compared with other plants. The longevity of the plant extends up to three more years than other plants. Yield per plant ranges from 7-8 bunches / cluster. He was given a consolation award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007.

The innovator has also developed a water pump operated by the energy of discharge of higher capacity pump. One or more water pumps (excluding motors) are operated by hydro power generated through a turbine.

34

Traditional bone healer

Pushpalata Saikia
Jorhat

Pushpalata Saikia hails from Pangria, a remote village in the Jorhat district of Assam She has been dispensing her family's traditional treatment for backache and bone fracture successfully for many years, after her late husband. She learnt the practice from her late husband Sidanand Saikia and brother in law Dulal Saikia. She treats nearly 20 to 30 patients daily free of cost. She has treated more than 500 patients with nearly 95% success. Pushpalata was honored with an appreciation award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

Leena Talukdar and Sushanta Mahanta
Morigaon

Herbal mosquito repellent

Leena Talukdar and Sushanta Mahanta hail from Morigaon, Assam. Leena has represented her school at various science fairs. She had won the Best Affiliated Science Fair Award for the model of a Cold Storage System at the Intel Science Talent Discovery Fair held at Mumbai in 2003. Sushanta Mahanta, a very shy girl, takes keen interest in science related activities and also takes part in various science fairs. Besides this mosquito repellent Sushanta has also formulated a *dantamanjan* (toothpaste) by using indigenous plants and presented it in a National Level exhibition held by NCSC at MIT, Pune.

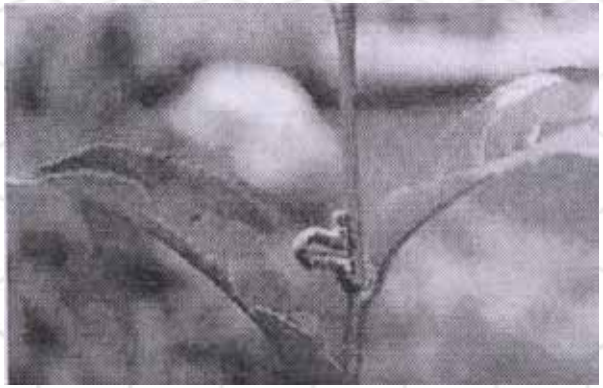
Leena and Sushanta undertook a project sponsored by "National Children Science Congress, 2001" with the theme of "Indigenous Scientific Knowledge for a better tomorrow" in the eighth standard at Muhila home Model School, Morigaon. They studied the use of medicinal plants, as mosquito repellent in Assamese society. They formulated a very effective herbal mosquito repellant by using some local herbs combination compared to some other repellants available in the market. Both the students had jointly won a student award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

36

Control of tea pest

Dulal Borah
Golaghat

Dulal Borah is an innovative farmer who has studied up to the 10 std. He cultivates rice, sugar cane and also has a small tea plantation. He believes in organic farming, and prepared the herbal formulation for control of pest as well as growth promoter for tea plantation. The main ingredients of herbal formulation for controlling pest are *Albizzia procera* L., *Azadirachta indica* A. Juss. and *Moringa oleifera* Lamk., etc.



Upasana Talukdar and Arpita Devi
Morigaon

Herbal pesticide for termite control

Upasana Talukdar and Arpita Devi from Morigaon are curious young environmentalist. Both these school students were concerned about the affect of chemical pesticides on animals and birds. They were equally disturbed about poisoning of peacocks in Rajasthan and similar fatal poisoning of birds in Assam. The ingestion of grain seeds treated with chemical pesticides triggers death of the birds. Bothered by these incidents they made a herbal formulation using *Ipomea carnea* Jacq. for controlling termites. The above formulation kills termites which destroy walls, within five minutes without harming other birds and animals.

38

Bamboo bicycle, handpump and a tooth

Dodhi Pathak
Nalbari

The innovator's reliance on the 'Bamboo plant', an integral part of Assam's flora and fauna, has led to his many of his innovations.

Dodhi Pathak was a pioneer in developing bicycle frame made of bamboo. It was liked very much by the people in the First Award function by National Innovation Foundation. He has also made an artificial denture from bamboo which he himself uses and also makes for other needy persons who come to him. With this he can chew and eat all types of food including mutton and fish. One of the world largest dental appliance making companies in Germany had shown interest in his technology after reading about it. They wre intrigued by the idea of a bamboo tooth.

He has also innovated a bamboo hand pump. Every part of the pump including the piston, valve, barrel and the handle is made from bamboo. Should not such people be encouraged to become brand ambassadors of Bamboo crafts.

The innovator was awarded in NIF's Second National Competiton for Grassroots Innovations and Traditional Knowledge Practices in 2002.

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 *Alstonia scholaris* (L.) Br. (Sotiona)

Source: http://www.mytho-fleurs.com/images/Fleurs_du_Vietnam/Alstonia_scholaris.jpg

NIF Database

Uses from Assam

Whooping cough

Extract sap (one teaspoon) of the plant and mix it with cow's milk (100ml). Take it once a day for three days.
- *Mahendra Nath Dutta, Jorhat, Assam*

Malaria
Take bark of the plant and *Caesalpinia bonduc* (L.) Roxb. (*Lataguti*) in equal proportions. Boil it till the contents reduce to 1/3rd of the initial amount. Take 50ml of the decoction once a day for ten days.
- *Shadeswar Gogoi, Sibsagar, Assam*

Jaundice
Mix sap of the plant with cow's milk. Take it early in the morning on an empty stomach for three days
- *Ramakanta Borah, Sibsagar, Assam*

Gastric complaint
Grind few leaves with black pepper. Take the paste orally before food
- *Indra Kanta Ojha, Sibsagar, Assam*

Uses from other states

Headache
Extract juice from the bark (20g) and take it orally
- *Prishila Tuddu, Hazaribag, Jharkhand*

Asthma
Take decoction of the bark orally
- *Robert L. Hamte, Aizawl, Mizoram*

Stomachache
Extract juice from the bark (20g) and take it orally
- *Prishila Tuddu, Hazaribag, Jharkhand*

Wound
Apply the paste of the bark and leaves on infectious wound
- *Robert L. Hamte, Aizawl, Mizoram*

Fever
Grind bark (50g) into a powder and take it with water thrice a day
- *Kutuva Birhorni, Koderma, Jharkhand*

Uses in Classical Codified Literature

The bark is used to cure skin diseases and rheumatism[1]; the root juice is taken with milk to cure leprosy[1]; fresh bark is put in water to draw out the latex in it, which is taken orally in case of tuberculosis[2]; dried powder is administered orally to cure diarrhoea[3]; and bark extract is useful in case of intestinal worms[4]. 'Ayush-64 cap./tab.'[5], prepared from the plant, is effective as an anti-malarial compound both for treatment and prophylaxis. Fifteen patents have been found on its medicinal uses as an antipyretic[6].

Uses of *Camellia sinensis* (L.) Kuntze (Chai, Cha pat)

NIF Database

Use from Assam

Ringworm
Crush the leaves of *Camellia sinensis*, *Randia* sp., *Lawsonia inermis* L., and *Leucas* sp. along with a garlic bulb and extract the juice. Apply the juice on the affected body part.
- *Dimbeswar Gogoi, Sibsagar, Assam*

Uses from other states

Herbal hair oil
Put 50g each of fine tea powder, black sesame seeds and black cumin in a vessel containing 600g coconut oil, 100g castor oil and 100g olive oil and mix it well. Apply the mixture on the hair third day onwards.
- *Valsamma Thomas, Idukki, Kerala*

Bleeding dysentery
Take tea powder with some sugar orally.
- *Umashankar Baitha, East Champaran, Bihar*

Fever
Prepare the decoction of tea, *ajwain*, black pepper, and ginger. Take it once a day
- *Madhudevi, Sikar, Rajsthan*

Uses in Classical Codified Literature

Root extract has antineoplastic[7] and anti-tumor properties[8]; hot water extracts show anti ulcer[9], anti-diarrhoeal properties[10]; and green and black tea has antioxidant property[11].

Green tea[12] has antioxidant and immuno-modulating properties, which strengthen body's immunity and delay the natural ageing process. One hundred and twenty three patents have been found on its medicinal applications like for treating diabetes[13].

Source: camellia FLOWER: http://upload.wikimedia.org/wikipedia/commons/7/73/Camellia_sinensis_flower.jpg

Source: http://utenti.lycos.it/piantetropicali/Carica_papaya.jpg

Uses of *Carica papaya* L. (Papita)

NIF Database

Uses from Assam

Headache
Grind seeds with some garlic cloves to make a fine paste and apply on the forehead
- *Saiba Barman, Borpeta, Assam*

Hydrocele
Make a paste of the latex and young fruit. Take a teaspoon thrice a day till the ailment cures.
- *Dimbeswar Gogoi, Sibsagar, Assam*

Uses from other states

Toothache
Dip the cotton in the latex of the stem and keep it on the aching tooth
- *Mangeram Jani, Hissar, Haryana*

Kidney stone
Take juice of the root orally
- *Sandhya Suman, Sitamarhi, Bihar*

Intestinal worms
Mix fresh latex with honey and take it orally
- *Prabhat Kumar Pandey, East Champaran, Bihar*

Ringworm
Apply the milky latex on the affected area
- *Mukesh Kumar, East Champaran, Bihar*

Jaundice
Make a curry of young fruit and eat
- *Sharda Devi Gangwal, Jaipur, Rajasthan*

Veterinary practice
Lactogouge

Feed fruits daily to enhance milk production
- *Manoj Kumar, Madhubani, Bihar*

Uses in Classical Codified Literature

Decoction of the flower is used as cardiotonic[14]; bark powder is applied externally on wounds[15]; decoction of the bark is given orally to get rid of intestinal worms[16]; and beverage of the fruit is taken orally to cure diarrhoea[17]. Natural moisturisers and creams[18] are prepared from *Carica* in combination with other plants. Thirty patents were found on its medicinal uses such as an antiallergic[19] and for prevention of cancer[20].

Uses of *Cassia fistula* L. (Sonaru)

NIF Database

Uses from Assam

Mouth sore
Extract juice from the plant, smear it on a banana leaf and burn the leaf. Apply the ash on the affected part
-Purna Borah, Golaghat, Assam

Dysentery
Take bark (50g each) of *Cassia fistula* L., *Spondias mangifera* Willd., *Mangifera indica* L., *Punica granatum* L., *Psidium gujava* L., grind it with water to make a smooth paste. Take two teaspoons daily on an empty stomach
- Niru Patangia, Sonitpur, Assam

Uses from other states

Cough
Chew fruit bark in the morning
- Santoshben Gamar, Banaskantha, Gujarat

Stomachache
Take decoction of the fruit with some jaggery orally
- Bhagwati Lal Kumawat, Chittorgarh, Rajasthan

Ringworm
Apply paste of the scrubbed tuber on the infected part of the body
- Kumar Chandel, Hamirpur, Himachal Pradesh

Uses in Classical Codified Literature

Powder of the dried bark is applied in the case of leucoderma[21]; fruit juice is useful in jaundice[22]; fruits are used as diuretic[22]; and root powder is applied in skin diseases[22]. Pilex[12] (Vein care) helps support metabolic processes involved in maintaining the vascular system's integrity for optimum health and appearance; Purim[12] (Hemo care) is used for blood purification. Six patents have been found on the medicinal applications of *Cassia fistula* as an antiviral[23].

Source: http://www.bh-froe.com/ZC/images/Cassia_fistula.jpg

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

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

NIF Database

Uses from Assam

Insomnia
Include whole plant's paste in daily diet
- Khiroram Barman, Borpeta, Assam

Toothache
Make a paste of *Manimuni* leaves, garlic bulb and banana roots. Apply topically and leave it for one hour.
- Anil Gogoi, Sibsagar, Assam

Sinusitis
Grind leaves (10g) with one black peppercorn and extract the juice. Put three drops of the juice in nostrils for three days
- Batchu Murmur, Kokrajhar, Assam

Dysentery
Grind ten leaves of *Manimuni* and guava to make a paste. Take the paste twice a day for ten days. In case of chronic dysentery, continue the treatment for 90 days
- Guna Ram Khanikar, Golaghat, Assam

Make a paste of leaves along with black pepper and take it orally
- Dipali Borah, Sibsagar, Assam

Uses from other states

Memory enhancement
Take leaf juice orally
- Savitri Devi, Kangra, Himachal Pradesh

Stomachache
Eat fresh leaves to alleviate stomachache
- Krishna Chand, Kangra, Himachal Pradesh

Diarrhoea
Take two spoonfuls of whole plant juice, with a pinch of salt, orally twice a day for one week
-Sapam Deben, Nombal, Manipur

Jaundice
Take juice of the whole plant orally
- Vifiya Oraon, Lohardaga, Jharkhand

Skin diseases
Apply the paste of the leaves topically
- Savitri Devi, Kangra, Himachal Pradesh

Herbal tea for immunity
Add some leaves while preparing tea. It helps enhance immunity
- Jasmit Singh, Hamirpur, Himachal Pradesh

Uses in Classical Codified Literature

Fresh juice from aerial part is used as brain tonic[24]; powder of aerial parts helps to control high blood pressure[25]; whole plant is diuretic[22]; and plant paste is applied as a poultice in case of bone fracture[22]. 'Herbal Tea'[26] is mainly indicated as a health drink. 'Mentat'[12] improves mental functions, mental quotient, memory span, and concentration ability and stress threshold. More than three hundred patents have been found on its medicinal applications as an anti-depressant [27].

Uses of *Jatropha curcas* L. (Bongali era)

NIF Database

Uses from Assam

Jaundice
Extract the juice of leaf and bark and add a little jaggery. Take the preparation for one or two days
- *Dimbeswar Gogoi, Sibsagar, Assam*

Cholera
Take the juice (50ml) of stem and bark for five days.
- *Purna Kanta Shyam, Sibsagar, Assam*

Agnail
Apply latex topically
- *Atilik Baruah, Sibsagar, Assam*

Uses from other states

Skin disease
Apply paste of the leaves topically
- *Madhav Shankar Rao Patil, Jalgaon, Maharashtra*

Eczema
Heat jatropha oil (60g) and bee wax (30g) at 60°C and dissolve borax (1g) in water (10 ml). Mix both together and stir slowly on simmer flame. Apply the ointment on the affected area
- *Raghubir Agarwal, Hissar, Haryana*

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

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

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

Veterinary practice
Foot & mouth disease
Grind seeds with the latex of *Calotropis gigantea* R. Br. and little amount of edible oil. Apply the paste topically
- *Gandubhai, Dang, Gujarat*

Uses in Classical Codified Literature

Bark powder is taken orally with water to get cured from pyorrhea[28]; leaves are useful in ulcer[22]; young branches are warmed in fire and tied on the aching joint[29]; and latex is applied on the burnt part[30]. 'Jatropha tincture'[31] is used as a disinfectant, antiparasitic and anticoagulant. Thirteen patents have been found on the medicinal uses like for cuts, burns and wounds[32].

Source: NIF Database

Uses of *Kalanchoe pinnata* (Lam.) Pers. (Dupar tenga)

Source: NIF database

NIF Database

Uses from Assam

Kidney stone
Grind the leaves of the plant with a piece of turmeric and extract the juice. Add some jaggery and take the preparation for ten days.
- *Dimbeswar Gogoi, Sibsagar, Assam*

Take the juice of leaves (10-12) orally once a day for 25-30 days.
- *Guna Ram Khanikar, Golaghat, Assam*

Uses from other states

Eye pain
Put two drops of leaf juice in the eyes
- *Susanta Kumar Manjhi, Birbhum, West Bengal*

Stomach disorder
Take two spoonful of leaf juice orally
- *Susanta Kumar Manjhi, Birbhum, West Bengal*

Diarrhoea
Take the leaf juice orally along with some sugar
- *Bikesh Kumar, Sitamarhi, Bihar*

Cuts & wounds
Apply leaf paste topically
- *Arun Ghosh, Bankura, West Bengal*

Pain
Apply leaf paste topically
- *Priyanka Pramanik, Purulia, West Bengal*

Jaundice
Take the leaf juice orally along with a few black pepper
- *Arun Kumar Pandey, Fatehpur, Uttar Pradesh*

Fever
Take the leaf juice orally along with a few black pepper
- *Arun Kumar Pandey, Fatehpur, Uttar Pradesh*

Uses in Classical Codified Literature

Plant paste is applied on forehead to alleviate headache[29]; leaf paste is applied externally to cure cuts and wounds[33]; and fresh sap of plant is used for eye diseases[34]. Product 'Regenerating Day Cream'[35], a multi-herbal medicine, enhances skin's tone and elasticity, helping to smooth wrinkles and fine lines. Five patents have been found on medicinal applications of *Kalanchoe* as an antiobesity[36] medication.

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

NIF Database

Uses from Assam

Cough
Take the warm juice of tender leaves with a little salt at night for three to four days
- Mahendra Nath Dutta, Jorhat, Assam

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

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

Thread worm
Take leaf juice (two teaspoons) orally with a pinch of salt
- Manoj Kalita, Kamrup, Assam

Uses from other states

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

Cough/cold
Grind about three leaves with a black pepper to make a paste. Take the paste with water orally
- Ashok Kumar Yadav, East Champaran, Bihar

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

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

Pain
Apply leaf paste topically to alleviate pain
- Ramsharan Dhruv, Dhamtari, Chhattisgarh

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

Uses in Classical Codified Literature

Dried fruits are taken orally to get relief from cough[37]; decoction of dried flower is given with jaggery as an anti-fertility agent in females[38]; leaf juice is applied topically on ringworm and other skin diseases[38]. 'Lupin'[39] is a medicine used for pain and inflammation associated with musculoskeletal and joint disorders. Six patents have been found on its medicinal uses for treating Leishmaniasis[40] and also for its natural property as a dye[41].

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Uses of *Phyllanthus emblica* L. (Amlakhi)

NIF Database

Uses from Assam

Stomach ulcer
Mix fruit powder of Aamlakhi (*Phyllanthus emblica* L.) and Haritaki (*Terminalia chebula* (Gaertn.) Retz.) equally. Take two teaspoons of the mixture, add some water and two teaspoons of honey to make a paste. Take the preparation twice a day for thirty days
- Guna Ram Khanikar, Golaghat, Assam

Leucorrhoea
Mix powder of *Phyllanthus emblica*, tapioca and black cumin equally. Take one teaspoon with a cup of water twice a day for thirty days
- Guna Ram Khanikar, Golaghat, Assam

Diarrhoea
Take mixture of juice of amla and lemon (in equal proportion) orally
- Bina Chaudhry, Kamrup, Assam

Uses from other states

Eye irritation
Extract juice from a ripe fruit and add an equal amount of honey. Put one drop of the mixture in the eyes before going to bed at night
- Indira Chandel, Bilaspur, Himachal Pradesh

Cough/cold
Mix the fruit powder and *Glycyrrhiza glabra* L. (10g). Take five grams of the mixture orally with water
- Ved Prakash, Faridabad, Haryana

Jaundice
Grind equal amounts of amla fruit, ginger, black pepper and turmeric into a fine powder. Take one teaspoonful of this powder with honey
- Nagarmal Bagaria, Nagor, Rajasthan

Wounds
Apply leaf paste topically on wounds
- Sevaram Bhaskar, Dhamtari, Chhattisgarh

Uses in Classical Codified Literature

Bark and fruits are used in diarrhoea and dysentery[42]; fresh juice of the fruit, mixed with pure cow's butter and honey, is administered to cure obstinate hiccough[42]; juice relieves pain in urine trouble[42]; pulp (2-3g) is eaten with warm milk to get rid of headache[43]; powder of seeds after mixing with ghee is applied on the head to stop nasal bleeding[44]; fruits are taken orally to reduce acidity[45]; and decoction of the fruit is taken to increase blood count[46].

Phyllanthus is one of the main ingredients of well known medicines 'Triphala, Chavanprash and Amla hair oil'[12]. Seventy-six patents have been found on its medicinal uses for diabetes[47], liver disorders and immune deficiencies etc.[48]

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

NIF Database

Uses from Assam

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

Diabetes
Take a leaf on an empty stomach in the morning
- *D K Phukan, Guwahati, Assam*

Uses from other states

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

Diabetes
Take leaf powder (¼ spoon) regularly
- *Patel Singh, Hissar, Haryana*

Rheumatism
Mix the plant (25g), dry ginger (5g), sesame oil (5g), soak in water overnight. Take the filtered solution the next morning
- *Jagjit Bahadur, Sitapur, Uttar Pradesh*

Piles
Boil, dry and grind the whole plants (50g) into a fine paste. Make tablets from it. Take one tablet thrice a day for 3-5 days
- *Pukhram Angouba Singh, Bishnupur, Manipur*

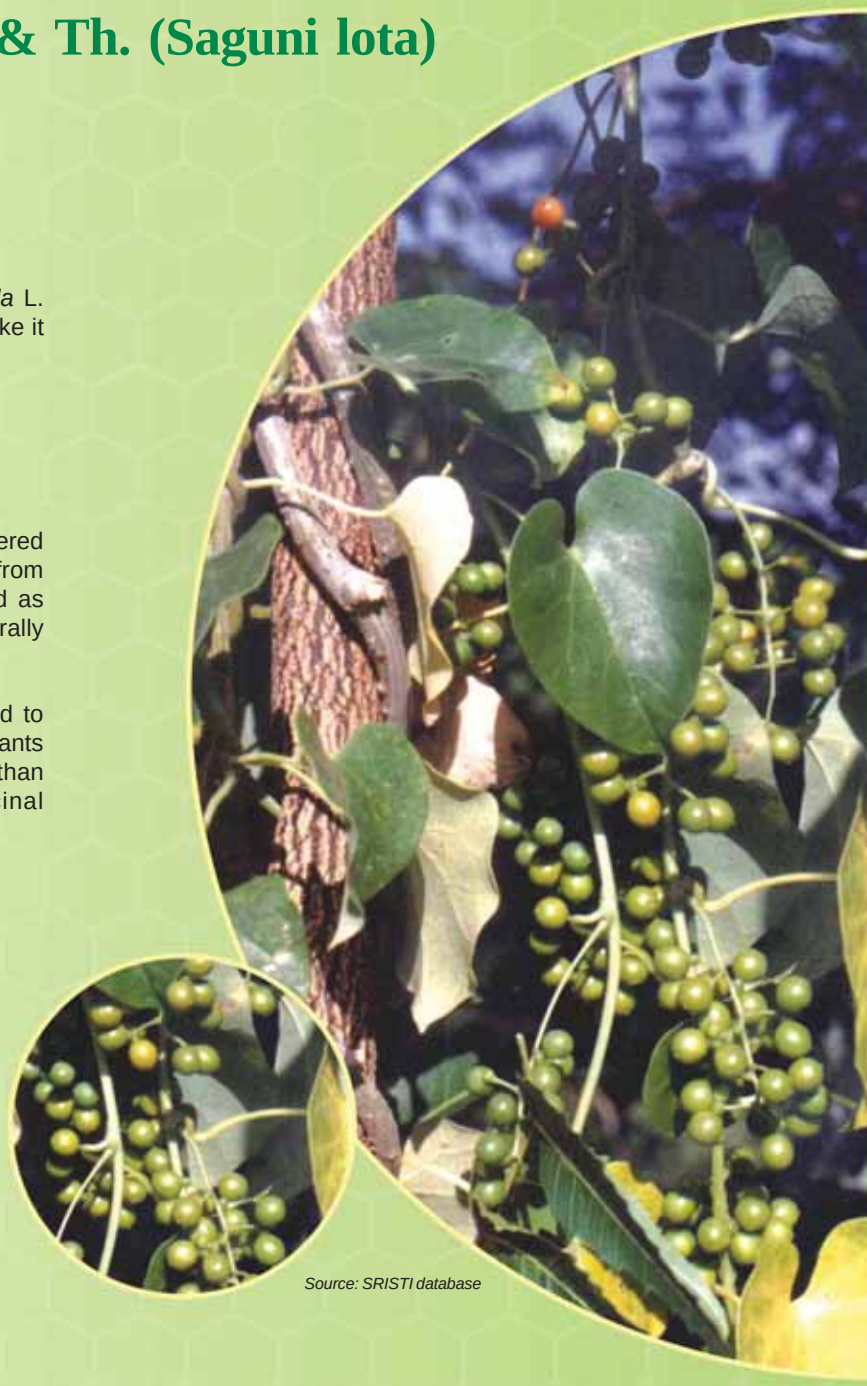
Veterinary practice

Anestrous
Grind the plant, along with the bark of *Cassia fistula* L. and leaves of *Artocarpus heterophyllus* Lam., and take it orally
- *Honnegowda, Bengaluru rural, Karnataka*

Uses in Classical Codified Literature

Powdered roots are taken to cure mouth ulcer[49]; powdered plant is administered orally with honey to get relief from stomach disorders[50]; the stem is bitter and is used as anthelmintic[22]; and decoction of the plant is given orally to cure diarrhoea[51].

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[12]' etc. More than hundred patents have been found on its medicinal applications like an antiallergic[52] and for cancer[53].



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, it is not harmful to nature and human beings. It also controls sucking pests like white fly, heliothis, aphid etc.

SRISTI KRUSHAK

Popatbhai Rupabhai Jambucha, Gujarat

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

SRISTI SURAKSHA

Community Knowledge, Gujarat

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

SRISTI PRAYAS

Community Knowledge, Gujarat

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

SRISTI SHAKTI

Community Knowledge, Gujarat

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

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

Mastiherb

Ukhardiyabhai S. Raot, Dang, Gujarat

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

~These formulations are based on traditional knowledge of farmers and developed by Sadbhav-SRISTI Sanshodhan Laboratory (www.sristi.org). 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 ASSAM

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

01

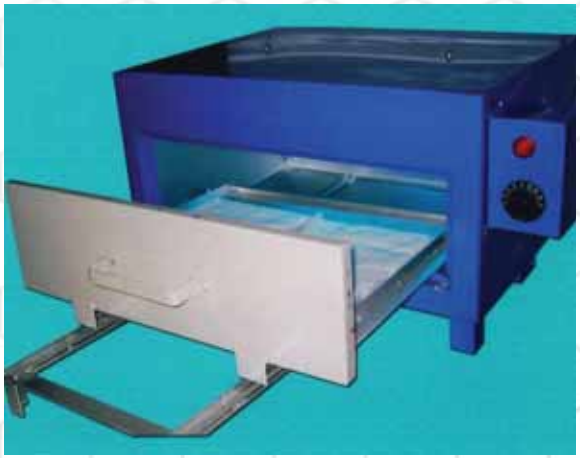
A. Muruganantham
Tamil Nadu

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.



02

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.

03

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.

04

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. It costs approximately two thousand rupees. This innovation was awarded in NIF's Fourth National Biennial Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007.

This innovation was also selected for value addition by CMERI, Durgapur under Mechanical Joint Implementation Committee (JIC) of CSIR-NIF.

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.

06

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.

07

Sandeep Kumar
Bihar

Bicycle that can be carried in a bag

A gritty and hard working graduate, Sandeep made this folding bicycle, which can be assembled and dismantled easily in a very little time. When dismantled and folded, the bicycle becomes portable such that it can be put in a bag and carried along!

08

Power generation through sewage / slow moving water

K. Balakrishna
Karnataka

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

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

09

Sheikh Jahangir Sheikh Usman
Maharashtra

Two-wheeler based spray painting device

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

10

Amphibious bicycle & others

Mohammad Saidullah
Bihar

Saidullah's penchant for innovations has made him lead such a rich life that it can inspire generations to come. He made the amphibious bicycle in mid 1970s to cross over from one place to another during a flood in the region. Thereafter he has been churning one innovation after the other over the years with his latest being an amphibious rickshaw. Among his many innovations a few that can be mentioned are a mini tractor, key operated table fan, fodder cutter operated centrifugal pump, spring loaded bicycle, mini turbine etc.

The serial innovator, Shri Saidullah was given the Life Time Achievement Award at the hands of the then President of India, in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.

11

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.

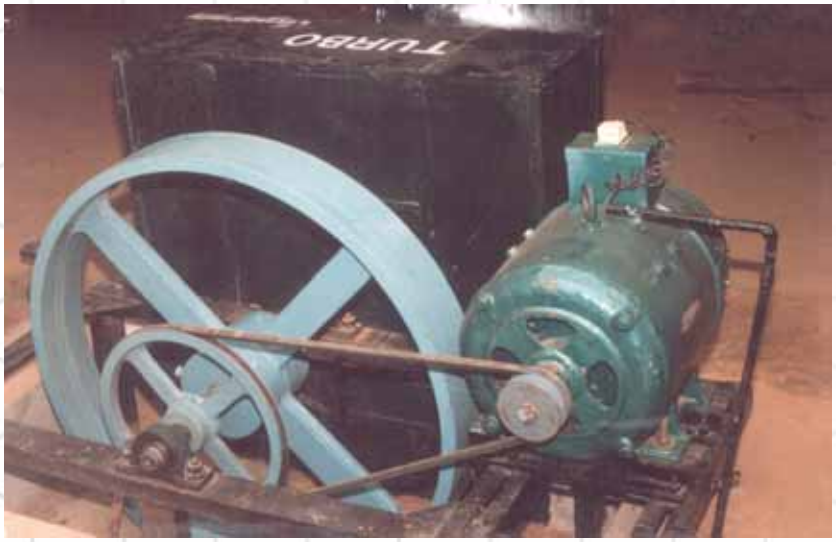
12

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.



13

Mohammad Rozadin
Bihar

Cooker for coffee

Conventionally, the pressure cookers have been used for making food only. However, the innovator has modified the normal cooker and made it into an espresso coffee making machine.

The modified cooker is used to boil water and generate steam. It is then passed through a modifed delivery system, attached to the lid, to a jar containing milk, coffee and sugar. In five minutes frothy, tasty coffee gets ready!

The modified cooker has been in great demand and even tea stall vendors from nearby districts have bought it for their shops.

14

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

Scientists from TERI (The Energy Research Institute) have confirmed 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.

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.

16

Handpump with a change

Ramashankar Sharma
Bihar

The plunger design of a hand pump has been modified by the innovator, which has resulted in substantial increase in the efficiency. The change of material has also helped in reducing the cost and weight as well.

BIT Mesra, Ranchi tested the same at NIF's instance and found that the hand pump with the modified plunger gave 69 per cent more discharge than the hand pump with the conventional plunger for the same number of strokes and head.

Ishwar Singh Kundu
Haryana

Herbal growth promoter

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

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

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

18

Mango nipper

Madhav Mahajan
Maharashtra

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

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

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

20

Mysore Mallige: A unique paddy variety

M. Lingamadaiah
Karnataka

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

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

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Honey Bee Network
SRISTI
P.O. Box : 15050, Ambawadi P.O.
Ahmedabad - 380 015, Gujarat, India
Phone: +91-79-27912792, 27913293
e-mail: honeybee@sristi.org
www.sristi.org/honeybee.html

National Innovation Foundation
Bungalow 1, Satellite Complex
Premchand Nagar Road
Vastrapur
Ahmedabad 380 015, Gujarat
Telephone: +91-79-2673 2456/2095
www.nifindia.org