



Rajasthan Innovates



RAJASTHAN INNOVATES



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HONEY BEE NETWORK

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Sundaram Verma, Sikar
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PREFACE

National Innovation Foundation (NIF) has been pursuing the mission of making India innovative and a creative society since 2000 with the active support of Department of Science and Technology, Government of India. Till date NIF has been able to scout innovations and traditional knowledge practices from over 545 districts across India.

Thanks to the support of volunteers from Honey Bee Network, we have been able to discover many unsung heroes 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 Rajasthan. 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 Rajasthan 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 Rajasthan are given in part three.

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

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

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

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

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

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



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Building a Bridge with Grassroots Innovators in Informal Sector

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

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

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

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

How does NIF work?

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

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

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

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

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

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

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

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

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

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

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

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

What has it done?

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1,00,000 ideas, innovations and traditional knowledge practices (not all unique, not all distinctive) from over 545 districts of the country.

NIF has filed 202 patents in India and seven in US and one PCT application. Out of these, 35 patents have been granted to grassroots innovations in India and four in US. NIF has funded

113 projects under MVIF to the extent of Rs.1.3 crores. Hundreds of technologies have diffused through farmer to farmer social network.

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

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

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

How can state government join hands with NIF?

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

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

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

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



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

- Dr APJ Abdul Kalam



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

- Dr RA Mashelkar

PART I

INNOVATIONS

from RAJASTHAN

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





Yusuf Khan
Sikar

Groundnut Digging Machine: From Deserts to the Sea Shore

Rajasthan has predominantly sandy soil which is quite suitable for groundnut cultivation. The yield of the crop is affected as up to 20% of the pods are left underground during harvest. Complete digging out of all the groundnut pods from the soil is not possible as manual labor is scarce, costly and other means are not available.

The innovator has revolutionized groundnut digging with this sturdy rugged desert unit which is retrofitted on a standard 35HP tractor. The unit consumes four litres of diesel per hour and digs out groundnuts from one hectare a day. The unit can also be used to sift out small stones, solid residue and garbage from fields and country roads.

Yusuf won a National Award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge in 2005. He has been supported under the Micro Venture Innovation Fund of NIF for commercialising his innovation. In 2006, the technology was licensed to a Vizag based company called Ardee Hi-Tech Pvt. Ltd. The licensee wanted to use the concept of groundnut digger to develop a sea beach cleaner. He has also helped in scouting five other innovators from his village and nearby. He was short listed in 2005 for Asian Innovation Award among 12 innovators from Asia, by The Wall Street Journal and also attended the award function in Singapore. A patent was filed for his innovation.



Trench Digging Machine

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

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

The machine can dig narrow and deep channels evenly, on hard and soft soil conditions. In one hour, it can dig a pit 65 meters long, 6 feet deep and 14 inches wide, while consuming only 2.5 liters of diesel per hour. The equipment costs less than half that of imported models. It is even used by the local telephone department to lay cables.

Radhey Shyam and Nathulal won a National Award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge in 2005.



Radhey Shyam Tailor
Nathulal Jangid
Yusuf Khan
Sikar



Madanlal Kumawat
Sikar

Improved Multicrop Thresher

Farmers across India require a reliable machine that achieves threshing with minimal grain breakage and 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.

Madanlal won a Consolation Award in NIF's First National Competition for Grassroots Innovations and Traditional Knowledge in 2001. 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. He was also featured among 50 pioneers of change in the country by India Today, 26 June 2008. A patent has been filed for his innovation.



Biomass Gasification System

There are lots of villages in the country which are still not electrified or are receiving power erratically. Given the limited global supply of fossil fuels, search for renewable energy has been on the top of the sustainability agenda. Dahiya has developed an efficient biomass gasifier adjudged to be outstanding by leading energy research organizations. Users of 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. He makes gasifiers in the range of 5-50hp as per the need of customer. The wood requirement has been claimed to be 30-35% lower than conventional gasifiers. NIF has been providing marketing support to the innovator as a result of which one machine is in the process of being sent to Germany.

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



Raisingh Dahiya
Hanumangarh





Prahlad Jangid
Sikar

Safe Wood Cutting Machine

While using powered equipment intensely, sometimes carpenters get too close to the cutting blades while holding the log and feeding them. This opens the chance for accidents as well as related occupational hazards due to inhalation of the fine dust, chips and wood flakes.

The innovator has developed an improved machine to address these concerns. 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.



Ajitgarh Selection: New Cauliflower Variety

Jagdish Parikh is a sixty year old farmer who left his government job to start farming. He has developed a variety of cauliflower which weighs as much as fifteen kilogram. This particular variety of cauliflower can be sown in all the three seasons. He has been distributing seed of this variety free to his fellow farmers. His innovative skills have been praised and in the process he received numerous prizes and citations. He is also a poet and social mobiliser. He motivates the farmers to become more innovative and spreads the message of Honey Bee network through his creative compositions.

He won the State Award in NIF's First National Competition for Grassroots Innovations and Traditional Knowledge in 2001. He was also given SRISTI Samman earlier. For his detailed profile kindly see Honey Bee: 11(3)15-16, 2000.



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Jagdish Parikh*
Sikar

*Awarded earlier, but now included in professional category. Rules of NIF were changed 2003 onwards to specifically focus on innovations of people from the unorganised sector



Manaram Choudhary
Sikar

Rashidpura: An Improved Variety Of Onion

Manaram Choudhary is an innovative farmer from Ladkhani village in Sikar district of Rajasthan. Water shortages in the Sikar region inspired him to breed a variety that would require less irrigation. After much experimentation, he developed a highly productive, early maturing, and drought resistant variety of onion that has become famous across the northern states of Haryana, Delhi, and Rajasthan for its delicious taste. This white onion variety is called *Rashidpura*.

Yield of around 400 quintals per hectare can be obtained through this variety. Seed rates of this variety hovers around Rs. 1000 per kg while sometime rising as high as Rs 3000 per kg.

He received SRISTI Samman in 2000 and the State Award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007.



Pioneer Innovator: Wise Platform Ticket Machine, and Other Innovations

Late P L Mistry was one of the most prolific innovators of his time. He thought about several problems affecting common people as well as large systems like railways. In some cases he succeeded with the actual prototype while many other ideas remained just as his dream.

Once he observed the platform ticket machines accepted even counterfeit coins. He designed a unique “wise platform ticket machine” which would reject counterfeit coins and needed no external power. It was patented in 1939. He thought of several other ideas such as inflating the tyre of a punctured cycle while it is in motion, bullock drawn water lifting pump and generation of power by the movement of traffic on road.

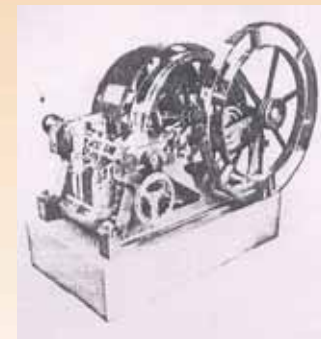


Other innovations that he developed and in most cases patented are improved tea/coffee maker, animal body weight drawn water lifting pump, device for constant pressure of water in pipeline/tap, improved machine for making chapatis/puris, system for prevention of train collision and accident due to derailment and sabotaging, improved churner, small flour mill, folding cradle, cloth washing and drying machine, folding swing bed, automatic lighting and delighting kerosene lamp and power generation from road traffic.

During his lifetime he made 33 innovations and of these 25 were granted patents in India. Such a crazy innovator left for his final abode in 1981 leaving some of his innovations incomplete but worthy of further research and development even today. Posthumously he was given the State Award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge in 2002. For his detailed profile please see Honey Bee, 14(4) & 15 (1): 2-3, 2003.



Late P L Mistry
Pali





Hazarilal Ojha
Baran

Future of the Drill Machine

To overcome glitches in the single-boxed, seed-cum-fertilizer drill machine, Hazarilal Ojha hit upon an idea of making a double-boxed machine instead.

Ojha's machine comprises three main parts — the box, a cultivator and an arm wheel. The machine is able to drill the fertilizer and seeds together, but delivers them separately, in a single drive and to different levels. The machine not only saves seeds and fertilizer, but also supports optimum growth of saplings.

He won a Consolation Award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge in 2002.



Overcoming Disability: Improving Car's Accessibility

Mujib Khan, an automobile mechanic, has limited functioning in his legs as a result of an attack of polio in his childhood. He lives with his wife and four children and has never let his disability stop him from living a productive life. He is constantly searching for ways to retain his independence and inspire other handicapped people to live with self-respect.

His quest to make a vehicle accessible to handicapped drivers started with tinkering with his parent's Maruti surreptitiously. The innovation lies in the modification to the accelerator, brake and clutch arrangement so that the controls are transferred to hand by use of levers, wires and linkage mechanism. Comfort, simplicity and ease of operation are the other features embedded in the controls, and drivers without disabilities can also operate the vehicle in a conventional fashion. He has retrofitted over six dozen vehicles in this fashion to date.

He won the State Award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007. He has also been supported under the Micro Venture Innovation Fund scheme of NIF for test marketing of his innovation.



Mujib Khan
Jaipur





Harimohan Saini
Manoj Saini
 Bharatpur

Breaking Boundaries: Designing The First Five-wheeled Car

Young cousins Manoj and Harimohan Saini have designed and built a five-wheeled car in the hope of making a cheaper vehicle that most middle class Indians would be able to afford. They built the prototype using scrap materials such as scooter wheels, a moped engine, and a chassis built from available nickel pipes. The four front and rear wheels are free and only the fifth wheel in the center of the car is powered and used in steering. Manoj and Hari Mohan estimate that when they fine-tune the design their car will be able to reach speed as high as 80 km/hr and average fuel consumption of 30-35 km/l, more efficient than the 18-20 km/l rating of most available models.

They won an award in the Students' category in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007. NIF also engaged engineering students in BVB College of Engineering & Technology, Hubli, Karnataka to develop an improved prototype of the same.



Solar Laminator: Sun Gives Your Documents A New Life!!

Amandeep developed a laminating machine that runs on solar energy when he was still in school. He is an avid member of Bharat Scouts and Guides, and has received recognition for his innovation at several fora.

The solar powered laminator operates using the same principle as a solar cooker, replacing the electrical heating filament inside the laminator with a black box surrounded with mirrors. The solar energy collected in the box heats the metallic plates that affix the lamination sheets to the desired document. The machine can laminate an A4 size document in 15 minutes on a sunny day and can be powered by electricity in the absence of sunlight. He won an award in the Students' category in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007. NIF/ GIAN North also facilitated its testing at the Solar Energy Centre, Ministry of New & Renewable Energy, New Delhi.

Amandeep and his friend Ranjeet have also developed a manual multifunctional farm tool bar, which is capable of carrying out ploughing, weeding, leveling, sowing and spraying. The tools required for these different purposes can be fitted to the tool bar easily.



Amandeep Singh
Hanumangarh





Late Radhey Shyam Mishra
Late Mewaram Jangid
Churu

Camel Driven Bus

Late Radhey Shyam Mishra worked as a manager and a caring teacher at B L Kala Bal Mandir Montessori School. His co-innovator late Mewaram Jangid is remembered as a caring friend and skilled carpenter. The camel driven bus was dreamt of by Radhey Shyam as a means of safely transporting students to and from school through the desert. Mewaram brought the idea into fruition with his technical skills in 1972. The driver of the bus steers from atop the camel and the students are pulled in a four-wheeled double-decker bus behind. This bus, which can transport 80 students, is an environment friendly and affordable solution for mass transportation in desert areas. Seven such buses are still used to transport over 400 students to Bhanwarlal Kala Bal Mandir School.

They were appreciated in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007.



Improved Wheat and Mustard Varieties

Mahavir Singh Arya (55) overcame a childhood of poverty to become a successful farmer. He is an advocate of organic farming and produces very high yields from his small farm despite never having used any inorganic fertilizers. Arya first became interested in plant breeding when he observed farmers crossing crop varieties on a visit to Hissar. He then crossed *T59* and *Golden* to make a new variety of mustard named *Sundari*. Since then, he has developed more than ten new mustard varieties. The maturity period of all these varieties ranges from 130-150 days and the yield from 18-24 quintals per hectare. All the varieties are disease resistant and high yielding. He has also developed many varieties of wheat with maturity periods varying from 135-60 days, and yields from 40-80 quintals per hectare.

He was appreciated in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007. Further testing is in progress at institutional research centers.



Mahavir Singh Arya
Churu





Kamruddin Choudhary
Alwar

Multi-purpose Bicycle

For over two and a half decades, Kamruddin has engaged himself in improving the design of the common bicycle to make it more comfortable, useful and safe and above all as a means for earning a livelihood. He modified an ordinary bicycle by adding tools and accessories as well as making it a mobile work platform to service diverse village needs. It has tools for carpentry and blacksmithy. Revenue can be generated by providing various services such as sharpening of blades, drilling, motor winding, sawing etc.

Kamruddin had filed a provisional patent application and later a complete patent application was filed by NIF on his behalf. NIF sanctioned support under the Micro Venture Innovation Fund for concept testing of the multipurpose bicycle in the rural market. He won a Consolation Award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge in 2005.



Tax at Source: Hand Pump with Attachment for Filling Animal Trough

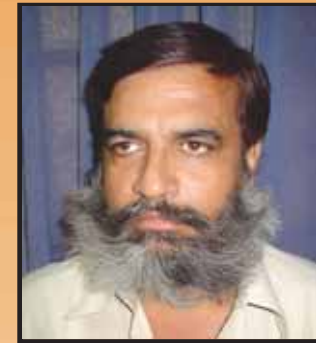
Lack of surface water sources and falling water table has made availability of clean drinking water a major problem in Rajasthan. For human beings, the need gets addressed to some extent but for animals this need is much less appreciated.

Swayambhoo Sharma came up with an interesting solution to address the drinking water needs of animals. He developed an arrangement such that every time people pump water for their use, 20 per cent of pumped water will directly go to fill animal water trough. Since most people feel lazy in filling drinking water trough for stray animals, this innovation solves this problem by a kind of tax at source. Another problem faced in hand pumps is that a single person finds it very difficult to pump and at the same time drink water (without a vessel with him/her). Chandan, then a first year student at IIMA came out with an idea of storing water in the body of the hand pump so that having pumped, one could use a tap and drink water like any other tap. Yusuf and Madan Lal Kumawat,



two other innovators combined the idea of Chandan and Swayambhoo Sharma and developed a hybrid model. This made it possible for storing water for animal to drink in a trough dug in the ground and at the same time provided two pipes, one for drinking with lesser outflow and other, bigger one for filling the bucket. If bigger tap was used for drinking by hand, then lot of water was spilled over and was wasted.

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Swayambhoo Sharma
Udaipur





Madan Lal Kumawat
Sikar

Attachment for Transporting Small Size Road Roller

The innovation is a transporting wheel assembly, as an attachment, for transporting soil compacting roller of small size. Such rollers are generally used in construction of narrow roads and for compacting play ground pitches. The attachment is fitted to the roller and is dragged by the tractor between job sites without damage quickly.



Machine for Making Products from Banana Stem

Ashish has developed a machine to separate different layers of banana stem. Each layer can be used for different products & technique to develop articles from the same. The machine has rollers, which compacts the leaf and squeezes out the moisture from the sheath. The blades split the stem in three layers. The upper layer can be used for making mats and ropes, middle layer as fiber for cloth, and the inner layer for paper making. The water in the process can also be used for dye/tannins.



Ashish Khatri *
Udaipur



*Professional registered with NIF. NIF only helps professionals in providing linkages and visibility

Manual Harvester

Pramod, a student, has tried to develop a manual harvester to cut crop at the ground level, which is faster than reaping by sickles. The whole assembly is mounted on three wheels and can be pushed and moved. The operator simply needs to rotate the handle and simultaneously move the harvester assembly. The movement is transferred to the cutter blade through chain and sprockets. GIAN North supported the innovator for developing the prototype.

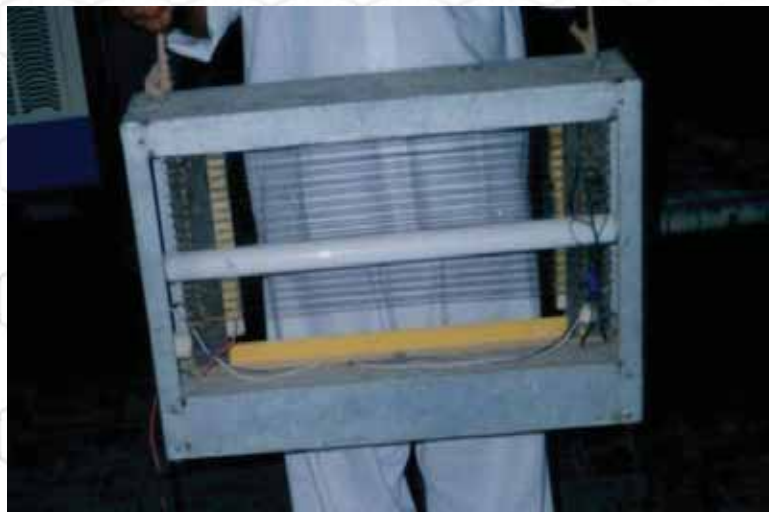
Pramod Kumar Sharma
Bharatpur

Cotton Fly Catcher

Balkor Singh is a progressive farmer growing cotton as a cash crop. Due to the repeated plantation of cotton, the area gets highly affected by cotton insect pests, which drastically reduces the annual turnover. Taking the idea from commercially used UV lamps to kill houseflies and insects he developed a device that traps and kills cotton insect pests.

One fly catcher is sufficient for one acre of land and cost around two thousand five hundred rupees only. This also reduces the dependence on chemical pesticides.

Balkor Singh
Hanumangarh





Sundaram Varma
Sikar

Dry Land Forestry Technique

Sundaram has developed a technique for plantation where it is claimed that a litre of water per plant once in its life time is sufficient for it to grow. The technique involves ploughing the field up to a foot deep before the rains. The field is planked and pressed so as to break the capillaries soon after the rains are over. Water which has already charged the soil can not easily be lost by evaporation now. The plants that are to be grown are sowed in a pit six inches further deep and then covered with soil and watered (one litre) in October-November. Idea is that unlike the plants sown in monsoon season; these will need to send roots deeper because there is no moisture in the upper layers of the soil. Once the plant catches the sub-soil moisture, it can survive till the rains next year. After which the tree sapling does not need any additional irrigation.

Using this technique, he has planted over 50,000 local forest trees/plants in and around Danta region in Sikar district. He is a very innovative farmer and has also developed many improved varieties of Bengal gram, Cluster bean and Moth Bean. He had shown this technique near GIAN office in Children Science Park campus in Jaipur. The technology though proven still remains to be replicated at large scale. For his detailed profile and work please see Honey Bee, 8(1):3-4, 1997

Multi-seed Drill

This seed drill can be used to sow different kinds of seeds at a time. The flow of quantity of seed is regulated by a simple mechanism of setting up of taper worm and check nut. The process of seeding remains unaffected irrespective of the position of the plough at uneven ground surface due to the attachment of a flexible rod connected with to the drill.



Gopal Dave
Jodhpur





Bhagwati Devi
Sikar

Eucalyptus Controls Termites

Bhagwati Devi uses Eucalyptus logs and stalks for control of termites in crops like wheat, bajara and vegetables. She uses about 100 pieces of Eucalyptus wood 2.0-2.5 foot long and 2.0-2.5 inches broad in one hectare. Eucalyptus, being soft wood, attracts termites. Termites thus feed on Eucalyptus wood pieces and leave the crop unaffected. The same stalks can be used for controlling termites for the next three seasons. Later these wood stalks are collected and destroyed. Bhagwati Devi claims to have achieved 70-80% control of termites using this method.



Oil Extraction From Waste Rubber

This is an apparatus having two chambers, one for heating the waste rubber, and another for condensing vapours produced due to the heating of rubber or like waste. The oil so obtained can be used to run engines and motors. He is a potter and has been doing this experiment out of his concern for the environment. For want of enough land, he pursued this experiment on the roof of his small house where he had also grown many plants.



Raghunath Prasad Kumawat
Bikaner



Ideas: Compressed Air As A Fuel!

Compressed Air Powered Engine

Keshar Singh, Udaipur

He has modified a diesel engine and made changes so as to make the engine work on compressed air without using any external gasoline fuel. A one hp compressor can be used to supply the compressed air to the modified engine of 3.5 bhp. The compressor may be run by electricity or another fueled engine.

Electricity Generation by Compressed Air Engine

Ratan Lal Lohar, Udaipur

He has developed a compressed air driven engine that can run vehicles and generators. It comprises two storage cylinders, a distributor, four piston cylinder and recycling cylinder. Lohar has tested this engine to run vehicles, operate flour mills and found it to be quite economical.

A Pneumatic Engine

Chunni Lal Lohar

He has developed a system for utilizing compressed air to actuate the piston of an engine. He has been using this device to run a six watt dynamo for igniting a three watt bulb with the help of belt and pulley drive. He has also tried to develop four cylinder compressed air powered engine.

Compressed Air Driven scooter and Kit For Increasing Mileage Of Vehicle

Hari Narayan Prajapati, Jaipur

He has modified a scooter engine to enable it to run on compressed air. Compressed air is supplied to the engine from an air tank fitted on the scooter. He has run the scooter successfully by using compressed air and achieved a maximum speed of 20 km/hr.

Further he has developed a small kit comprising a piston and calibrated nozzle, which can be fitted in the fuel line between the carburetor and the entry to the cylinder head. The attachment introduces additional air before the charge (mixture of air and atomized fuel) is compressed. This results in increased combustion efficiency and thereby the mileage of vehicle. It has been tried in 4 stroke engines. NIF has extended support for trial marketing under its MVIF scheme. The trial results have been found promising.



Hari Narayan Prajapati
Jaipur

Soil Preparation

LM Lodha

There are many small and big tanks in Udaipur constructed 200 to 300 years ago. These were meant for irrigation and for providing drinking water to cattle. During summer (May-June) most of them turn dry. A large quantity of silt and organic matter, drawn from their catchment area during rainy season, lies deposited at the bottom of these tanks. Farmers collect this enriched silt from the dried reservoir beds and broadcast it in their fields. This practice is beneficial in many ways:(a) it improves structure of soil and humus content; (b) it has a fair proportion of major plant nutrients; (c) when large quantities are used in alkaline soils, the salinity is reduced. This is a very old practice; locally the soil is called 'pana'. The desilting of the tanks increases their water holding capacity and also provides clean water to the cattle. Honey Bee, 4(2&3):12, 1993

Flowering and Fruit-Ripening Techniques of Bhils

Rooplal Bhil

Udaipur

Rooplal makes a light girdling (notch like groove) around the stem of 'mahua' (*Madhuca indica*) tree below breast height. The notch is made by an axe and is 1-3 cm deep. The first notch is made during first flowering season of the tree. During subsequent years, if production of flowers becomes less or their drop is delayed, then notching may be repeated. He believes that this initiates an early and heavy flowering and fruiting in *mahua*. This practice is locally called 'ghagari'. It is possible that the girdling decreases



downward flow of food in phloem and this leads to an accumulation of food in the aerial parts of the tree. And perhaps, this is responsible for heavy flowering and fruiting in 'mahua' tree. Honey Bee, 7(3):11, 1996

Risk Reducing Cropping Pattern

LM Lodha

Rainfall is very uncertain and erratic in the Udaipur region of Rajasthan. Hence the farmers have evolved a cropping pattern to reduce the risks associated with low rainfall. As paddy needs more water than maize, the farmers dibble the seeds of maize in one line while in another two or three they sow paddy seeds or seedlings. Towards the end of July, they make an assessment of the pattern and the quantum of rain and accordingly retain one of the two crops. In some areas farmers follow a similar practice with kidney bean and green gram. Honey Bee, 4(2&3):12, 1993.

Anticipating sowing time for mustard

Mustard is sown as winter (rabi) crop on a large scale in Rajasthan. The area under this crop has grown at a very fast rate in the last few years. If ants are observed going out of their burrows during noon time or soon after, it indicates the best time for sowing of mustard seeds in the field. Normally mustard is sown in the first fortnight of October just at the beginning of the winter. Farmers explain it by saying that presence of ants outside during noon time indicates a decline in the temperature because of onset of winter. Mustard is a very thermo sensitive crop. Honey Bee 7(1):12, 1996

Protecting the seedling from wind erosion by opening furrows

The problem of wind erosion occurs sometime in the beginning of the monsoon season causing damage to the foliage of seedlings of the crop sown at the onset of monsoon.

To control this damage farmers open a furrow between 3/4 lines of the crop. In these open furrows sand being carried out by the wind is deposited. It reduces the damage to the foliage/leaves of the growing seedlings. It is a quite common practice mostly in the arid zones of Saurashtra and Rajasthan. Honey Bee, 3(1):3, 1992



Sesame oil for hairy tail

Shantibhai Faljibhai Vasnoi
Jhalore

Animals sometimes lose hair on their tail due to excessive cold or some skin problems. Sesame oil is boiled till it becomes red in colour, then it is allowed to cool and the animal's tail is dipped into it. If it is applied for two to three times a day for a month, the animal reportedly regains its hair. Honey Bee 8(3): 13, 1997)

Fenugreek too Hot for Termites

Manguram Meena
Alwar

Manguram sows fenugreek along with gram to control the attack of termite. He says that the sowing of one kg of seeds of fenugreek along with 10 kg of seeds of gram gives encouraging results. The farmer feels that the attack was considerably less in gram because of the bitterness of fenugreek. He also says that storing the dry biomass of fenugreek with the straws of other crops is believed to prevent the attack of termite in the



straws. Honey Bee, 14(1):9, 2003

Yokegall in bullock

Bahigabhai Karnaji Vasnoi

Jhalore

About 200 g of onion peels are taken, burned and the ashes mixed with some butter, and the paste applied to the yokegall of the bullock to heal the galls. Honey Bee 8(3): 13, 1997

Checking Disease and Pests in Mango

LM Lodha

Farmers apply oil to the stem and root of the mango tree in the bearing stage. It is a common belief that this practice prevents attacks by fungus and the common mango hopper pest. However, this practice is now becoming rare because of the rising price of oil. Honey Bee, 4(2&3):12, 1993

Nest strainer

Half built nests of 'baya' (*Ploceus philippinus*) are used for sieving 'ghee' (butter oil) and buttermilk in many villages of Alwar, Bharatpur, Jaipur, Sikar, Ajmer districts of Rajasthan. Similarly these nest-strainers are also used in local jaggery making process by tribals and farmers of Rajasamand, Udaipur, Dungarpur and Banswara districts. Sugarcane juice is expelled by farmers in cattle-driven mills in the field itself. The sugary sap so produced may have some suspended impurities. Before boiling, the sap is sieved twice or thrice through such nest-strainers. Sometimes two nests are used, keeping one above another, for a more effective sieving.



Generally half built nests of '*baya*' contain deposits of mud or cow dung on the internal walls of the egg chamber. The nest without the deposits is considered good for sieving purpose. Before use, a nest is washed twice or thrice with pure water to remove dirt. It is kept upside down as a funnel on a narrow mouthed container. To facilitate sieving, chin-trap of the nest is also removed. Honey Bee, 8(4):13, 1997

Biological Control of Termite

LM Lodha

There is a general old practice of attracting the common ants to termite mounds using flour and sugar. It is believed that the ants act as a biological control against termites. Farmers feel that by providing food they can induce the ant-hill (nest) to stay on at a place in the field. If a particular white ant is too heavy to manage, two to three common ants join to pull it into their home. On close observation, it also appears that the eggs, larvae, or even the caterpillars of the flying insects found on the trees, vines and shrubs etc., are also removed by ants in the same way. Farmers never kill the ants and avoid walking on ant-hills. They also prevent their cattle from disturbing the ant hills. Only one species of red ants is harmful as it bores hole in the trees. Honey Bee, 4(2&3):12, 1993

Effects of cow milk on leaf curl virus of chilli

Chilli (*Capsicum annum*) is grown as a major cash crop in Jodhpur, Ajmer, Tonk, Bhilwara and Chittorgarh districts of Rajasthan. The local cultivars, Mathania-red, Haripur-Raipur and Mandoria are the most popular ones in these arid regions. Major disease that causes considerable losses in the yield is the leaf curl mosaic virus (LCV). The characteristic symptoms of LCV are bright yellow mosaic, leaf rolling, distortion and puckering, reduction in leaf size



and stunting of the affected plant. The white-fly (*Bemisia tabaci* Genn.) transmitted gemini virus are the causal organisms of this disease. Gemini viruses in chilli are difficult and expensive to manage. The only strategies available are to spray insecticides or use virus-resistant crop-varieties. An attempt was made to test the practice of the effect of cow milk on leaf curl virus of chilli by conducting on-farm trials to control LCV on a farmer's field in Mathania village during 1997-98. The seeds of the cultivar, Mandoria were treated with raw cow milk for 24 hours. The seeds were dried and then sown to raise nursery. The roots of seedlings were dipped in milk before transplanting in the field. In the field, milk was sprayed at intervals of 10 days. The incidence of LCV was recorded on the cow milk treated plants and on the plants with other treatments along with a control field. The results indicated that in the milk treated plants LCV incidence was recorded as the lowest (30.7%) when compared with other treatments. The cow milk treatment controlled the disease by 34%. An increase average fruit size (15.3 cm) per plant was also noticed. Honey Bee, 9(3):14, 1998



प्रयागधर्मा किसानों की शोधयात्रा

भीकमपुरा से नीलकंठ (गढ) (जि. अलवर, राजस्थान)

दिनांक: २४-१२-२००१ से १-१-२००२

आयोजक: सृष्टि आई. आई. सी. बी. ने
आयोजक: तत्कालीन किसान

8th Shodh Yatra

December 24, 2001–January 1, 2002

Bhikampura to Nilkanth, Alwar, Rajasthan

Shodh Yatra is a journey on foot in the search of knowledge, creativity and innovations at grassroots.

It is an attempt on the part of SRISTI, a Honey Bee Network partner based at Ahmedabad and NIF along with other network partners to reach out to the remotest part of the country with a firm belief that hardships and challenges of natural surroundings are one of the prime motivators of creativity and innovations.

Shodh Yatra aims at unearthing such traditional knowledge and grassroots innovations that have not only simplified the lives of men, women and farm labourers but have also significantly contributed towards the conservation of bio-diversity.

The yatris, during the 8th Shodh Yatra, over the period of seven days, travelled through the rural areas honouring innovators, traditional knowledge holders, experimental farmers and centenarians on the way. Many biodiversity and recipe contests were also organised at various places. The Shodh Yatra saw the participation of people from all walks of lives, scientists, students, innovators, farmers, journalists and traditional knowledge holders from India and abroad.



NATIONAL INNOVATION FOUNDATION, INDIA

The Seventh 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 Seventh National Competition started on February 1, 2009 and entries will be accepted till December 31, 2010.** 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 *Acacia nilotica* (L.) Del. (Babul)

NIF Database

Uses from Rajasthan

Abscess

Apply the leaf paste topically
- Sapna Kanwar, Sirohi, Rajasthan

Toothache

Brush with the fruit rind powder
- Babulal Sharma, Nagor, Rajasthan

Mouth ulcer

Gurgle with the bark decoction
- Sundari Devi, Nagor, Rajasthan

Pneumonia

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

Retention of urine

Take the juice of bark or seed orally
- Ganesh Das, Sirohi, Rajasthan

Uses from other states

Skin crack

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

Burn

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

Abscess

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

Uses in Classical Codified Literature

Paste made from fresh leaves is applied on the forehead for headache¹; decoction of the bark is gargled to give relief from sore throat²; decoction of the bark is consumed to cure bronchitis³; and the dried bark powder is taken orally with water for diabetes⁴. Toothpaste is prepared from *Acacia* with the brand name 'Dental cream'⁵. Thirty patents have been found on its medicinal uses such as for dental plaque and gingivitis⁶.



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

Uses of *Annona squamosa* L. (Sitaphal)

NIF Database

Uses from Rajasthan

Head lice

Apply the seed paste on the scalp at night. Wash hair the next morning

- Radhakishan Kumawat, Ajmer, Rajasthan

Diabetes

Take four tea spoonful of the fruit powder orally every morning on an empty stomach

- Shantanu Gupta, Kota, Rajasthan

Uses from other states

Hair care

Apply the leaf paste on the hair

- Sana Parvin, Mandu, Jharkhand

Head lice

Apply the seed powder on the scalp

- Madhav Rao Shankar Rao Patil, Jalgaon, Maharashtra

Cough

Smoulder the powder of *Annona* and date palm seeds to inhale the smoke for relief

- Ramdas Ghanshyamdas Patel, Nasik, Maharashtra

Abscess/boils

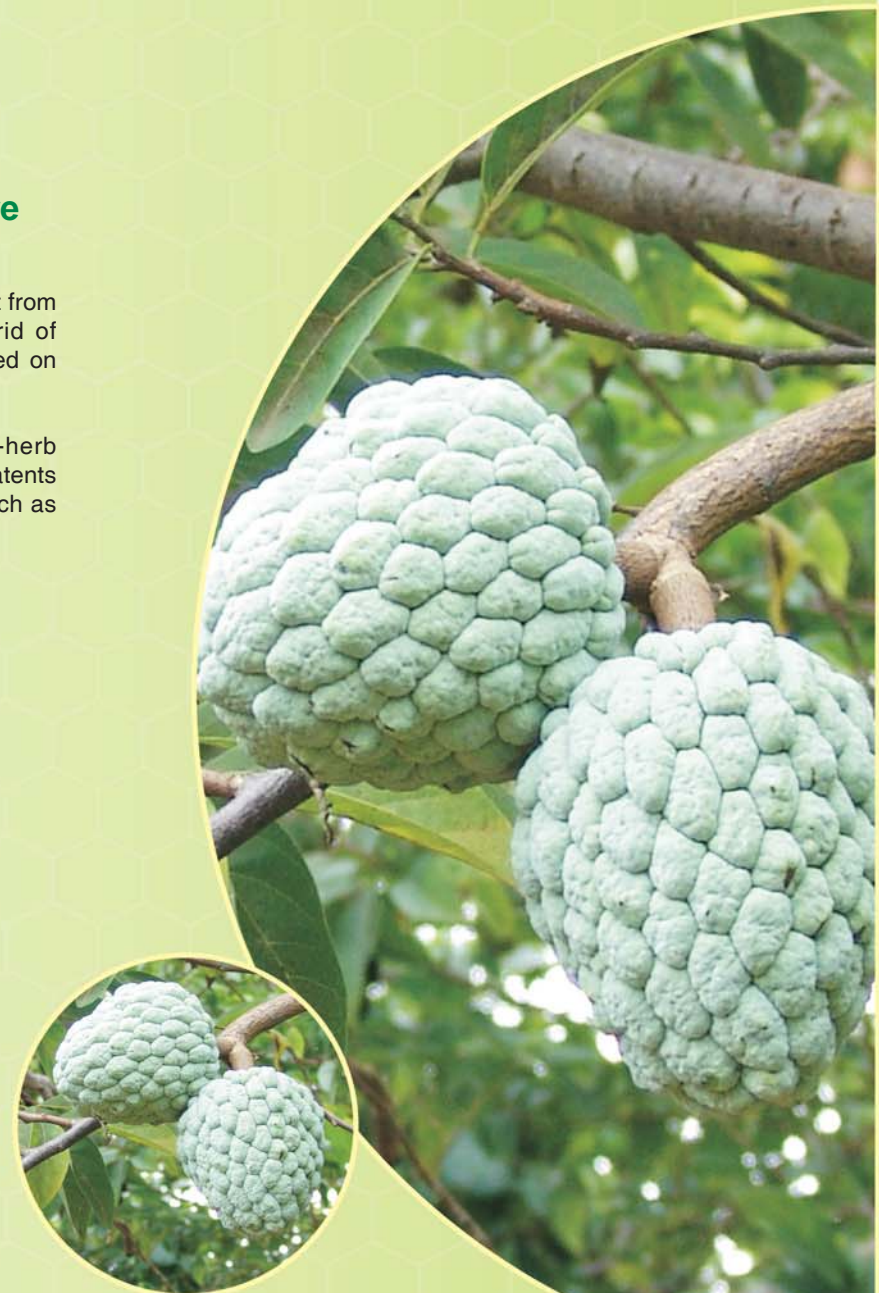
Apply the fruit paste over the affected part

- Naganath Durga Chogule, Sholapur, Maharashtra

Uses in Classical Codified Literature

Ripe fruit is considered as an anthelmintic⁷; extract from leaves and fruit is administered orally to get rid of rheumatic pain⁸ and the paste of leaves is applied on the head to kill head lice⁹.

Product 'LICEX Headlice expeller'¹⁰ is a multi-herb formulation that removes headlice and nits. Nine patents have been found on its various medicinal uses such as an antiretroviral¹¹ and for scalp care¹².



Source: <http://striweb.si.edu/ctfs/webatlas/plant.photos/annosq.hofr1.jpg>

Uses of *Argemone mexicana* L. (Satyanasi)

NIF Database

Uses from Rajasthan

Skin disease

Apply the root & bark paste on the affected area
- Durga Singh, Jaipur, Rajasthan

Acne

Apply the leaf paste topically
- Kiran Khatik, Sikar, Rajasthan

Itching

Apply the plant juice over the affected part
- Rameshwari Devi, Sikar, Rajasthan

Abscess/blisters

Apply the plant juice over the affected part
- Chandra Kanvar, Sikar, Rajasthan

Uses from other states

Intestinal worms

Take root (½ inch) along with water thrice a day to remove hookworms
- Amar Singh, Kangra, Himachal Pradesh

Urinary disorder

Take latex (10ml) orally along with milk
- Rani B. Bhagat, Pune, Maharashtra

Eczema

Crush the whole plant (25g) along with black pepper (2 nos). Apply the paste topically
- Suresh Thakur, Hazaribag, Jharkhand

Poisonous bites

Take the root juice orally
- Jighha Oraon, Gumla, Jharkhand

Uses in Classical Codified Literature

Seed powder is taken with water to reduce toothache²; decoction of the plant is given orally¹³; seed oil is useful in case of colic pain²; and rheumatics should take seed powder to get relief².

'Step syrup'¹⁴, prepared from the plant, is used to cure skin diseases and soft tissue infections. Ten patents have been found regarding its various medicinal uses such as in treating psoriasis¹⁵ and for headache¹⁶.



Uses of *Calotropis procera* (Ait.) R. Br. (Aak)

NIF Database

Uses from Rajasthan

Headache

Put lukewarm leaves on the forehead
- Shilpa Kumari, Sirohi, Rajasthan

Earache

Boil the latex with Sesame oil. Put three drops of the medicated oil in the ear at night
- Ramkaran Bokda, Ganganagar, Rajasthan

Cough/cold

Take the flower decoction orally
- Komal Soni, Sikar, Rajasthan

Itching

Burn the leaves, collect ash and mix with little curd. Apply the mixture topically
- Jugal Soni, Sikar, Rajasthan

Uses from other states

Stomach disorder

Smear mustard oil on a leaf and apply it warm over the abdomen for immediate relief
- Chawda Chanduben Jawanji, Gandhinagar, Gujarat

Knee pain

Take the leaf juice orally
- Jyothi Bhatta, Chikmagalur, Karnataka

Arthritis

Mix latex with turmeric powder, boil it with sesame oil and then apply this paste on the aching joint
- Sanjay Singh Uplana, Nagda, Madhya Pradesh

Migraine

Put two-three drops of leaf juice in the nostril in the opposite side of the head having pain
- Indiravati Rana, Udham Singh Nagar, Uttarakhand

Uses in Classical Codified Literature

Plant extract is used as bronchodilator¹⁷; flower buds of *Calotropis*, along with black pepper seeds and salt, are crushed to make pills the size of small peas. Two pills are taken twice daily for three days to cure malaria¹; warmed leaves, smeared with oil, are applied on the aching part to alleviate rheumatic pain¹⁸. 'Muscle & Joint Rub'¹⁵ is a highly effective ointment for backaches, muscular sprains and joint pains. 'Arkavaleha'¹⁹, made from this plant, is given to cure irritation of the stomach, nausea, vomiting, diarrhoea etc. Eight patents were found on the medicinal uses mainly for anti-tumor and antidotal activity²⁰ and bronchial asthma²¹.



Source: SRISTI Database

Uses of *Capparis decidua* (Forssk.) Edgew. (Kair)

NIF Database

Uses from Rajasthan

Stomachache

Soak fruits in saline water for 10 days, dry and make a powder. Take a spoonful orally twice a day
- Mukesh Kumar Lora, Nagor, Rajasthan

Diabetes

Take two spoonful of the powder of the deseeded fruit orally
- Nanuram Meghwal, Sri Ganganagar, Rajasthan

Constipation

Soak fruits overnight. Dry them and grind into a fine powder. Take a spoonful of the powder orally every morning
- Kamla Devi, Nagor, Rajasthan

Uses from other States

Toothache

Put two drops of young shoot juice in the ear
- Bhavaji Dayaji Thakor, Patan, Gujarat

Rheumatism

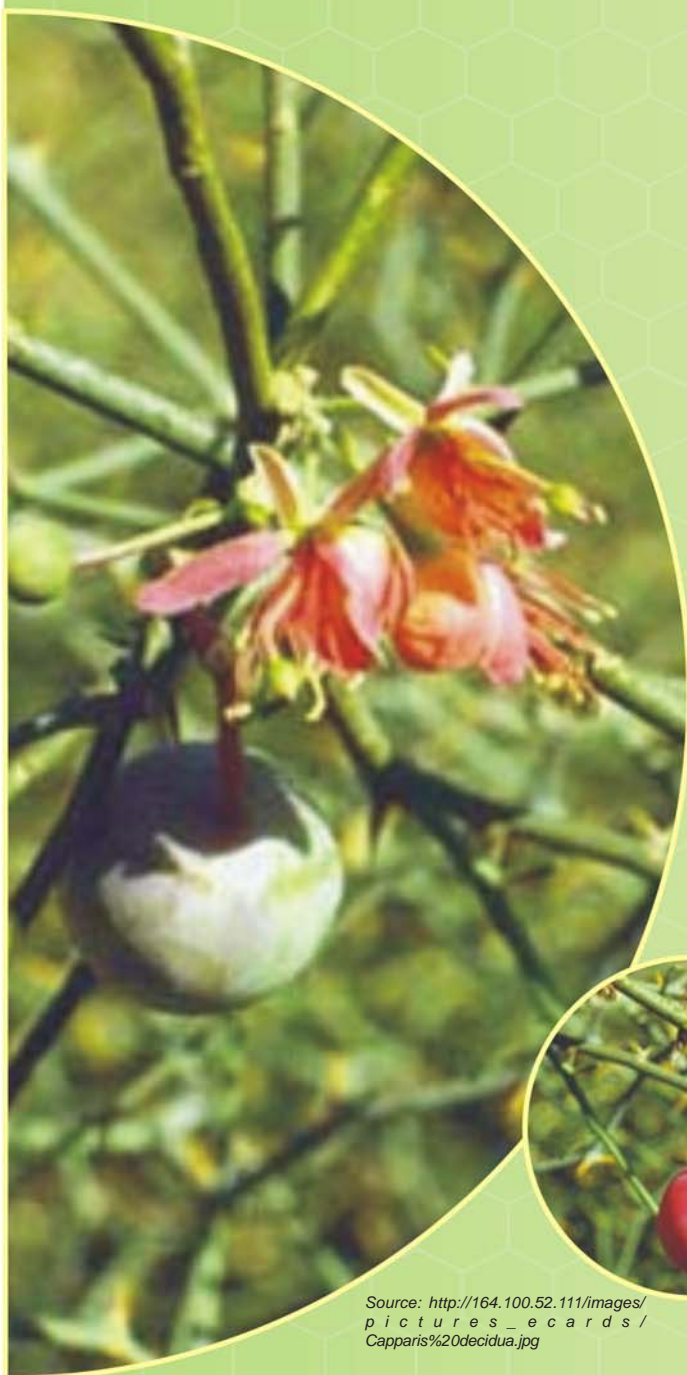
Cook the chopped fruit (3kg) along with jaggery (500g) in ghee (500g). Take the preparation (30g) twice a day for a month
- Samuben Khodabhai Parmar, Patan, Gujarat

Eczema

Make a paste from the bark of *Kair* and leaves of *mamejava* (*Enicostema littorale* Bl.) taken in equal quantity. Apply the paste on the infected area
- Karimbhai Sumara, Banaskantha, Gujarat

Uses in Classical Codified Literature

The fruit is taken orally to reduce blood sugar²²; plant extract is applied topically on skin diseases¹⁷; decoction of the plant is taken orally to alleviate rheumatic pain²³. Tablet 'Jyoti kalash'²⁴ a multi-herb drug acts as an antioxidant; 'Maharshi Amrit Kalash'²⁵ is used for vomiting, anorexia and improving general well being. One patent has been found on its cosmetic use²⁶.



Source: http://164.100.52.111/images/pictures_e_cards/Capparis%20decidua.jpg

Uses of *Carica papaya L.* (Papita)

NIF Database

Uses from Rajasthan

Toothache

Mix equal amount of fruit latex of *papita*, *Asafoetida* and camphor. Put the mixture on the aching tooth
- Pravin Kumar, Sikar, Rajasthan

Kidney stone

Take the root extract orally
- Chanda Kumari Lohar, Sirohi, Rajasthan

Uses from other states

Lactagogue

Eat the ripe fruit
- Kalia Behera, Bargarh, Orissa

Jaundice

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

Cuts & wounds

Apply leaf paste topically
- Jongam Ngemu, Papum Pare, Arunachal Pradesh

Ringworm

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

Apply small fruit pieces topically
- Marykutty Thomas, Idukki, Kerala

Kidney stone

Take the root juice orally
- Sandhya Suman, Sitamarhi, Bihar

Hydrocele

Make a paste of latex and tender fruit. Give one teaspoon thrice a day till the ailment cures.
- Dimbeswar Gogoi, Sibsagar, Assam

Uses in Classical Codified Literature

Decoction of the flower is used as cardiotoxic²⁷; bark powder is applied externally on wounds³; decoction of the bark is given orally to get rid of intestinal worms²⁸; beverage of the fruit is taken orally to cure diarrhoea²⁹. Natural moisturizers and creams³⁰ are prepared from *Carica* in combination with other plants. Thirty patents were found on its medicinal uses as an antiallergic³¹ and for prevention of cancer³².



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

Uses of *Cuscuta reflexa* Roxb. (Amarbel)

NIF Database

Uses from Rajasthan

Hair care

Apply the plant decoction on the scalp
- *Dinesh Kumawat, Ajmer, Rajasthan*

Headache

Mix curd in the plant decoction in 1:3 ratio, heat and inhale the vapours
- *Dalpat Singh Rathod, Nagor, Rajasthan*

Uses from other states

Anthelminitic

Take extract of plant (50g) in 100 ml of water for seven days
- *Prabhat Sharma, Kangra, Himachal Pradesh*

Skin disease

Apply plant paste over the infected area
- *Community knowledge, Aizwal, Mizoram*

Uses in Classical Codified Literature

Decoction of the vine is mixed in the water for bathing to combat fever³³; seeds are used as carminative²; plant is used for treating jaundice²; Extract of the plant is used as diuretic². Product 'Blossom Hair Oil'³⁴ and 'Wondruff Oil'³⁴ is an ayurvedic natural herbal formula helps to promote thick and healthy hair. 'Super Herbal Care'³⁵ is anti fat tablet taken for reducing weight.



Uses of *Datura metel* L. (Datura)

NIF Database

Uses from Rajasthan

Headache

Seeds are chewed and spat for instant relief
- Ganesh Das, Sirohi, Rajasthan

Earache

Put two drops of the leaf juice in the ear
- Ram Kishan Gatani, Nagor, Rajasthan

Diarrhoea

Soak a fruit in water overnight. Filter the water next morning, add salt and sugar, and take it orally
- Rukma Devi, Nagor, Rajasthan

Skin disease

Put lukewarm leaf smeared with *ghee* over the affected area
- Shakuntala Devi, Nagor, Rajasthan

Uses from other states

Alopecia

Smear the leaf juice on the head and leave for 30 minutes
-Bansi Ghosal, West Midnapur, West Bengal

Asthma

Take a seed soaked in water orally initially. Gradually increase a seed every week for five weeks
- Rani Farhat, Hazaribag, Jharkhand

Uses in Classical Codified Literature

One fruit, filled with 10g *Piper longum* L. is burnt and 5g of the ash is taken with honey, morning and evening for 5 days to cure malaria¹; the thumb is kept inserted within the fruit to treat finger felon³⁶; root paste is applied externally on poisonous bites³⁷. 'Muscles & joint rub'¹⁵ is a highly effective medicine for backache, muscular sprain and joint pain made from the plant.



Uses of *Ficus benghalensis* L. (Vat)

NIF Database

Uses from Rajasthan

Blisters

Apply the milky latex topically
- Omprakash Sharma, Sikar, Rajasthan

Stomachache

Apply the milky latex on the naval region
- Ranjeet Kumar Chowdhary, Sirohi, Rajasthan

Backache

Put lukewarm leaf smeared with *ghee* over the aching area
- Suresh Kumar Seshma, Nagor, Rajasthan

Uses from other states

Whooping cough

Grind the bark into a fine paste and take one spoonful orally
- Priyanka Kumari, West Champaran, Bihar

Wound

Apply the mixture of leaf ash and coconut oil topically
- Priyanka Paramanik, Purulia, West Bengal

Sprain

Smear lukewarm bark paste on the site of the sprain
- Arun Ghosh, Bankura, West Bengal

Uses in Classical Codified Literature

Aerial roots' paste mixed with salt after filtering is taken once a day in the morning for 8 days in case of diabetes³⁸; decoction of plant is applied externally on wounds and ulcers³⁹; latex is given orally to cure bronchitis⁴⁰.

'Anti-Dandruff shampoo'⁵, a product prepared from this plant in combination with other plants, is used to keep hair healthy and dandruff free. Product 'KLD Lotion'⁴¹, a multiherbal ayurvedic preparation using *Ficus*, is effective in many skin ailments such as acne marks, pimples, burns - sunburns, nappy rash etc. 'Litina'⁴², a herbal toothpaste made from this plant along with other plants, is good for the gums and the teeth. Four patents have been found on medicinal applications of *Ficus* for antitumor⁴³ medication, wound healing⁴⁴ etc.



Source: NIF database

Uses of *Mangifera indica* L. (Aam)

NIF Database

Uses from Rajasthan

Toothache

Burn the stem of *aam* and leaves of *jamun* (*Syzygium cuminii* (L.) Skeels); add a pinch of alum in this ash. Brush the teeth with this powder

- Jitendra Singh Vagehla, Sirohi, Rajasthan

Diarrhoea

Abrade the seed of mango and tamarind (*Tamarindus indica* L.) on stone. Make a paste and take it orally

- Hiralal Gonda, Dungarpur, Rajasthan

Scorpion sting

Apply the watery sap topically

- Dhanabhai Koted, Dungarpur, Rajasthan

Uses from other states

Asthma

Take one spoonful of powder of roasted mango seeds orally twice a day

- Narsabhai Bhagabhai Bubadiya, Sabarkantha, Gujarat

Stomachache

Take a cup of the juice of roasted fruit along with sugar

- Akash Kumar Jha, Sitamarhi, Bihar

Dysentery

Take one spoonful bark powder orally

- Gamaliyal Hembrom, Hazaribag, Jharkhand

Uses in Classical Codified Literature

Bark decoction is given orally to cure diarrhoea⁴⁵; decoction of leaves and bark is given orally to cure pain and aches⁴⁶; and bark of the plant acts as an appetizer⁴⁷. 'Wildcrafted Angel's Touch Hand Crème'³⁰, a herbal cosmetic product, is formulated to restore rough and reddened hands and to keep them velvety and soft.³⁰ 'Mensta'⁴⁸, a multi-herb drug, acts as uterine support and is the first non-hormonal menstrual modulator with spasmodic activity. Fourteen patents have been found on its various medicinal uses such as for treating gastrointestinal disorders⁴⁹ and for hair growth⁵⁰.



Uses of *Moringa oleifera* Lam. (Sargava)

NIF Database

Uses from Rajasthan

Itching

Apply the leaf paste mixed with cow's urine topically
- *Rameshchand Sambal, Sikar, Rajasthan*

Gout

Make a paste of leaves and add equal amount of ginger juice and a pinch of *Asafoetida*. Prepare tablets and take a tablet along with goat's milk twice a day
- *Satyannarayan Sain, Sawai Madhopur, Rajasthan*

Wound

Apply the bark powder topically
- *Nanuram Nanima, Dungarpur, Rajasthan*

Uses from other states

Asthma

Take 30g of the root juice orally along with an equal amount of ginger juice
- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Diabetes

Take the leaf juice orally
- *Rahul Kumar Mahato, Gopalganj, Bihar*

Joint pain

Take the bud curry to reduce the pain
- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Ulcer

Make pills from the leaf paste. Take one pill for three days early in the morning after light breakfast
- *Sukumar Nath, North Tripura, Tripura*

Leucoderma

Take the curry of the leaves of moringa, pumpkin and spinach
- *Rama Radhakrishnan, Idukki, Kerala*

Uses in Classical Codified Literature

Juice of bark is given orally along with a pinch of asafetida and salt³⁹; dried fruit is eaten to combat diabetes⁵¹; powder of the plant is administered orally to cure asthma⁵¹.

Product 'Sugan Nutrimix'⁵³ is a ready mix preparation where *Moringa* is mixed with pulses, spices and other natural ingredients to make it rich in nutrients, minerals, protein etc., and to enhance its taste. This powder can be consumed in its natural form or can be mixed with staple food. 'Pain Massage Oil'⁵ is a herbal oil, which provides relief from neuromuscular pain. Twelve patents have been found on its medicinal uses such as for anticancer⁵⁴ and antidiabetic⁵⁵ properties.



Uses of *Phyllanthus emblica* L. (Amla)

NIF Database

Uses from Rajasthan

Dandruff

Apply the fruit juice on the scalp
- Sunita Kumawat, Jaipur, Rajasthan

Stomachache

Take the fruit juice orally
- Shakuntala Devi, Nagor, Rajasthan

Diabetes

Take the fresh fruit juice along with honey
- Bimala Devi, Jaipur, Rajasthan

Uses from other states

Jaundice

Take the plant powder (5g) along with milk
- Kiran Batti, Dhamtari, Chhattisgarh

Wound

Apply the leaf paste topically
- Sevaram Bhaskar, Dhamtari, Chhattisgarh

Gray hair

Wash the hair regularly with the fruit decoction
- Sulekha Jabbar, Idukki, Kerala

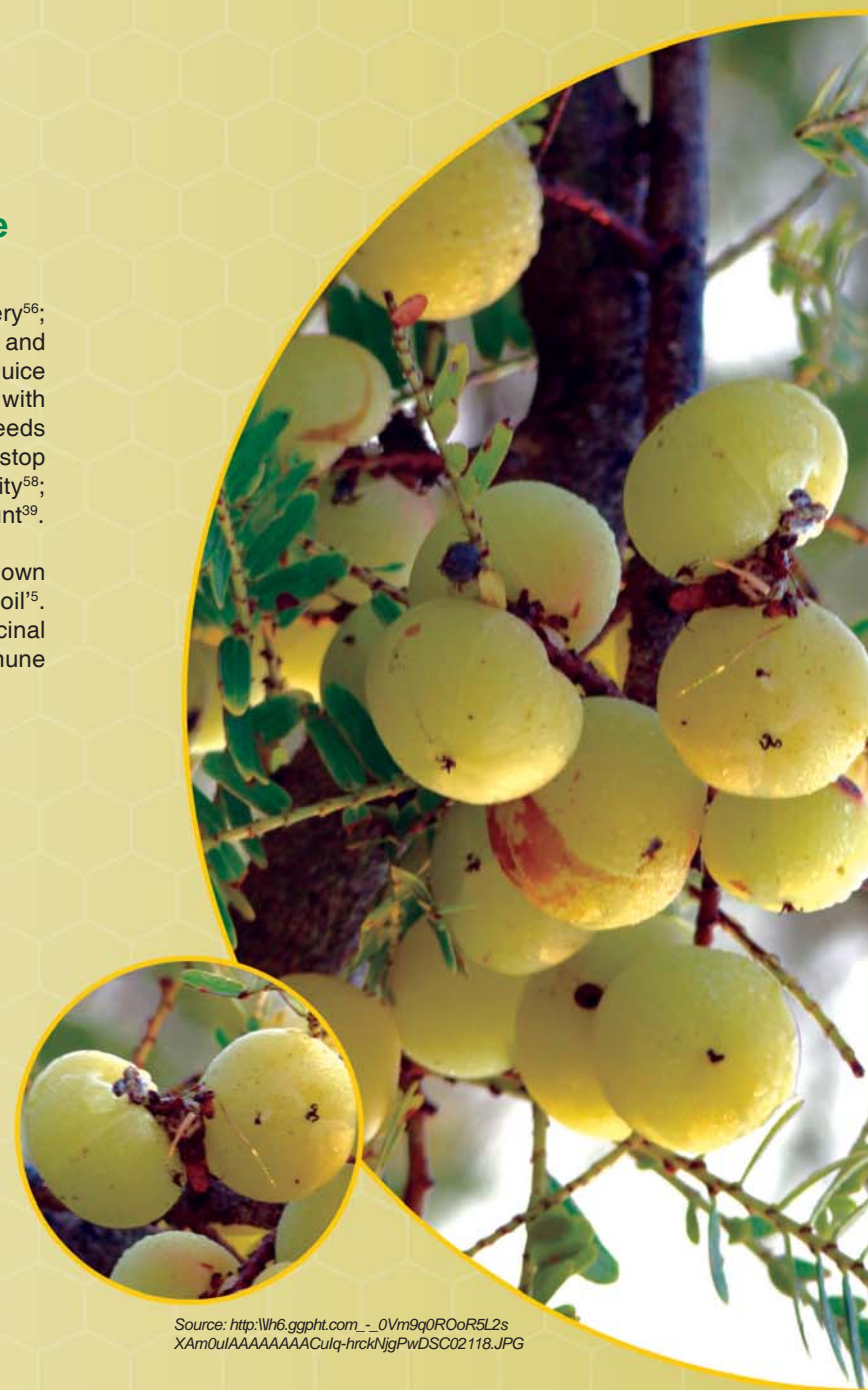
Headache

Make bark paste using the water in which rice has been washed. Apply the paste on the forehead
- Sulekha Jabbar, Idukki, Kerala

Uses in Classical Codified Literature

Bark and fruits are used in diarrhoea and dysentery⁵⁶; fresh juice of the fruit, mixed with pure cow's butter and honey, is administered to cure obstinate hiccough⁵⁶; juice relieves pain in urine trouble⁵⁶; pulp (2-3g) is eaten with warm milk to get rid of headache⁵⁷; powder of seeds after mixing with ghee is applied on the head to stop nasal bleeding⁹; fruits are taken orally to reduce acidity⁵⁸; decoction of the fruit is taken to increase blood count³⁹.

Phyllanthus is one of the main ingredients of well known medicines 'Triphala, Chavanprash and Amla hair oil'⁵. Seventy-six patents have been found on its medicinal uses such as for diabetes⁵⁹, liver disorders and immune deficiencies⁶⁰.



Uses of *Solanum xanthocarpum* Schrad. & Wendl. (Bhoi ringani)

NIF Database

Use from Rajasthan

Toothache

Boil seeds in sesame oil. Apply the medicated oil over the aching tooth

- *Shantilal Baranda, Dungarpur, Rajasthan*

Uses from other states

Toothache

Inhale the fumes of the seeds burnt in coconut shell

- *Ramathayu, Idukki, Kerala*

Mouth ulcer

Take the fruit juice orally with a little salt

- *O. Ibobi Devi, Bishnupur, Manipur*

Throat pain

Take the root decoction orally along with honey

- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Fever

Take the root powder orally to cure fever

- *Kamlesh Patil, Jalgaon, Maharashtra*

Take the fruit juice orally along with honey

- *Shijagurumayum Sandhyarani Devi, Bishnupur, Manipur*

Ear pus

Put 2-3 drops of the root decoction in the ear

- *Kamlesh Patil, Jalgaon, Maharashtra*

Vomiting

Take the root juice orally with some honey

- *Sanjay Singh Uplana, Nagda, Madhya Pradesh*

Uses in Classical & Codified Literature

Extract of dried flowers is administered orally to cure fever⁶¹; extract of fruit and seed is taken orally to combat cold⁶²; the plant acts as a gastric stimulant⁶¹. Product 'Diakof'⁵ and 'Koflet'⁵ made from *Solanum* is beneficial for both dry and productive cough. Five patents have been found on its various medicinal uses such as bronchial asthma⁶³ and cancer⁶⁴ etc.

Promotion of knowledge based enterprises and lateral markets

National Innovation Foundation in association with regional collaborator Peermade Development Society, Idukki, Kerala initiated a massive campaign through women self help groups to mobilize knowledge, innovations and practices among women. In this exercise more than ten thousand traditional knowledge practices were documented (many were quite common) from the field of cosmetics, nutraceuticals, health care, cooking etc., from just one block of a district in Kerala. This exercise has indicated the immense potential of knowledge at the grassroots, which can be converted into products and viable enterprises for augmenting livelihood options for rural women.

Initially four products having commercial potential were taken up for enterprise development. All knowledge holders of the four products were constituted as a single SHG named Amala and SSI registration was done. Nutrient supplement, baby massage oil and incense stick are the products selected for the initial intervention. The products were tested and standardized. All products were made available in the market under the brand name SAHYA.

The products were formally launched on August 11, 2007 in an auspicious function, attended by large number of women including the innovators. Amala enterprise was supported through the MVIF scheme of NIF.



Herbal Formulations for Healthy Crops

SRISTI SHASTRA

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

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

SRISTI KRUSHAK

Popatbhai Rupabhai Jambucha, Gujarat

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

SRISTI SURAKSHA

Community Knowledge, Gujarat

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

SRISTI PRAYAS

Community Knowledge, Gujarat

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

SRISTI SHAKTI

Community Knowledge, Gujarat

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





Herbal Formulations for Livestock and Poultry

Coccicure

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

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

Poultmax

Community knowledge, Valsad, Dang, Gujarat

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

Mastiherb

Ukhardiyabhai S. Raot, Dang, Gujarat

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



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



IGNITE 09- The National Students' Competition

IGNITE is a national competition of ideas and innovations of school children organized by NIF. It is open till August 31, 2009. The awards will be announced on October 15, 2009, the birthday of Hon'ble former President of India, Dr. A.P.J. Abdul Kalam; celebrated as Children's Creativity and Innovation Day. The awards will be given by Dr. Kalam at his convenience soon after. Those who can not submit entries till August can submit later also for the next annual competition.

NIF will provide support for patenting and incubating innovative projects in all deserving cases. All school going children up to class XII of any school (and even out of school) can participate in the competition either by sending their entries through post to our address mentioned below or through email at ignite09@nifindia.org (For more details, please log on to www.nifindia.org).

Children can submit entries in any or all of these categories: a) ideas of technologies not yet developed, b) innovative products developed by the students (does not matter if these are crude or just proof of concept), c) problems identified in their neighborhood with which we have lived for long without solving them, and d) traditional knowledge practices learned from elders. Please note that the projects guided by teachers/parents will not be accepted.



Co-sponsors



Honey Bee Network



CBSE



SRISTI



IIM-A

IGNITE 2009

National Innovation Foundation,
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Ahmedabad 380 015
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www.nifindia.org

PART III

INNOVATIONS for RAJASTHAN

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





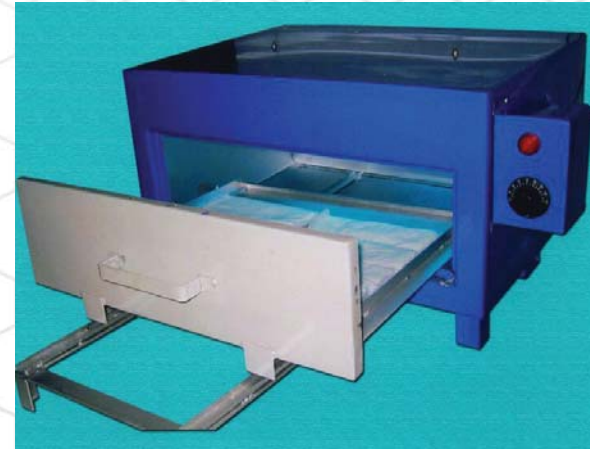
A Muruganandam
Tamil Nadu

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

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



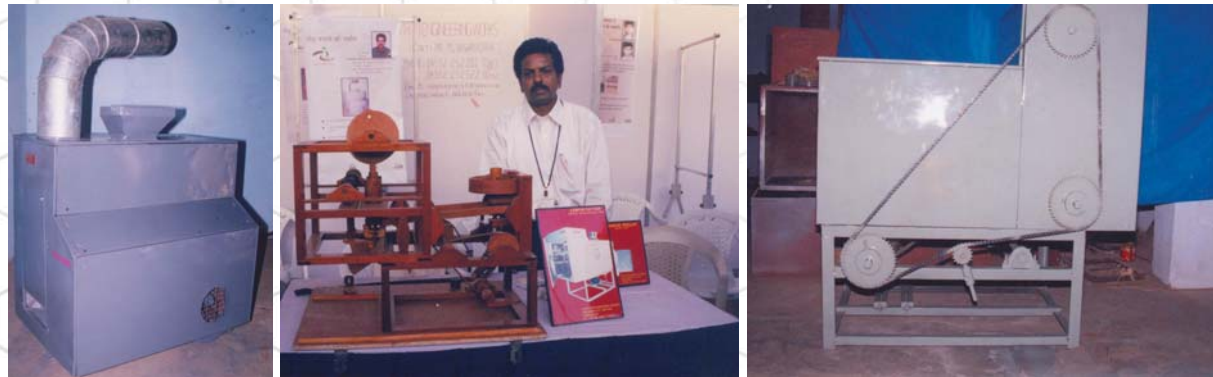
Garlic Peeling & Lemon Cutting Machine

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

The second product is also used in pickle industry, but for cutting lemons. It is a cost effective machine, having innovative design, with continuous feeding system. It performs precise and standard cutting of large quantity of lemons in uniform shape and size. It can be operated by one person and cuts lemon into eight equal pieces. The innovator has been able to run a good business with the financial support of Micro Venture Innovation Fund and marketing effort of NIF. He received a National award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005.



M Nagrajan
Tamil Nadu





Raghav Gowda
Karnataka

Manual Milking Machine

Safe milking of cows/buffaloes is a requirement across rural India and this product is an efficient step in that direction. It is a low cost, manually operated device that helps farmers to milk the animal hygienically and also reduce 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. Raghav was given State Award in NIF's Third National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2005 for the machine (also see Honey Bee, 15(4):4-9, 2004).



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. NIF has also filed a patent for the machine in the innovator's name.



Dharamveer
Haryana



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.

He received a Consolation award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007. NIF also filed a patent for this device in the innovator's name. The Innovation has been taken up for value addition at CMERI Durgapur (WB) through the NIF-CSIR JIC Fellowship Scheme.



Mobile Operated Switch and Multi-media Poster

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

The farmer can remotely know the status of the pump in his cell phone and turn the motor on or off by calling the particular configured number. It activates the switching by certain number of rings and hence incurs no call charges. Patent was filed by NIF in the innovator's name for this technology, which also won him a National Award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge Practices in 2007. Prem Singh has developed several other innovations, one of which is the viewer triggered multi-media poster. If any agency wants to communicate some graphic message with different language audios or videos, this multi-media poster can be very useful. NIF facilitated a Mumbai based company to purchase two hundred units of the talking poster worth around eight lakh rupees for diffusion in various states. These were made available in five local languages.



Prem Singh Saini
Haryana





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 engine as the compressor for pumping air into the tube. A pinch of polymer granules is also inserted in the tube to seal the leakage in the tube.

Arvindbhai won a National Award in NIF's Second National Competition for Grassroots Innovations and Traditional Knowledge in 2002. NIF, apart from filing a patent in his name, facilitated sales of a few hundred pieces to customers in Assam and Arunachal Pradesh through dealership technology licensing and local entrepreneurs. The technology is available for licensing to entrepreneurs in different states.



Check Dam and Dual Purpose Tractor

The innovator lives in an arid region, prone to water scarcity. This inspired him to build a dam that could be built on site using local materials, unskilled labour, and at minimal cost.

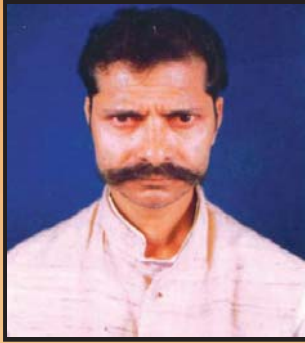
His path breaking innovation consists of a modular check dam built using the arch shaped bunds in sequence. The innovator was inspired by the strength and durability of arches used vertically in constructing bridges. He used locally available materials such as stones, river sand and deployed one mason and four labourers to build the dam. The low cost dam was built in 4 days and at a total cost of Rs 10,000. This dam has made the area a green haven.

His next major innovation, developed over 15 years was a compact yet powerful 10HP “convertible” tractor. The front axle is designed facilitating its deployment as a “three wheeler” at low speed for farming operations and a “four wheeler” at higher speeds for transporting goods to the market. The tractor is built with an adjustable wheel base for various inter-culturing operations, thereby enabling the farmer to repair the unit with minimal effort or skills.



Bhanjibhai Mathukia
Gujarat





Prakash S Raghuvanshi
Uttar Pradesh

Kudrat 9- An Improved Variety Of Wheat

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

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



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 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.



Ishwar Singh Kundu
Haryana





Raj Kumar Rathore
Madhya Pradesh

Richa 2000- Perennial Pigeon Pea Variety

Progressive farmer Raj Kumar Rathore (40) owns 18 acres of land on which he grows wheat, soybean, mango, strawberry and litchi. One acre is reserved for breeding new pigeon pea varieties. His family has always supported his plant breeding efforts, even when the government discouraged him.

Rathore has developed a high yielding perennial pigeon pea variety with a bushy growth habit. He first began his foray into commercial plant breeding in 1997 when he noticed an odd plant in his field of ICPL-87. The plant remained green for a longer duration and had bigger flowers and longer leaves. He propagated the plant in isolation but found that yields were low until he began topping the plant twice a year to encourage further branching. Rathore has struggled in the marketing of his variety but remains hopeful that a solution will be found.



Apart from the plant variety he has also made a motor-cycle driven agricultural implement and has developed a technique to preserve strawberries while in transportation. He was given a Consolation award in NIF's Fourth National Competition for Grassroots Innovations and Traditional Knowledge in 2007.

Pulley With Stopper

With water table going down and length of rope to pull water increasing, women (who have to often perform this arduous task) have to face a lot of drudgery while pulling water through conventional pulley. Many times while pulling water, women/men feel tired and have to pause to catch their breath. Bucket some times fall into the well. Indian civilization developed a bunch of hooks to get such a bucket out of the well but could not devise any mechanism so that bucket does not fall into the well. Honey Bee network had posed this problem to a network of innovators and then Amrutbhai came out with this innovation more than a decade ago. He attached a stopper over the pulley so that by the backward movement of rope, lever will press it automatically and would not let it slip. Now the person can take the rest as long as one wishes, without having to keep holding the rope. The innovation is available in three models - Ganga, Narmada and Saraswati. For this innovation he won Asian Innovation Award in 2000 and a National Award in NIF's First National Competition for Grassroots Innovations and Traditional Knowledge in 2001. An attempt was made to diffuse this pulley with the help of SEWA, Ahmedabad in a few hundred cases.



Much more remains to be done. Apart from these two, Amrutbhai has made numerous other devices like Bund maker (bumper) to make bunds in the field for facilitating irrigation, Santi- multipurpose agricultural attachment, Groundnut digger (mini kaliyu), blades for the kaliyu, wheat sowing box, Aaruni-tilting bullock cart among other things.



Amrutbhai Agrawat
Gujarat



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 in 2007. NIF also filed a patent application for the same and supported him through the Micro Venture Innovation Fund. He has also made a scooter mounted washing machine and a scooter mounted flour mill.



Earthen Kitchen Products

Tawa/pan: Non-stick tawas have become an essential part of our kitchens to prepare low oil food. But these non-stick pans made of metal are quite costly. Their non-stick coating also does not last long. Blending traditional and modern technology, Mansukhbhai has developed a clay tawa with a black non-stick food grade coating. Being non-metallic, the rotis, dosas and other items cooked on it give a different taste and feel much better. The paint gets into the clay pores and thus does not come off despite prolonged use. He was also supported under the Micro Venture Innovation Fund scheme of NIF.

Mitticool: It is a fridge for the common man that does not require electricity and keeps food fresh too. Mansukhbhai came up with Mitticool, a fridge made of clay, working on the principle of evaporation. Water from the upper chambers drips down the side, gets evaporated, leaving the chambers cool. This keeps food, vegetables and even milk fresh naturally for days. He has received national and international exposure and the recent issue of The Economist carried a story in which his innovation was mentioned. Lot of queries have come from around the world for his Mitticool, including from the world's third largest company in Germany.



Cooker: It is a pressure cooker made from clay. Food cooked in clay vessel has different taste from the food cooked in the conventional vessels. He has been short listed for recognition in Fifth round of NIF's National Competition for Grassroots Innovations and Traditional Knowledge.

14



Mansukhbhai Prajapati
Gujarat

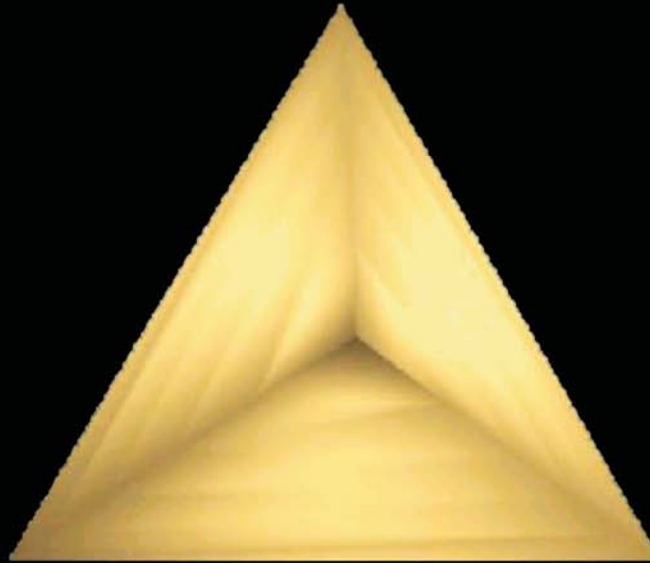


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