Honey Bee Network

Creative Eastern Himalayas

Tripura

Manipur

Meghalaya

Mizoram

Nagaland

Arunachal Pradesh

Assam

National Innovation Foundation

CREATIVE EASTERN HIMALAYAS

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

www.honeybee.org, www.sristi.org

Regional Collaborator
IIT Guwahati

CONTENTS

CREATIVE
EASTERN HIMALAYAS

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 Eastern Himalayas. 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 Eastern Himalayas 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 Eastern Himalayas are given in part three.

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

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

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

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

It is my belief that such examples will act as spur for other State government departments to look for creative efforts of their staff and users at ground level. I hope that NIF will have the opportunity to work closely with the State governments 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 just his/her problem. There is no mechanism available for him to share the knowledge, innovation or practice with other people in different regions. Sometimes, ideas and innovations get diffused through word of mouth. But many times, these ideas remain localized. In the process, potential growth and social development gets constrained. To overcome this constraint, Honey Bee Network with a handful of volunteers triggered a movement, twenty years ago to scout, spawn and sustain the unaided innovations and outstanding traditional knowledge from the informal sector of our country.

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

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

How does NIF work?

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

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

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

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

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

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

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

---

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

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

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

What has it done?

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

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

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

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

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

How can state government join hands with NIF?

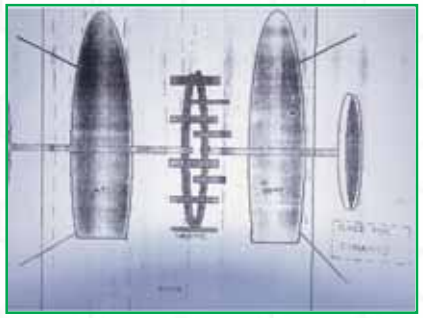
a. NIF has no field extension unit nor does it want to have one. However, state government has several field functionaries in the area of agriculture, education, industry, rural development, women and child care, forestry, etc. There can be a very fruitful partnership between NIF as a

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

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

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

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

“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 EASTERN HIMALAYAS

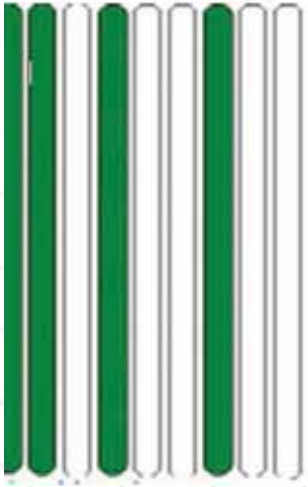
This section contains grassroots innovations emerging from the Eastern Himalayan Region

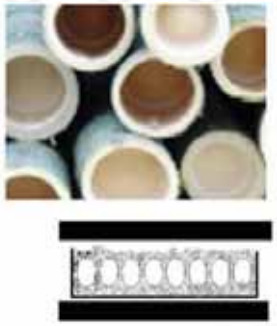
Imli Toshi Namo
Nagaland

Bamboo processing machinery, water pumps, electric hydro generators and others

Originally hailing from Mokokchung, Imli Toshi is a 27 year old serial innovator currently residing in Dimapur. Afterhis BSc in Geology he has been self employed.

Toshi always had a keen interest in machineries and automobiles, which led him to develop many of his innovations. The idea of his first innovation came into his mind while he was washing his car. For this he needed to go to the waterfall just near his house for filling up his bucket with water every time. Then he thought of the possibility of diverting the water to his car-washing place. These thoughts resulted in the development of an innovative low discharge energy pump, which is a novel combination of a vane pump and spiral bladed water turbine. The innovation submerged in flowing water can lift water up to a height of one meter. For this innovation he was awarded in NIF's Third National Competition of NIF for Grassroots Innovations and Traditional Knowledge Practices in 2005.





He has also developed a Bamboo processing machinery/lathe for the removal of nodes and outer surface. One unit has even been purchased by the Nagaland Bamboo Mission. Using bamboo powder, which is a by product of this machine, he developed a composite material which he used in further developing a small electric hydro generator and a low cost bamboo wall. Among his other innovations some of the notable ones are bamboo strip making machine, weed uprooter for hilly region, egg-boiler and hot-water filter, incense stick making machine etc.

Toshi has been supported financially by NIF for development and dissemination of a few of his technologies.

Vekho Swuro*
Nagaland

Naga smokeless dry oven

Vekho Swuro, belongs to Ruzazho Village in Phek District. He is currently employed as an Engineer under the State Government. In the year 1990 during one of his discussions with a doctor friend, Vekho Swuro heard that the conventional Naga method of drying meat and vegetables by exposure to smoke could cause cancer. This set Vekho Swuro to think seriously and after a number of trials spread over many years, he came up with his 'Naga Smokeless Dry Oven'. The oven can dry meat, fish, chilies, fruits, tea leaves as well as all kind of green vegetables, cardamom, turmeric, etc.

The oven is made of galvanized iron with bamboo racks. The lower compartment contains 1000 watts electrical heater or a uniquely designed fire box in the second variant. The temperature of the air in the upper compartment varies between 800° C – 900° C. In the upper compartment meat is hung from stainless rods / sharp bamboo. When the heat source is activated, it heats the center plate which in turn heats the air in the upper compartment. The hot air in the upper compartment dries the meat and vegetables uniformly.

As a special consideration NIF assisted (through mainly, the linkages) the innovator in filing a patent for his innovation, which perhaps may be the first in Nagaland. It was also widely publicized in the local media with the help of NIF due to which the innovator has been able to sell more then 500 units till date, each costing between from Rs. 2000-3500 depending on the variants. For his contribution he was also awarded by the Governor during the Republic Day celebration in 2004.

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

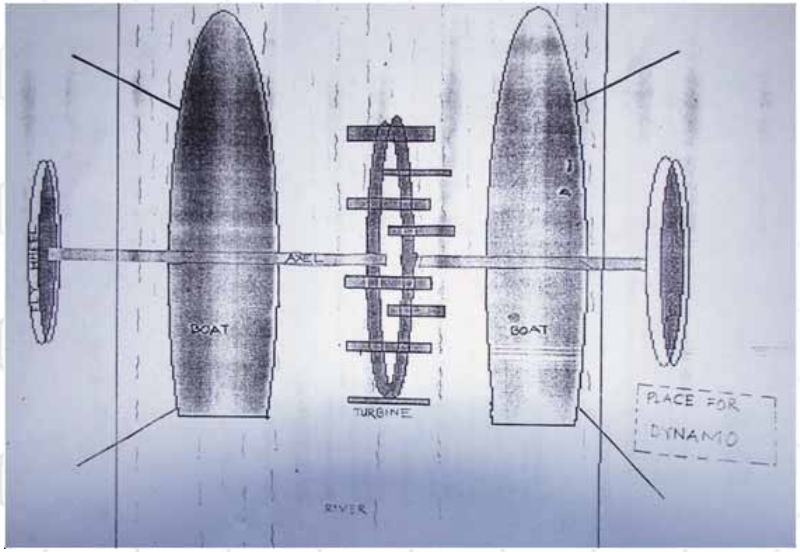
03

Idea of a simple way to generate electricity from stream, cascades and sea waves

Partha Sarathi Deb
Tripura

It is an idea of generating electricity in the hilly regions where streams, rivers, cascade run with a high velocity as in the remote areas of Tripura, or other parts of the country. Similarly, it may work with sea waves too.

Partha has proposed the use of Tow boats, turbine with axle, dynamo, and free wheel etc., for construction of an electricity generating device. For streams and cascades two boats are anchored in parallel with the banks of the river. A turbine with an axle is planted on the boats in such a way that the blades of the turbine touch the water surface as the picture describes. The axle ends are attached to the dynamos with belts. Electricity will be generated when the axle starts moving the turbine.



Raju Thapa
Nagaland

Cost effective cool air fan

Raju Thapa, 30, self employed generator mechanic from the Lomithi colony in Dimapur is well known as an innovator in the locality.

Raju has come up with a cool air fan, which can be used as a substitute for air conditioners and water coolers. The novelty of the product is that there is no need to supply water regularly. It is also cost effective. The fan has two variants, one that produces water vapor and the other without this feature. The portable device can be run on AC current.

05

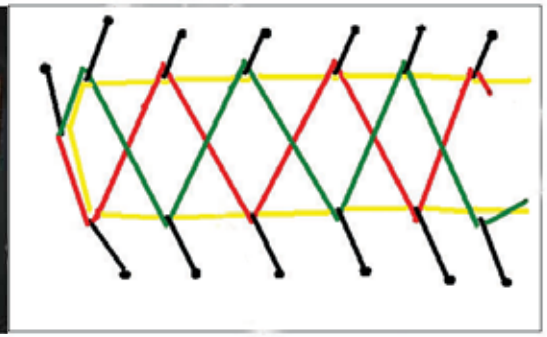
Woolen scarf knitting device

Moirangthem Manglembi Devi
Imphal

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

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

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



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.

07

Portable cardamom drier –SAWO

Tavesu Vadeo
Nagaland

Tavesu is a 55 year old farmer residing with his family in Sakraba village in Phek. He cultivates cardamom and other lesser value crops. He felt the need to improve the quality of drying vegetables and particularly cardamom in order to have value in the market. Working over a period of time he finally was able to build a drying device, which can utilize both charcoal and electricity as heat source. Tavesu named his innovations after the traditional drying system in a Naga kitchen- “SAWO”.

The SAWO is made of wood and aluminum sheet only. Steel frames and sheets are not used to avoid rusting. The normal single door variant of SAWO weighs 100 kgs while that of a double door weighs 200 kgs. Both of these variants consist of two racks inside. In the first model 25 kgs of cardamom can be dried in 4 hrs at a time while in the second model 50 kgs can be dried in the same time period. The SAWO dried cardamom fetches a much higher price for farmers then the Government Approved drying machines with a margin of Rs. 10- 25 per kg. The SAWO can also be used as a freezer with the help of an exhaust fan.

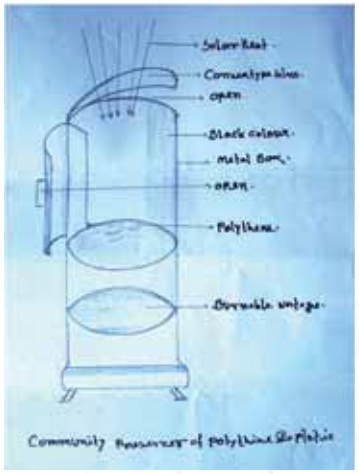
At present the innovator owns a small SAWO manufacturing unit in his village. Through this he has sold around 75 units out of which 54 units were purchased by the Government. Tevesu’s objective is to help and encourage young people to take up self employment in Agriculture by creating higher value for agricultural products by appropriate and low cost technological interventions.

Incinerating polythene carry bags by sun light

Tutan Das
Tripura

The innovator has proposed a metal box with a black colored outer wall having one concave roof. The roof should have two parts, which can be opened like doors. There will be another box in the shape of a cone or square below the first box with an opened upper surface.

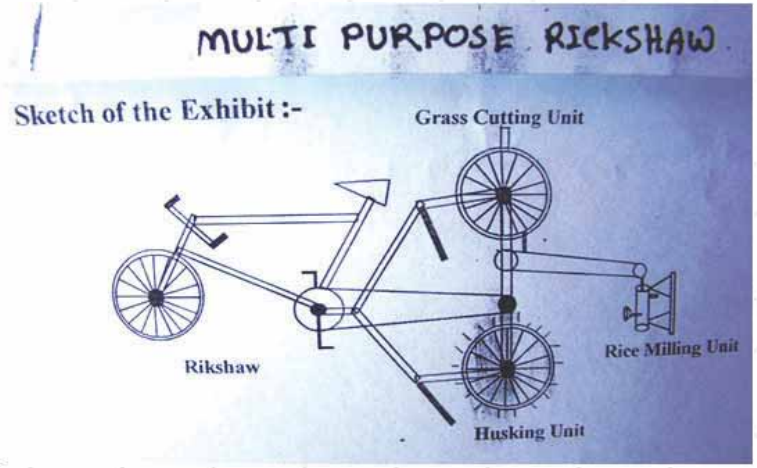
Polythene bags or plastic garbages are kept on the upper box and combustible wastage are kept on the lower box. After this the box is placed in sun light with the concave cover facing it. Due to the black color of the surface the box will be heated and the garbage will be burned. Thus the polythene may be condensed and change into smaller manageable sizes.



09

Multi purpose rickshaw

In this partially modified “Cycle Rickshaw’, the body and rear wheels (two) are removed after which specially designed wheels are attached to the rear axle. One of these wheels functions as a paddy and wheat husker and the other wheel functions as a grass/hays cutter. This is especially used for preparation of cattle feed. The attachment may additionally be used for cutting bamboo mats and jute bags, etc. This may be quite useful for development of cottage industries.



Gobinda Deb Nath*
Tripura

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

Herbal treatment for bone fracture

Mathura Phonglo
Nagaland

This particular treatment was passed on to Mathura by his late father Thangbandao Phonglo. His father had invented this treatment by careful experimentation and a rigorous trial and error process over a period of time. After successful trials on animals his father started giving the treatment to members of his Dimasa tribe. Before his death Thangbandao passed on the knowledge of the treatment to Mathura who had retired from the Eastern Frontier Rifle Battalion.

The treatment consists of a paste, which is procured by grinding together parts of four plants (local names: Methafly, Samnathu, Kathisoanithongaphom and Phislem). This is then put along with a bandage or leaves over the damaged bone. Splints fashioned out of bamboo are also used so that the broken bone is held in place. In a few days time even badly damaged bones are reported to heal. Mathura's treatment has gained reputation in the local region such that even out of state patients flock to him for cases where conventional medical treatments have even failed. For them Mathura's small house is always available for the duration of their treatment for free with only a condition that they have to take care of their cooking separately. Mathura has treated over a thousand patients, which is evident from the patient register that he started maintaining only a few years back. As Mathura dispenses his treatment for free, he maintains his family with a small amount that he gets as donations from grateful patients.

Mathura's only wish is that he be given a plot of land so that he can cultivate the four plants, which otherwise have to be collected from the forest day after day. A grinder to make the paste and a refrigerator to store the paste would also be very helpful. NIF has not been able to give full support to the innovator as two of the constituent plants have not been taxonomically identified yet. Matter is being pursued with experts.

11

Method of repelling pests

During the month of September- October, there is heavy damage of paddy due to the attack of pests like *Tryporyza incertulas*. To get rid of this pest Jadav has tried mixed cropping of paddy with arum. In this practice arum is cultivated after every two lines of paddy. This reportedly keeps the insect out of the paddy field.

Jadav Mazumdar*
Tripura

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

Ghonakanta Gogoi
Assam

Multi purpose wood-working machine

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.

13

Night playable shuttle cock

The game of badminton can be played in sufficient light, natural or otherwise. However, it becomes impossible to play the game at night in absence of electric lights. The innovator came out with an idea of fitting a light inside the skirt of shuttle cock to improve visibility and to make it possible to play at night.

Koj Taki
Arunachal Pradesh

Karuna K. Nath
Assam

Manual wood cutting & Bamboo cross cutter

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 been supported under the Micro Venture Innovation Fund scheme of NIF and has been doing modest business in the area.

15

Bamboo splitting machine

The innovator is an energetic motor vehicle mechanic who came up with his innovation for splitting and dressing bamboo to meet a local need. With this machine one can split bamboo lengthwise and also into small pieces. This machine has an additional feature to maneuver and shave them into finer strips as well. This machine can be a useful substitute of *dao* and other such tools used by people for splitting and dressing bamboo. It is easy to operate, efficient and economical in nature as its output is almost three times in comparison to manual labour.

Liagi Baht
Arunachal Pradesh

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.

Source: NIF database

Uses of *Abrus precatorius* L.

NIF database

Backache
Powdered seeds of the plant along with the powder of rhizome of *Acorus calamus* L., roots of *Asparagus racemosus* Willd., and leaves of *Vitex negundo* L., *Cannabis sativa* L. are mixed in honey and tablets are made. One tablet is given twice a day for three to four weeks
-Ami Chand, Kangra, Himachal Pradesh

Baldness
Seeds are ground into a paste and applied on the scalp along with honey
-Mangilal Purohit, Churu, Rajasthan

Mouth ulcer
Juice extracted from the green leaves is applied on the ulcers
- Chhitar Lal Gurjar, Sawai Madhopur, Rajasthan

Stomachache
Seeds (100 g) are taken with ghee or butter for relief
- Kalpana, Trichy, Tamil Nadu

Knee pain
Seeds (6 g) are taken orally with milk for 14 days
- Pavan Mehra, Sikar, Rajasthan

Uses from Classical Codifed Literature

Dried leaves and root powder is given orally in case of eye complaint[1]; decoction of the young leaves is given orally for cough[2]; leaf powder is given orally in case of urine problems[3]; seed extract is used in sciatica[3].

It is one of the ingredients of 'Tranquil'[4] for reliving stress and anxiety. Ten patents have been found on the applications of *Abrus* as natural sweetener[5], oral contraceptive[6], etc.

Uses of *Aegle marmelos* (L.) Corr.

NIF Database

Diabetes
150ml of the juice extracted from the pounded roots is administered orally
- *Maibum Lolito Meitei, Bishempur, Manipur*

Jaundice
Juice extracted from leaves or fruits is given orally
- *Ngairangbam Santosh Singh, Imphal East, Manipur*

Headache
Equal amounts of roots of bel and leaves of *Leucas aspera* L. are ground into a paste and applied
- *Bhadi Ram Bharali, Guwahati, Assam*

Nasal bleeding
Leaves are ground into a paste, which is applied on the top of the nose
- *Puran Chand, Kangra, Himachal Pradesh*

Eye diseases
Juice is extracted from the green leaves and two drops are put in the eye
- *Kumari Nigar Pravin, Hazaribag, Jharkhand*

Menorrhagia
Leaf paste is administered orally to control the disorder
- *Rani B. Bhagat, Pune, Maharashtra*

Fever
Leaves of bel and chirayata (*Andrographis paniculata* (Burm.f.) Wall.ex Nees) 250g each are boiled in a litre of water to obtain a decoction of 250g. 100g decoction is given to the patient twice a day for seven days
- *Sindhoo Kumari, Gopalganj, Bihar*

Intestinal worms
Juice extracted from the green leaves is taken orally
- *Jagjeet Bahadur, Sitapur, Uttar Pradesh*

Diarrhoea
Pulp of the ripen fruit is taken
- *Jagjeet Bahadur, Sitapur, Uttar Pradesh*

Veterinary practice

Abdominal pain
Leaves of *Aegle* and *Euphorbia neriifolia* L., flower of *Tagetes erecta* L., are mixed with fodder and fed to the animal
- *Dipendra Kumar, East Champaran, Bihar*

Uses in Classical Codified Literature

Burnt fruit pulp is applied for rheumatic arthritis[7]; 10g fruit pulp is given before sleep to overcome morning sickness[8]; fruit rind is applied externally on hair to kill headlice[9].

'Bael'[10], prepared from *Aegle* is used in diarrhoea, dysentery and GI disorders. It has digestive and carminative properties. Lukol's[10] tonic is made from this plant along with other plants. It improves uterine circulation, and its antimicrobial and astringent actions on the mucous membrane of the genital system also help control leucorrhoea. 'Bilwa'[11], a product of *Aegle* is used as a medicine to cure a number of diseases. Fifty-three patents have been granted on the medicinal applications of *Aegle* for curing diabetes[12], gastric ulcer[13] etc.

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

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

Uses of *Alstonia scholaris* (L.) Br.

NIF Database

Wound
Paste of bark and leaves is applied on infectious wound
- *Robert L. Hamte, Aizawl, Mizoram*

Leaf paste is applied topically over the affected area
- *Jongam Ngemu, Papum Pare, Arunachal Pradesh*

Gastric
Few leaves are ground with black pepper and taken orally before food
- *Indra Kanta Ojha, Sibsagar, Assam*

Asthma
Decoction of bark is given orally
- *Robert L. Hamte, Aizawl, Mizoram*

Fever
Powdered bark (50g) is taken with water thrice a day
- *Kutuva Birhorni, Koderma, Jharkhand*

Stomachache
Juice extracted from bark (20g) is administered orally
- *Prishila Tuddu, Hazaribag, Jharkhand*

Headache
Juice extracted from bark (20g) is given orally
- *Prishila Tuddu, Hazaribag, Jharkhand*

Joint pain
Bark paste is applied on aching joint
- *Prishila Tuddu, Hazaribag, Jharkhand*

Uses in Classical Codified Literature

The bark is used against skin diseases and rheumatism[14]; the root juice is taken with milk to cure leprosy[14]; fresh bark is put in water to draw out the latex in it, which is taken orally in case of tuberculosis[15]; dried powder is administered orally to cure diarrhoea[16]; bark extract is given orally to get rid of intestinal worms[17].

'Ayush-64 cap./tab.'[18], prepared from this plant is effective as an antimalarial compound both for treatment and prophylaxis. Fifteen patents have been found on the medicinal applications like for use as an antipyretic[19].

Uses of *Cassia fistula* L.

NIF Database

Mouth sore
Juice extracted from the plant is kept on a banana leaf and the leaf is burnt. The ash is then applied on the affected part
-Purna Borah, Golaghat, Assam

Dysentery
Equal amount of bark of *Cassia*, *Mangifera indica* L., *Psidium guajava* L. and *Spondias pinnata* (L. f.) Kurz. is ground into a fine paste. Two spoonful of this paste are administered orally
- Niru Patangia, Sonitpur, Assam

Ringworm
Paste of the scrubbed tuber is applied on the infected part of the body for a few days
- Kumar Chandel, Hamirpur, Himachal Pradesh

Cough
Skin of the fruit is chewed in the morning
- Santoshben Gamar, Banaskantha, Gujarat

Stomachache
Decoction of the fruit and jaggery is taken orally
- Bhagwati Lal Kumawat, Chittorgarh, Rajasthan

Uses in Classical Codified Literature

Powder of dried bark is applied in case of leucoderma[20]; fruit juice is taken in jaundice[21]; fruits are used as diuretic[21]; root powder is applied in skin diseases[21].

Pilex[10](Vein care) helps support metabolic processes involved in maintaining the vascular system's integrity for optimum health and appearance; Purim[10] (Hemo care) is used for blood purification. Six patents has been found on the medicinal applications of *Cassia fistula* like as an antiviral[22].

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

Uses of *Centella asiatica* (L.) Urban

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

NIF Database

Malaria
Take the decoction of the plant along with some other herbs thrice a day
- Smit Yanueg Jamoh Lego, East Siang, Arunachal Pradesh

Insomnia
Plant paste is taken along with food regularly
- Khiroram Barman, Borpeta, Assam

Toothache
Equal proportions of brahmi leaves, onion and banana roots are ground to make a fine paste, which is applied on the aching tooth
- Anil Gogoi, Sibsagar, Assam

Memory enhancer
Juice extracted from the leaves is administered orally
- Savitri Devi, Kangra, Himachal Pradesh

Anorexia
Juice extracted from leaves (25g) is administered orally
- Gamaliyal Hembrom, Hazaribag, Jharkhand

Stomachache
Eating of fresh leaves helps alleviate stomachache
- Krishna Chand, Kangra, Himachal Pradesh

Dysentery
Paste of leaves along with black pepper is administered orally
- Dipali Borah, Sibsagar, Assam

Diarrhoea
Whole plant is ground and juice is extracted. Two spoons of the juice, with a pinch of salt, is administered orally twice a day for one week
- Okshongbung Mamang Leikai, Bishnupur, Manipur

Skin diseases
Leaf paste is applied topically
- Savitri Devi, Kangra, Himachal Pradesh

Herbal tea
Tea is made using leaves of the plant to enhance immunity
- Jasmit Singh, Hamirpur, Himachal Pradesh

Uses in Classical Codified Literature

Fresh juice from aerial part is used as brain tonic[23]; powder of aerial portion is taken to control high blood pressure[24]; the whole plant is used as diuretic[21]; plant paste is applied as a poultice in case of bone fracture[21].

'Herbal Tea'[25] is mainly indicated as a health drink. 'Mentat'[10] improves mental functions, mental quotient, memory span, concentration ability and stress threshold. More than three hundred patents were found on its medicinal applications mainly on anti-depressant activity[26].

Uses of *Ficus carica* L.

NIF Database

Cold
Fruit juice is administered orally to combat cold
- Mehnaza Tabassum, Anantnag, Jammu & Kashmir

Gastritis
Two tablespoons of powder of shade dried fruit is mixed in 200ml of water. The mixture is left over night and is taken next morning
- Kumar Chandel, Hamirpur, Himachal Pradesh

Kidney disorder
Ripe fruit is eaten
- Roomi Jan, Anantnag, Jammu & Kashmir

Cardiac problem
Juice (2 spoons) extracted from the fruit is warmed slightly and taken orally
-Sarathy Maity, East Midnapur, West Bengal

Blood purification
Fruit, if taken regularly, acts as blood purifier
- Devaram, Sirohi, Rajasthan

Bleeding piles
Two fruits are soaked in half a glass of water for twelve hours. This water is taken after twelve hours and same process is repeated until the ailment cures
-Kumari Sarita, Sikar, Rajasthan

Leucoderma
Bark powder (2 spoons) is given with water
-Sarathy Maity, East Midnapur, West Bengal

Corns
Fruit sap is applied on corns
- Roomi Jan, Anantnag, Jammu & Kashmir

Itching
Topical application of leaf extract is helpful
- Dilber Shabir, Anantnag, Jammu & Kashmir

Uses in Classical Codified Literature

Decoction of boiled fruit is taken orally to cure cough[27]; milky latex is applied externally to get rid of warts[21]; juice extracted from fruit is taken in case of constipation[21]; fruit juice also acts as a laxative[21].

Refreshing fruit pack[10] prepared from fig rejuvenates the facial skin. Four patents have been found on medicinal applications of fig like for treating tumor[28] etc.

Source: http://www.profizahrada.cz/images_data/2837-ficus-carica-2.jpg

Source: NIF Database

Uses of *Jatropha curcas* L.

NIF Database

Jaundice
Juice extracted from leaves and bark is mixed with jaggery. One tea-spoonful of this mixture is given orally
- *Dimbeswar Gogoi, Sibsagar, Assam*

Agnail
Latex is applied on the infected part
- *Atilik Baruah, Sibsagar, Assam*

Piles
Juice extracted from the leaves is given orally
- *Chingakham Binashaki Devi, Imphal West, Manipur*

Tumor
Leaves are warmed after smearing with oil and tied on the tumor
- *Madhav Shankar Rao Patil, Jalgaon, Maharashtra*

Skin disease
Paste made from the leaves is applied topically
- *Madhav Shankar Rao Patil, Jalgaon, Maharashtra*

Thorn pain
Latex of the plant is applied on the affected part
- *Madhav Shankar Rao Patil, Jalgaon, Maharashtra*

Eczema
Jatropha oil (60g) and bee wax (30g) is heated at 60° C and borax (1g) is added in water (10ml); both are mixed together and stirred slowly on simmer flame. The resultant ointment is applied on the infected area
- *Raghubir Agarwal, Hissar, Haryana*

Veterinary practice

Foot & mouth disease
Seeds are ground with latex of *Calotropis gigantea* R. Br. and edible oil in small amount. The paste obtained is applied topically
- *Gandubhai, Dang, Gujarat*

Uses in Classical Codified Literature

Bark powder is taken orally with water to get cured from pyorrhea[29]; leaves are useful in ulcer[21]; young branches are warmed in fire and tied on the aching joint[30]; latex is applied on the burnt part[31].

'Jatropha tincture'[32] is used as a disinfectant, antiparasitic and anticoagulant. Thirteen patents have been found mainly on the medicinal uses such as for cuts, burns and wounds[33].

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

NIF Database

Kidney stone
Extract the leaf juice and put a red hot iron rod in it. Let the juice cool down and take it in morning on an empty stomach with either sugar or honey
- Monindranath Thakur, North Tripura, Tripura

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, Sibasagar, Assam

Take leaf juice orally once a day for 25-30 days.
- Guna Ram Khanikar, Golaghat, Assam

Injury
Put warmed leaves on the affected body part
- Onom T. Doming, East Siang, Arunachal Pradesh

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

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

Diarrhoea
Take 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 juice of leaves and black pepper orally
- Arunkumar Pandey, Fatehpur, Uttar Pradesh

Fever
Take the juice of leaves and black pepper orally
- Arunkumar Pandey, Fatehpur, Uttar Pradesh

Uses in Classical Codified Literature

Plant paste is applied on forehead to alleviate headache[30]; leaf paste is applied externally to cure cuts and wounds[34]; fresh sap of plant is used for eye diseases[35]. Product 'Regenerating Day Cream'[36] a multiherbal medicine enhances skin's tone and elasticity, helping to smooth wrinkles and fine lines. Five patents were found on the medicinal applications of *Kalanchoe* mainly as an antiobesity[37] medication.

Source: NIF database

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

Uses of *Nyctanthes arbor-tristis* L.

NIF Database

Malaria
Grind the leaves of *Nyctanthes* with *Azadirachta indica* A. Juss., *Andrographis paniculata* (Burm.f) Nees, *Adhatoda vasica* Nees, *Swertia chirata* Buch.-Ham. in equal quantity to make a paste. Make small pills from it. Take one pill on an empty stomach during the malaria prone months.
- Pramod Nath, North Tripura, Tripura

Juice of the leaves is taken orally along with honey
- Prabati Kalita, Kamrup, Assam

Fever
Decoction of the leaves is given orally
- R.K. Bheirosana Singh, Bishnupur, Manipur

Intestinal worms
Juice of the flowers is extracted after squeezing them. Two spoonful of this juice are taken orally for two days with a pinch of salt
- Manoj Kalita, Kamrup, Assam

Hair fall
Seeds are crushed in water and the paste is applied on hair scalp
- Rani B. Bhagat, Pune, Maharashtra

Cough/cold
Paste is prepared using three leaves and black pepper. It is then taken orally with water
- Ashok Kumar Yadav, East Champaran, Bihar

Wound
Topical application of leaf paste gives relief
- Ranjeet Kumar, Sheohar, Bihar

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

Diabetes
Decoction of the leaves is taken orally for 40 days
- Shama Pravin, Gopalganj, Bihar

Juice of the leaves is taken orally
- Rani B. Bhagat, Pune, Maharashtra

Uses in Classical Codified Literature

Dried fruits are taken orally to get relief from cough[38]; decoction of dried flower is given with jaggery as an anti-fertility agent in females[39]; leaf juice is applied externally on ringworm and other skin diseases[39].

'Lupin'[40], is a medicine used for pain and inflammation associated with musculoskeletal and joint disorders. Six patents have been found on its medicinal uses such as in treating Leishmaniasis[41] and also for its natural property as a dye[42].

Uses of *Phyllanthus emblica* L.

NIF Database

Stomach ulcer
Equal amounts of amla and *Terminalia chebula* Retz. are taken and powder is made. Two spoonful of powder, along with two spoonful of honey and four spoonful of water are taken, mixed properly and administered orally
- Guna Ram Kanikar, Golaghat, Assam

Diarrhoea
Juice of amla, with an equal quantity of lemon juice, is administered orally
- Bina Chaudhry, Kamrup, Assam

Gynecological disorder
Equal amounts of amla, tapioca and cumin are ground into a fine powder. One spoon of the powder is given orally to cure the disorder
- Guna Ram Kanikar, Golaghat, Assam

Eye irritation
Juice from ripen fruit is extracted and an equal amount of honey is added. One drop of the mixture is put in the eyes before going to bed at night
- Indira Chandel, Bilaspur, Himachal Pradesh

Diabetes
Equal amounts of amla, *Terminalia chebula* Retz., *Terminalia bellirica* Roxb. are ground into a fine powder. Two spoonful of this powder are given orally
- Pritam Chand, Kangra, Himachal Pradesh

Cough/cold
Powder is prepared from fruits (4) and *Glycyrrhiza glabra* L. (10g). 5g of this powder is taken with a glass of water
- Ved Prakash, Faridabad, Haryana

Jaundice
Equal amounts of amla fruit, ginger, black pepper and turmeric are ground into fine powder. One tea-spoonful of this powder is given with honey
- Nagarmal Bagaria, Nagor, Rajasthan

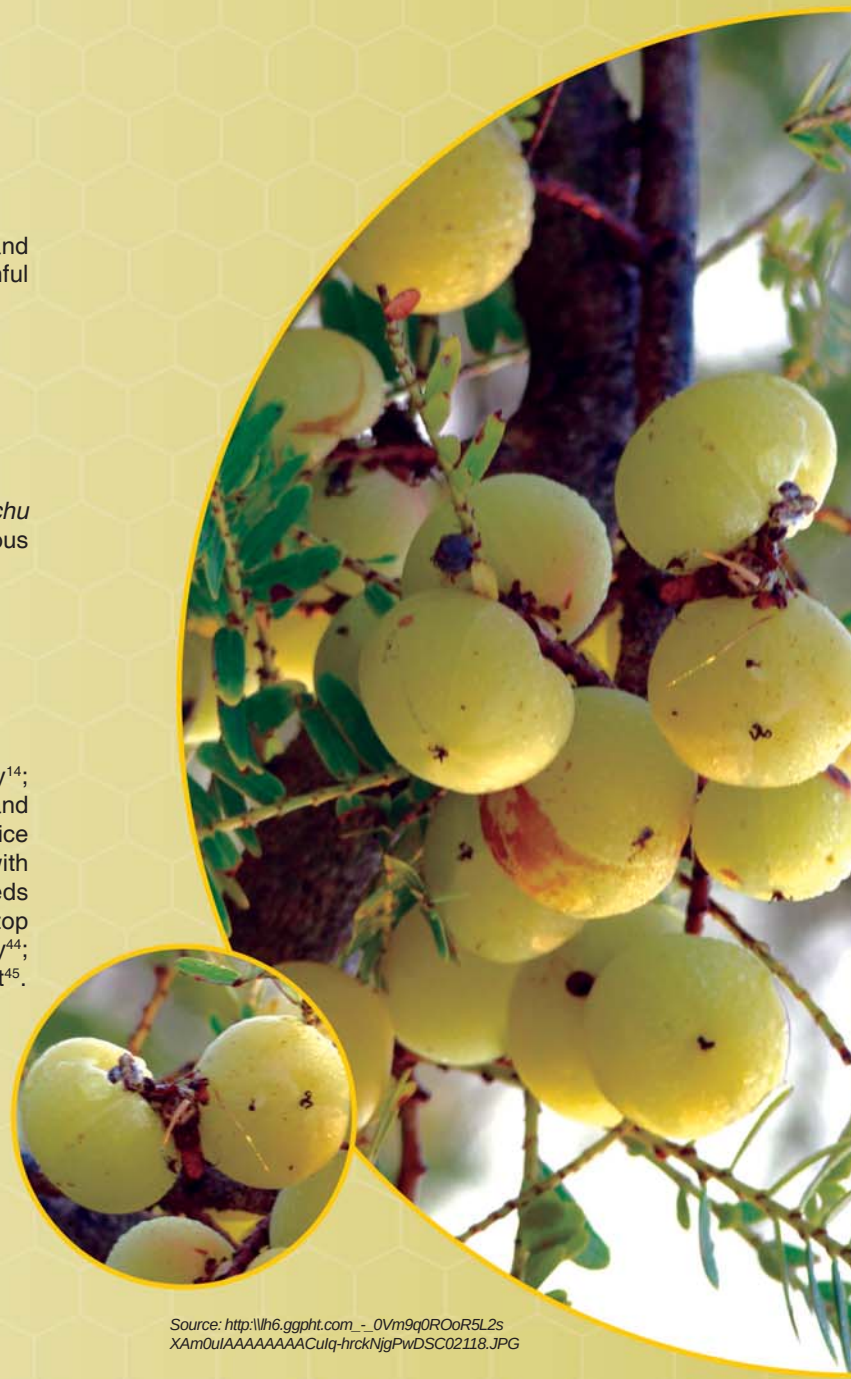
Wounds
Pounded leaves are applied on wounds
- Sevaram Bhaskar, Dhamtari, Chhattisgarh

Poisonous bite
About 3-4 root pieces along with a leaf of *Areca catechu* L. are chewed to get relief from the effect of poisonous bites
- Anna Gangavarn, Osmanabad, Maharashtra

Uses in Classical Codified Literature

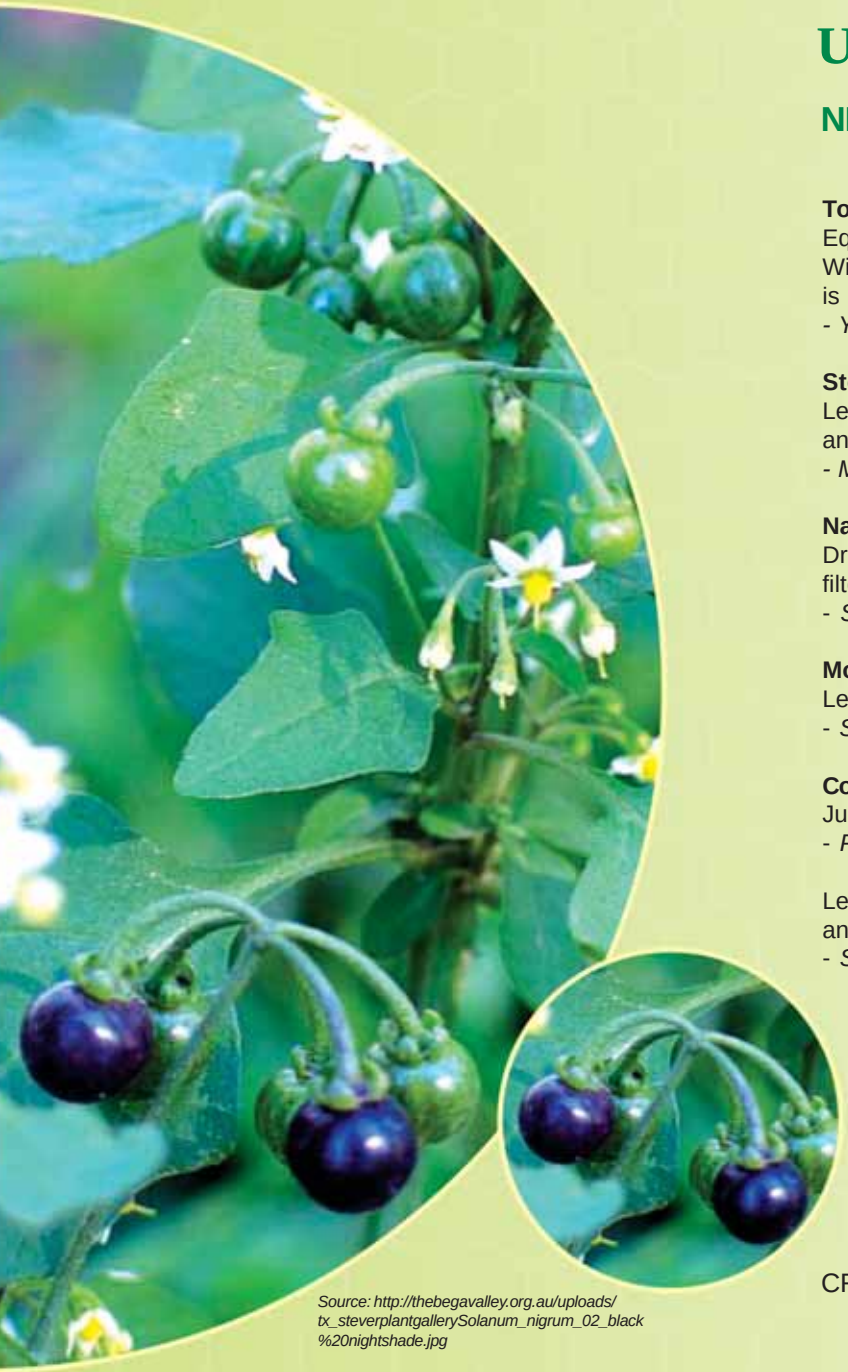
Bark and fruits are used in diarrhoea and dysentery[14]; fresh juice of the fruit, mixed with pure cow's butter and honey, is administered to cure obstinate hiccough[14]; juice relieves pain in urine trouble[14]; pulp (2-3g) is eaten with warm milk to get rid of headache[43]; powder of seeds after mixing with ghee is applied on the head to stop nasal bleeding[7]; fruits are taken orally to reduce acidity[44]; decoction of the fruit is taken to increase blood count[45].

Phyllanthus is one of the main ingredients of well known medicines 'Triphala, Chavanprash and Amla hair oil'[10]. Seventy-six patents have been found on its medicinal uses such as for diabetes[46], liver disorders and immune deficiencies[47].



Source: http:\\lh6.ggpht.com_-_0Vm9q0ROoR5L2s XAm0uIAAAAAAAACuIq-hrckNjgPwDSC02118.JPG

Uses of *Solanum nigrum* L.



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

NIF Database

Tonsillitis
Equal amount of leaves of *Solanum* and *Alpinia galanga* Willd. are ground and tablets prepared from it. One tablet is administered orally twice a day
- *Yumnam Rajenkumar Singh, Imphal West, Manipur*

Stomachache
Leaves of *Solanum*, neem and *Vitex negundo* L. are fried and administered orally twice a day
- *Moirangthem Mani Devi, Imphal West, Manipur*

Nasal bleeding
Dry fruit (25g) is boiled in mustard oil (100g). The oil is filtered and applied on the forehead
- *Sahim Ansari, Lohardaga, Jharkhand*

Mouth ulcer
Leaves are chewed
- *Shripal Singh, Bulandshahar, Uttar Pradesh*

Cough
Juice extracted from the roots is taken orally
- *Priyanka Kumari, Gopalganj, Bihar*

Leaves of makoi (200g) are fried in mustard oil (20ml) and administered with little salt
- *Sukhai Mali, Faridabad, Haryana*

Jaundice
Juice extracted from the roots is administered orally
- *Suman Kumari, Gopalganj, Bihar*

Uses in Classical Codified Literature

Powdered fruit is given orally to reduce fever[30]; juice extracted from the whole plant is applied externally on the burnt part[48]; poultice of the plant is placed on the aching joint[49]; fruits are ground and taken orally to cure diarrhoea[50].

'Herbolax'[10] made from *Solanum* along with other plants is used as gentle laxative in case of constipation and for electrolyte balance. Ninety patents were found on its medicinal uses mainly on hepatitis[51,52].

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

NIF Database

Worms
Soak the stem overnight in a cup of water after removing its bark. Take the juice of the stem once a day for three days on an empty stomach in morning
- Pramod Nath, North Tripura, Tripura

Jaundice
Juice extracted from stem is administered orally till cured
- D. K. Phukan, Guwahati, Assam

Piles
Whole plants (50g) are boiled, dried and ground into a fine paste. Tablets are then prepared and one tablet is administered orally to the patient thrice a day for 3-5 days
- Pukhram Angouba Singh, Bishnupur, Manipur

Migraine
Stem of the plant (250g) is boiled in water along with green gram (250g) and sesame oil (250ml) till half of the decoction remains and then applied on the forehead
- Stedimon Arackal Paul, Port Blair, Andaman & Nicobar Island

Asthma
Juice is extracted from the leaves and two spoonful are administered orally with honey for 40-42 days
- Ramabandhu Mahajan, Jalgaon, Maharashtra

Diabetes
Fresh leaves (1-2) are taken on an empty stomach
- D. K. Phukan, Guwahati, Assam

Powder of the leaves (¼ spoon) is taken regularly
- Patel Singh, Hissar, Haryana

Rheumatism
Plant (25g), dry ginger (5g) and sesame oil (5g) is mixed and soaked in water overnight and next morning the mixture is filtered and administered
- Jagjit Bahadur, Sitapur, Uttar Pradesh

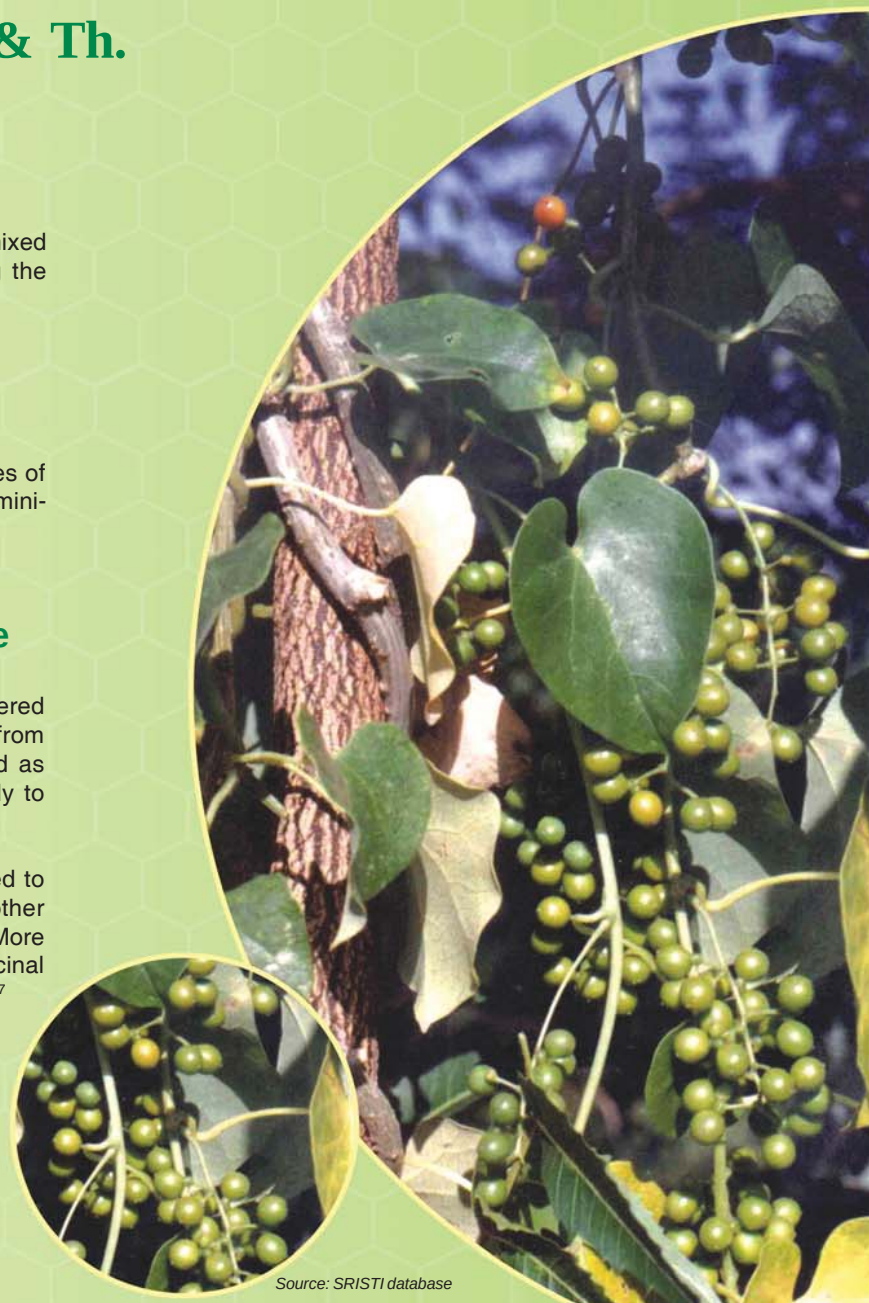
Veterinary practice

Anestrous
Plant, along with bark of *Cassia fistula* L. and leaves of *Artocarpus heterophyllus* Lam., is ground and administered orally
- Honnegowda, Bengaluru rural, Karnataka

Uses in Classical Codified Literature

Powdered roots are taken for mouth ulcer[53]; powdered plant is administered orally with honey to get relief from stomach disorder[54]; the stem is bitter and is used as anthelmintic[21]; decoction of the plant is given orally to cure diarrhoea[55].

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[10]' etc. More than hundred patents have been found on its medicinal applications such as an antiallergic[56], for cancer[57] etc.



Source: SRISTI database

Herbal Formulations for Healthy Crops~

SRISTI SHASTRA

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

It flourishes the growth of the plant by increasing flowering as well as fruiting besides overall vegetative growth, without being harmful to nature as well as human beings. It also helps in controlling sucking pests like white fly, heliothis, aphid etc.

SRISTI KRUSHAK

Popatbhai Rupabhai Jambucha, Gujarat

It is an excellent remedy for leaf curl disease, which not only controls the disease but simultaneously increases the vigor of the plants by increasing its overall growth.

SRISTI SURAKSHA

Community Knowledge, Gujarat

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

SRISTI PRAYAS

Community Knowledge, Gujarat

It is a highly effective formulation to act as a herbal growth promoter, which also stops shedding of flowers as well as increases the overall growth of the plant. This formulation strengthens the plants internally and enables them to withstand extreme weather conditions.

SRISTI SHAKTI

Community Knowledge, Gujarat

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

Herbal Formulations for Livestocks and Poultry~

Coccicure

Sudakarbhai K. Gauli & Jeevalbhai M. Gauli, Dang, Gujarat

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

Poultmax

Community knowledge, Valsad, Dang, Gujarat

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

Mastiherb

Ukhardiyabhai S. Raot, Dang, Gujarat

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

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

PART III

INNOVATIONS
for EASTERN HIMALAYAS

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

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 smell 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 lac acres in five states.

02

Kudrat 9- An Improved Variety of Wheat

Prakash Singh Raghuvanshi
Uttar Pradesh

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

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

Jai Prakash Singh
Uttar Pradesh

Virat (JP-6)- An Improved Variety of Pigeon pea

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

04

Richa 2000- An Improved Variety of Pigeon pea

Rajkumar Rathore
Madhya Pradesh

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

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 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 to the garden in Rashtrapati Bhavan.

06

Aloe vera Gel Extractor

Dharamveer
Haryana

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, 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 from the Micro Venture Innovation Fund at NIF. One unit has been sent to Kenya on a pilot basis for application feasibility study in the country.

Kamal Narayan Pradhan 'Gorkha'
Himachal Pradesh

Modifications in Gears for Mountainous Slope

Anybody who has driven on mountainous roads knows that while descending on the slopes, one needs a kind of locking mechanism in the gear to prevent slippages. Kamal Narayan has modified the old gears which may get worn out and may cause accidents if not replaced or repaired.

He has modified the gear arrangement to prevent slippage even in the new vehicles. This innovation has been found very useful by the heavy vehicle drivers. Its dissemination, however, is localised.

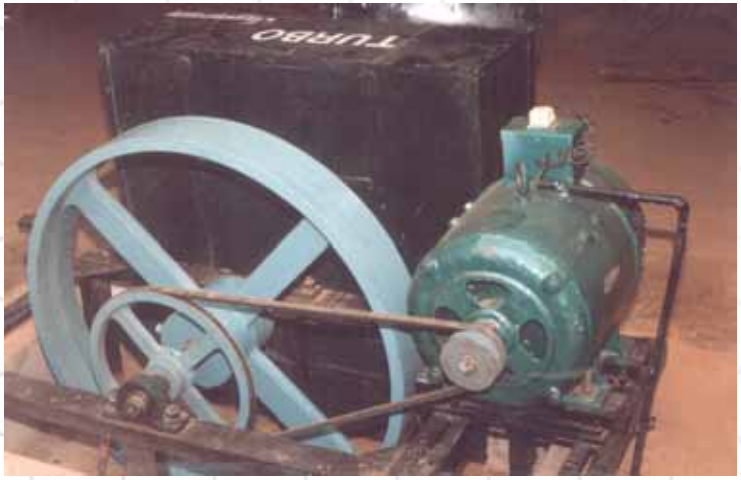
08

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.



N Sakthimainthan
Tamil Nadu

Hand Operated Water Lifting Device

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.

10

Improved Multicrop Thresher

Madanlal Kumawat
Rajasthan

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

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

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

11

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.

12

Portable Painting System

Gurjeet Singh
Himachal Pradesh

Often, users need a small portable spray painting system to meet local needs including indoors. Gurjeet has developed such a system using available parts such as compressor, air tank and a spray gun.

Weighing hardly ten kilograms and costing one-third of the commercial systems, it works very well. By using a tube in place of air tank, the innovator projects that the cost can be reduced for certain type of jobs.

13

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 converts the compressor into an air pump. A pinch of polymer granules is also inserted to seal the leakage in the tube. The user can kick and fill air in the tube. This may last for a few kilometers to reach a pump repairing shop. An entrepreneur from Mumbai has licensed this technology and has sold more than 2500 pieces so far, mainly in North Eastern India through another technology licensing initiated by NIF North East cell at IIT Guwahati.

14

Safe Wood Cutting Machine

Kishanlal Jangid
Rajasthan

The innovator has developed a diagonal cutting system, which enables cutting at different angles. The machine uses a 2HP motor, transmission system, rotating platform, and saw blade with a simple elegant construction. It consists of a moving platform to feed the job, while being able to fix and cut the job in any orientation. It also has facilities to mount multiple fixtures using an inbuilt scale for measurement and productivity enhancement.

Khimjibhai Kanadia
Gujarat

Panihari - A Head Load Reducing Device

Rural women walk tens of miles with heavy load on their head, which causes stress, discomfort and eventually head and neck injuries.

The product is an ergonomically designed device fixed on top of the head, with two extended supporting rods from the sides of the device. The device transfers the weight carried on the head to the shoulders, which is better positioned to carry weight.

16

Jalpari- The Water Carrier

Madhav Sawant
Maharashtra

Women who walk miles with heavy water pitchers on their head, suffer discomfort and even injuries. This innovation consists of a shoulder slung unit fixed with water canisters balanced on either side.

The carrier has two washable plastic containers of 20 liters capacity in the front and the back respectively. Metallic handle grips for holding and picking, a soft flexible shoulder strap and a tap for taking out water are some of the features of this versatile unit.

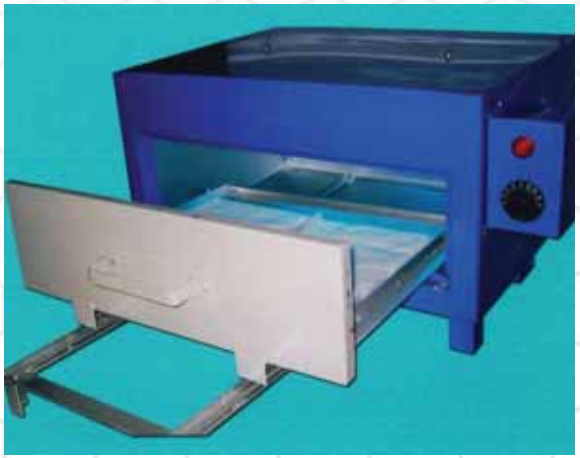
A. Muruganandam
Tamil Nadu

Sanitary Napkin Making Machine

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 standard material 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, the innovator has been able to install fifty units in seven states.



18

Garlic Peeling & 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, needs 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 sizes. It can be operated by one person and cuts lemon into maximum eight pieces. The innovator has been supported under MVIF scheme and has achieved a turn over of around sixty lakhs since 2003.

Dulal Choudhary
Assam

Beauty Care Umbrella

Protection from harsh rays of the sun is a requirement in most parts of a tropical country like India. An umbrella made from traditional yet multifaceted material is a boon for the common man.

This innovative umbrella is durable, stain free, water proof and is produced from muga silk. It has a pleasing golden shine, which illuminates colour and protects from UV radiations up to 80 percent as per laboratory tests, far better than that offered by conventional umbrellas. NIF had facilitated the technology licensing of the innovation to Assam Silk Development Centre in 2005. The product has been sold to customers in Europe and Australia also.

20

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.

End Notes & References

1) Jain, S.P. and Verma, D.M. 1981. Medicinal Plants in the folklore of North-East Haryana. *Nat. Acad. Sci. Lett.* 47: 269-271.
2) Cantoria, M. 1976. Aromatic and Medicinal Herbs of the Philippines. *Qut. Jour. Crude Drug Res.* 14 : 97-128.
3) Jain, S.K. 1991, *Dictionary of Indian Folk Medicine and Ethnobotany*, New Delhi, Deep Publication, pp. 1-311.
4) SBL Homoeopathy Clinic, http://www.sblglobal.com/tranquil.html, downloaded on 04.11.2008.
5) Kinghorn, A.D. and Choi, Young-Hee.1993. *Natural intense sweeteners*. Research Corporation Technologies, Inc.(Pat no.5198427 dt.09.07.1990; http://patft.uspto.gov, downloaded on 04.11.2008)
6) Das, P.C. 1976. *Oral contraceptive long-acting- method of and system for determining the rate of an electronic* .PC Das. (Pat no. GB1445599 dt.11.08.1976; http://v3.espacenet.com, downloaded on 04.11.2008)
7) Reddy, M.B., Reddy, K.R. and Reddy, M.N. 1989. A survey of plant crude drugs of Anantapur district, Andhra Pradesh, India. *Int. J. Crude Drug Res.* 27 (3): 145-155.
8) Bhattarai, N.K. 1994. Folk herbal remedies for gynaecological complaints in Central Nepal. *Int. J. Pharmacog.* 32 (1): 13-26.
9) Shrivastava, R.K. 1985. *Aegle marmelos*: An Ipso Facto plant of India. *J. Res. Edu. Ind. Med.* 4 (3/4): 21-25.
10) Himalaya healthcare products, http://www.himalayahealthcare.com/products.htm, downloaded on 20.08.2008.
11) Bazar of India herbal products, http://www.bazaarofindia.com/productsnew.asp?pid= 100K38&catid=BC&subcatid=CL, downloaded on 04.08.2008.
12) Pushpangadan, P. and Dhan, P. 2006. *Herbal nutraceutical formulation for diabetics and process for preparing the same*. CSIR, New Delhi. (Pat no. 7014872 dt. 21.03.2006; http://patft.uspto.gov, downloaded on 20.08.2008).
13) Rao, J.M., Sampathkumar, U., Sastry, B.S., Yadav, J.S., Raghavan, K.V., Palit, G., Rai, D., Varier, P.M., Muraleedharan, T.S. and Muraleedharan, K. 2003. *Composition for treating gastric ulcer and a process for preparing the same*. (Pat no. 20030180398 dt. 25.09.2003; http://www.freepatentsonline.com, downloaded on 20.08.2008).
14) Tamsang, K.P. 2004. *Glossary of Lepcha medicinal plants*, Kalimpong, India, Mani Printing Press, pp. 7-19.
15) Tiwari, K.C., Majumder, R. and Bhattacharjee, S. 1979. Folklore medicines from Assam and Arunachal Pradesh. *Int. J. Crude Drug Res.* 17 (2): 61-67.
16) Holdsworth, D. and Wamoi, B. 1982. Medicinal plants of the Admiralty Islands, Papua New Guinea. Part I, *Int. J. Crude Drug Res.* 20 (4): 169-181.
17) Deka, L., Majumdar, R. and Dutta, A.M. 1983. Some ayurvedic important plants from district Kamrup, Assam. *Ancient Sci. Life*. 3 (2): 108-115.
18) Universal Medikit, http://www.umkit.com/Herbal%20products.htm, downloaded on 29.08.2008.
19) Pushpangadan, P., Rawat, A.K.S., Rao, Ch.V., Srivastava, S.K. and Khatoon, S. 2006. *A synergistic antipyretic formulation*. CSIR, New Delhi. (Pub no.WO/2006/067537 dt. 29.06.2006; http://www.freepatentsonline.com, downloaded on 29.08.2008).
20) Reddy, M.B., Reddy, K.R. and Reddy, M.N. 1988. A survey of medicinal plants of Chenchu Tribes of Andhra Pradesh, India. *Int J Crude Drug Res* 26 (4): 189-196.
21) Prajapati, N.D., Purohit, S.S., Sharma, A.K. and Kumar, T. 2007. *A Handbook of Medicinal Plants*. Jodhpur, Agrobios (India), Section-II, pp. 1-554.
22) Hozumi, T., Matsumoto, T., Oyama, H., Nanba, T., Shiraki, K., Kurokawa, M., Hattori, Y. and Kadota S. 1994. *Galenical drug-containing antiviral agent*. Showa Shell Sekiyu, Nanba Tsuneo and Shiraki Kimiyasu (Pat no. JP6025003 dt. 01.02.1994; http://v3.espacenet.com, downloaded on 04.11.2008)
23) Adesina, S.K. 1982. Studies on some plants used as anticonvulsants in Amerindian and African traditional medicine. *Fitoterapia.* 53 : 147-162.
24) Panthong, A., Kanjanapothi, D. and Taylor, W.C. 1986. Ethnobotanical review of medicinal plants from Thai traditional books, Part 1: plants with antiinflammatory, anti-asthmatic and antihypertensive properties. *J. Ethnopharmacol.* 18 (3): 213-228.
25) Aravind Herbal Labs (P) Limited, http://www.tradeindia.com/selloffer/1394593/ Herbal-Tea.html, downloaded on 29.08.2008.
26) Enrico, D.V., Antonio, P., Chiara, C., Luisa, G., Gianfranco, M. and Emanuella, M. 2008. *A novel use of antidepressant compounds and related compositions*. Medestea Internazionale S.P.A. Italy. (Pub no. WO/2008/078353 dt. 03.07.2008; http://www.freepatentsonline.com, downloaded on 29.08.2008).
27) Ghazanfar, S.A. and Al-abahi, M.A. 1993. Medicinal plants of Northern and Central Oman (Arabia). *Econ Bot* 47 (1): 89-98.
28) Tang, Z. 2006. *Chinese medicine for treating skin lesion and malignant tumor and application thereof.* Tang, Zaichun (Pub no. CN1883659 dt. 27.12.2006; http://v3.espacenet.com, downloaded on 04.11.2008)
29) Manandhar, N.P. 1995. An inventory of some herbal drugs of Myagdi district, Nepal. *Econ. Bot.* 49 (4): 371-379.

30) Sahu, T.R. 1984. Less known uses of weeds as medicinal plants. *Ancient. Sci. Life.* 3 (4): 245-249.
31 Manandhar, N.P. 1995. An inventory of some vegetable drug resources of Makawanpur district, Nepal. *Fitoterapia* 66 (3): 231-238.
32) Tropilab, http://tropilab.com/jatrophatincture.html, downloaded on 30.06.2008.
33) Pushpangadan, P., Mehrotra, S., Rawat, A.K.S., Rao, Ch.V., Ojha, S.K. and Aziz, I. 2008. *Herbal composition for cuts, burns and wounds*. CSIR, New Delhi. (Pat no. 7344737 dt.18.03.2008; http://patft.uspto.gov, downloaded on 23.10.2008).
34) Bhandary, M.J., Chandrashekar, K.R. and Kaveriappa, K.M. 1995. Medical ethnobotany of the Siddis of Uttara Kannada district, Karnataka, India. *J. Ethnopharmacol.* 47 (3):149-158.
35) Martinez, M.A. 1984. Medicinal plants used in a Totonac community of the Sierra Norte de Puebla: Tuzamapan de Galeana, Puebla, Mexico. *J. Ethnopharmacol.* 11 (2):203-221.
36) Natural skin Care, http://www.drhauschka.co.uk, downloaded on 08.11.2008.
37) Kamata Y., Toyokawa, T., Teruya, M. and Ichiba T. 2005. *Anti-obesity agent having lipase inhibiting activity and antioxidation activity.* Okinawa Prefecture. (Pat no. JP2005060334 (A) dt.10.03.2005; http://v3.espacenet.com downloaded on 08.11.2008)
38) Rathore, A., Juneja, R.K. and Tandon, J.S. 1989. An iridoid glucoside from *Nyctanthes arbortristis*. *Phytochemistry* 28 (7): 1913-1917.
39) Dixit, R.S. and Pandey, D.C. 1984. Plants used as folk-medicine in Jhansi and Lalitpur sections of Bundelkhand, Uttar Pradesh. *Int. J. Crude Drug Res.* 22 (1): 47-51.
40) Lupin Herbal, http://www.lupinworld.com/herbal/deepactos.htm, downloaded on 21.08.2008.
41) Chattopadhyay, S., Achari, B., Poddar, A. and Kumar, A. 2007. *Extracts from Nyctanthes arbortristis for the treatment of Leishmaniasis.* CSIR, New Delhi. (Pub no. WO/2007/042902 dt. 09.04.2007; http://www.freepatentsonline.com, downloaded on 22.08.2008).
42) Pushpangadan, P., Mehrotra, S., Rawat, A.K.S., Khatoon, S. and Govindarajan, R. 2006. *Safe, eco-friendly, health protective herbal colours and aroma useful for cosmaceutical applications*. CSIR, New Delhi. (Pat no. 20060115505 dt. 01.06.2006; http://appft1.uspto.gov, downloaded on 22.08.2008).
43) Bhattarai, N.K. 1992. Folk herbal remedies of Sinhupalchok district, Central Nepal. *Fitoterapia* 63 (2): 145-155.
44) Khanom, F., Kayahara, H. and Tadasa, K. 2000. Superoxide-scavenging and prolyl endopeptidase inhibitory activities of Bangladeshi indigenous medicinal plants. *Biosci. Biotech. Biochem.* 64 (4): 837-840.
45) John, D. 1984. One hundred useful raw drugs of the Kani tribes of Trivandrum forest division, Kerala, India. *Int. J. Crude Drug Res.* 22 (1): 17-39.
46) Antony, M.B. 2008. *Preparation, process and a regenerative method and technique for prevention, treatment and glycemic control of diabetes mellitus*. Alwaye, India, Arjuna Natural Extracts. (Pat no. 7378113 dt.27.05.2008; http://patft.uspto.gov, downloaded on 23.10.2008).
47) Rohatgi, S. 1996. *Ayurvedic composition for the prophylaxis and treatment of AIDS, flu, TB and other immuno-deficiencies and the process for preparing the same*. Kanpur, India. (Pat no. 5529778 dt. 13.09.1994; http://patft.uspto.gov, downloaded on 23.10.2008).
48) Spring, M.A. 1989. Ethnopharmacologic analysis of medicinal plants used by Laotian Hmong refugees in Minnesota. *J. Ethnopharmacol.* 26 (1): 65-91.
49) Zagari, A. 1992. *Medicinal plants*. Vol. 4. (5th Ed.) Tehran, Iran. Tehran University Publications, p. 969.
50) Sebastian, M.K. and Bhandari, M.M. 1984. Medico-ethnobotany of Mount Abu, Rajasthan, India. *J. Ethnopharmacol.* 12 (2): 223-230.
51) Hwang, Shie-Ming. 2001. *Process for preparing an anti-viral medicinal product from plant extracts*. Sage R&D, Columbus, USA. (Pat no. 6214350 dt. 10.04.2001; http://patft.uspto.gov, downloaded on 25.08.2008).
52) Tsai, Hsiu-Hsien, Hwang, Shie-Ming and Kung, Pai-Chu. 1998. *Use of plant extracts for treatment of HIV, HCV and HBV infections*. Sage R&D, Columbus, USA. (Pat no. 5837257 dt.17.11.1998; http://patft.uspto.gov, downloaded on 25.08.2008).
53) Singh, V.K. and Ali, Z.A. 1992. A contribution to the ethnopharmacological study of the Udaipur forests of Rajasthan, India. *Fitoterapia* 63 (2): 136-144.
54) Nagaraju, N. and Rao, K.N. 1990. A survey of plant crude drugs of Rayalaseema, Andhra Pradesh, India. *J. Ethnopharmacol.* 29 (2): 137-158.
55) Gupta, S., Yadava, J.N.S. and Tandon, J.S. 1993. Antisecretory (antidiarrhoeal) activity of Indian medicinal plants against *Escherichia coli* enterotoxin-induced secretion in rabbit and guinea pig ileal loop models. *Int. J. Pharmacog.* 31 (3): 198-204.
56) Solanki, R.S. 2003. *Herbal formulation*. Sahajanand Biotech Private Ltd, India. (Pub no. GB2378384 dt. 12.02.2003; http://v3.espacenet.com, downloaded on 23.10.2008).
57) Pushpangadan, P., Rao, Ch.V., Rawat, A.K.S., Ojha, S.K. and Reddy, G.D. 2008. *Anti-allergic herbal formulation*. CSIR, New Delhi. (Pat no. 7344739 dt.28.12.2004; http://patft.uspto.gov, downloaded on 22.10.2008).

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