India Innovates:

Second National Grassroots Technological Innovations and Traditional Knowledge Award-2002

December 17-18, 2002

National Innovation Foundation

National Innovation Foundation

National Award, First
Plant Variety: 'Mysore Mallige'- a unique paddy variety

Shri M. Lingamadaiah

'Mysore Mallige'- a unique paddy variety

The story of his selecting this variety is very interesting. Karnataka Rajya Raitha Sangha had organized an International Seeds seminar in 1994, which was attended by many farmers. During this seminar many farmers from various countries had participated and there was free mutual exchange of seeds between the farmers.

Shri Lingamadaiah got 10 g of seeds of a unique paddy variety from a Philippines farmer. The farmer had advised him to grow this seeds in organic manner. Hence a new field was prepared for this purpose. He sowed all the 10 g seeds in the field from which only twelve seeds germinated. He planted one seedling/hill and in fifteen days each seedling got about 6-8 tillers. These were again removed and replanted in more spots that grew up well and started

Shri Lingamadaiah (61 years), has a BA, LLB degree. He lives with his wife and two sons. His wife works in a nearby factory. He served 16 years in the army as a clerk and worked in Bharat Petroleum factory for some time till he took voluntary retirement. He purchased 16 acres of land, which he has been cultivating since 1983. He is growing mango, banana, sapota and forest tree species in his land. Besides this, he is having collection of several paddy varieties and in the recent years, he has completely devoted his life for development of new paddy varieties. Shri Lingamadaiah and his variety 'Mysore Malligae' are very well known in Karnataka, Tamil Nadu and parts of Andhra Pradesh. He was honored with Beeja Mitra award from GREEN foundation. He was the Vice Chairman of Village Panchayath, Former President of Local Co-operative Bank, and Director of Taluka Agril. Produce Marketing Committee.

Nisargs Farm,
Allasandra,
Taluka: Channapatna,
District: Bangalore, Karnataka

Scout: PRITVI, Karnataka

giving panicles. The uniformly grown panicles were selected and replanted the next year. Next year he got 30 kg of selected seeds by this method. In the mean time, he converted one acre of his field into organic field and planted this variety in this field. He used farmyard manure, green manure and tank silt in the field. By using this method, there was no incidence of disease and pest in this crop.

As people came to know about this variety, the demand of this variety increased and people around this region started using this variety. When people used this variety with pesticides, the crop did not do well. The innovator advised them to use less pesticide and the advice worked.

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

National Innovation Foundation

National Award, Second
Plant Variety: New Nutmeg variety with larger and heavier fruits – Kadukkamakkan Jathi

Shri Abraham Mathew

New Nutmeg variety with larger and heavier fruits – Kadukkamakkan Jathi

The new 'jaiphal' (nutmeg - *Myristica fragrans*) variety is the result of systematic selection from the seedlings planted at Kallanode in 1971 from a collection of seeds. This collection had come from a nursery that developed nutmeg seeds originally introduced from Sri Lanka in 1946. Indian Institute of Spice Research (IISR), Calicut studied this variety in detail and has certified its superiority.

The new variety developed has large fruits. Compared to 150 dried nuts per kg of local varieties, the number in this variety is 90 dried nuts per kg. More importantly, the quality of *japatri* or mace (dried fibrous aril, covering the testa of the fruit) is much better. Weight of 1000 filaments of mace is between 3.5 kg and 4 kg, almost four times that of conventional varieties. Further, since the tree is a dwarf type, farmers can grow 100 nutmeg trees along with 100 coconut palms in half an acre (0.2 ha) plantation area.

Shri Abraham Mathew (56 years), is a farmer educated up to the Intermediate level. He won the prestigious Kerala Kesari award from the Government of Kerala in 1995 as the Best Farmer. Besides this, he has been awarded by NABARD as the best Model Farmer in the state and with KAMADA Karshaka award. He has received appreciation from several other organizations including All India Radio, Calicut. He has developed a new variety of Nutmeg.

Kadukkamakkan House,
Post: Kallanode, Via: Kakkayam,
District: Kozhikode – 673 615, Kerala
Phone – 0496 660310

Scout: PDS, Kerala

National Award, Third
Plant Variety: Latexless jackfruit- sompady jackfruit

Shri S. Harishchandra Shetty

Latexless jackfruit- sompady jackfruit

The innovator has a garden having large number of Jackfruit trees. One tree amongst these was very weak, yielded less number of fruits and the fruits were tasteless. During that period he read about latex less jackfruit variety in a local magazine 'Adike Pathrike'. Inspired from this news, he tried to develop a good variety of jackfruit by grafting method. After struggling for a year, he could arrive at the proper variety. He had grafted nearly thousand plants out of which only one survived. Then he started mass production of it. At first his spouse thought it to be wastage of time but she had to change her views after successful grafting of trees. The Karnataka state government further encouraged him by giving him a certificate of appreciation. Director, CPCRI, Kasargod, recognized the increasing popularity of this variety in southern states of India due to the efforts of Mr. Harishchandra.

Shri Harishchandra Shetty (69 years), is a farmer having four acres of land where he grows arecanut and coconut. A widower with two children, Shri Shetty has received several honours and awards so far. His 'Shetty Nursery' is very popular in the locality. Grafting of fruits like mango is his great hobby that he has inherited from his father. This prompted him to select and popularize the latex less jackfruit. Thousands of farmers through out Karnataka benefited from this variety. Even state horticultural department, obtained grafted materials from him.

Shetty Nursery, Sompady,
Post: Savanoor,
District: Puttur- 574 202,
Karnataka

Scout: PRITVI, Karnataka

The innovator did softwood grafting by using old jack tree as stock and another old jackfruit with very good taste and with negligible gum as scion. This was done by trial and error method. On the10th attempt, he succeeded in his experiment. He had done first successful grafting in 1988. After three years, it started yielding. But during the first year of yield, fruits dropped from the tree at immature stage itself. Next year tree bore ten fruits. When these ripened, a big surprise awaited him. The fruits were totally gum less with very good taste and colour. Shri Shetty was astonished by the taste, texture and aroma. In all these years, he has distributed more than one lakh gum less jack (sompady jack) seedlings all over the state and also to other states like Tamil Nadu, Kerala and Andhra Pradesh.

In the literature, one finds just a single reference to such a variety in Malaysia and none at all in India. Who could deny the potential of farmer breeders with such examples being found all over the country. There is, of course, a need to protect his rights under the new Plant Variety and Farmers Rights Act so that nobody else exploits his innovation in an unauthorized manner.

National Innovation Foundation

National Award, First
Farm Implements: Cotton stripping machine

Shri Mansukhbhai Patel

Cotton stripping machine

The idea of mechanising the process of stripping rainfed cotton (Variety No.797) from shells came to him during one of his frequent visits to his village. He kept mulling over the idea for several months. In 1991, he was convinced that mechanisation of the process of stripping the cotton lint from partially opened bolls was not an impossible task and that he could develop a machine to carry it out. He discussed this idea with his colleagues and relatives. They were very enthusiastic and encouraged him to go ahead.

Kantibhai Patel, a factory manager with Trent Group Cooperative Cotton Shelling Ginning and Pressing Society Limited, promised to invest in the research and development work involved in fructifying the idea. So enthusiastic about supporting the venture was Kantibhai that he parted with a hefty sum of Rs 1,50,000 to cover the initial establishment expenditure.

With this money Mansukhbhai rented a shed close to the cotton-processing mill and acquired some basic machinery with this money. Several colleagues of his, and the workers from the factory volunteered to assist in the development of the machine. They used to spend several hours every

Mansukhbhai (50 years), born in a farmer family started lending a helping hand to his father in various farm-related works, particularly related to farm machinery. He pursued studies up to high school. As a child, Mansukhbhai had great interest in mechanical and electrical appliances and he would tinker with these whenever he got an opportunity. This interest brought him in close touch with an electrician friend whom he assisted in his spare time.
In 1973, his uncle got him a job as a helper in a steel tube manufacturing company at Ahmedabad. He ran errands for the maintenance fitters and electricians for several months and gradually picked up the skills and knowledge. Eventually, he was appointed as an electrician. Further, his career progression was smooth albeit in different companies. His last job was as Deputy Electrical Engineer in Asarva Mills Limited.

Mansukhbhai resigned his job two years ago and started concentrating on business on full time basis. However, he has to

49, Kanti Park Society,
Ranna Park,
Ghatlodia,
Ahmedabad-380 015, Gujarat

Scout: SRISTI, Gujarat

evening after their regular duty hours in discussing and trying out alternatives.

It took two years of dedicated efforts to come out with the first model. Mansukhbhai designed, fabricated and demonstrated his first full-fledged cotton-stripping machine in 1994. The demonstration in his village convinced everyone that it was indeed possible to mechanise the tedious process. At the end of a meeting organised after the demonstration of the machine, he found himself flooded with confirmed orders for as many as 50 machines. This was despite the performance not being as good as Mansukhbhai wanted it to be.

The actual supply of machines was easy. Although the customers had been quite impressed at the time of demonstration, the performance under actual working conditions did not satisfy users. All the machines were returned back with complaints. It was eventually found that the malfunction was due to a trivial technical problem. He had to refund the money received and he suffered a severe financial setback.

Mansukhbhai would not give up. He felt that the overwhelming initial response received from prospective users obliged him to somehow justify the confidence they reposed in him. He intensified his efforts at perfection. He shifted the workshop from Ahmedabad to Nana Ubhada at his brother-in-law's place to save on rent. Mansukhbhai began visiting Nana Ubhada once or twice a week. Jayantibhai and his family members devoted whatever time they could find for the project. Other relatives too chipped in over a period of time.

The first prototype was developed way back in 1994 and he could develope the final model in 1996. Mansukhbhai made more changes to the machine over a period of three

avoid too much of running around due to his failing health. At present, his brother-in-law, his sons and nephews are managing the manufacturing activities as well as marketing of the machines. He has virtually retired from day-to-day management of the unit and confines himself to planning the long-term strategy for product-market development. He recalls that his wife did not approve of their sons abandoning their college studies to join him in his "crazy pursuit." She would often quarrel with him and insist that a steady income was essential for running a home decently. She has stopped nagging for the past couple of years and has apparently come to terms with realities. She has apparently started deriving pride in her husband's achievement. She makes it a point to ask her daughter-in-law to show the latest brochure of the machine when someone happens to enquire about the status of this "crazy pursuit".

more years. Last year, he introduced dust collectors and fitted an automatic feeding system to the machine. He also provided wheel-brackets and castors to make the machine portable. Mansukhbhai has manufactured 35 machines so far costing about Rs three lacs each.

Mansukhbhai's stripping machine innovation was scouted by SRISTI. Grassroots Innovations Augmentation Network (GIAN - West), took up the task of value addition. Mansukhbhai was put in touch with Council of Scientific Industrial Research (CSIR) and other arms of Department of Science and Technology (DST). With GIAN's support, Mansukhbhai could secure a Rs 5,80,000 under Technopreneur Promotion Program (TePP). GIAN-W also arranged for technical assistance from National Institute of Design (NID), Ahmedabad. A German student pursuing his studies at NID systematically worked for six months on the design of the machine and provided some valuable inputs. Faculty from IIT-Mumbai also gave suggestions for design improvement.

This stripper saves cost involved in manual labour and eliminates drudgery for women and children. It processes 400 kg cotton per hour. It improves the quality of cotton. The machine is available in two models. It is available with suction feed as auxiliary attachment.

At present the national patent has been applied for and the international patent application is under process in United States through the efforts of SRISTI, NIF and GIAN- West.

National Innovation Foundation

National Award, Second
Farm Implements: Innovative check dam and 12 H.P three and four wheel tractor

Shri Bhanjibhai Mathukia

Innovative check dam and 12 H.P. three and four wheel tractor

Low cost Check Dam

The innovator has built check dam with series of semi circular bunds on the river Dhrafad flowing through the innovator's village. For constructing the dam he took stones of the size of 11x15 inches and placed the stones in the flowing water keeping a little distance between two stones. Later on this gap was filled up using river sand, stones and cement. The total cost for this came up to Rs.10, 000 including the labour cost. The innovator has constructed this dam without any help from the government agencies. After this dam was meaningfully completed, villages pleaded with him to build another check dam down stream. He then build second check dam in collaboration with neighbouring farmers. Students from IIT-Kanpur are studying the technical parameters so as to learn from this simple innovation with worldwide implications.

Bhanjibhai (70 years), has been tinkering with machines from his childhood. Living close to Gir Forest, he also respects the rights of wild life and often talks about the need to conserve the lion's habitat.

Due to insufficient rainfall and poor water harvesting in past, the under ground level water has been going down. He was deeply concerned with the problem of widespread water scarcity in Saurashtra. The first idea to solve this problem came to him in April 2002 after his participation in eighth 'shodh yatra' in Alwar district of Rajasthan. The efforts made by 'Tarun Bharat Sangh' to conserve water made him think about his commitment to the future generations. Another inspiring factor was Government's 60x40 check dam scheme, which made him think that if a dam was built at low cost, more dams could be built and more water could be conserved.

The dam was built with the help of one mason and four labourers within four days. Due to this innovation, the surrounding region has been green for far longer time compared to other years. The

Village:Kalawad,
Taluka: Visavadar,
District. Junagadh, Gujarat

Scout: SRISTI, Gujarat

10/12 H.P. Tractor

Bhanjibhai felt that a much smaller machine could perform most of the operations carried out by a tractor. He developed a small three-wheel tractor powered by a 10 HP engine. It is cost effective and provides improved maneuverability making it ideal for small farmers. The design was kept simple making it possible for the farmer himself to do the repairs. The various advantages include innovative transmission unit, interchangblity from three wheel to four wheel and vice versa, improved performance with reduced cost and adjustable wheel base to meet the requirement of inter-culturing operation in different crops.

A unique feature of the mini-tractor that has evolved over fifteen years is that it is a “convertible”. The front-axle is designed in such a fashion that the tractor can be made into a 3-wheeled or a 4-wheeled vehicle. Explains Bhanjibhai, “double-wheeled front axle is essential while carrying out

wells in the neighbouring regions have also been charged.

The innovator has also done various other innovations in the field of agriculture. The innovator’s spouse gave support throughout the process of innovation. He observes, “she takes care of other responsibilities when I am working on any innovation. But she feels that the innovations do not help us prosper while others are benefited much more out these”. The innovator has one son who has also acquired a mechanical bent of mind. His nephews have also been very closely involved with him in their workshop. Together they worked on the design of three wheel/four wheel tractor.

Bhanjibhai has developed several other innovations and is in the process of developing few more. He developed a bullock drawn sprayer modified seed drill and is currently working on an improved version of windmill driven pump. He was part of the delegation which went to South Africa at the invitation of Commonwealth Science Council and South African government to transfer technologies and help build capacity of counterpart small farmer and artisans.

He struggled a lot when the idea of building a three-wheel tractor came to his mind about ten years ago. Using a diesel engine of 10 HP and chasis of jeep, his first model drew lot of attention. His

farm operations which are usually at low speed and high load. However, when you want to use it for transporting goods to the market yard, many people would prefer a single front wheel. Personally, I am more comfortable with a three-wheeled vehicle in pulling a trailer. After all, the owner must have a choice." Having used the three-wheel model for several years, he is extremely confident of the "convertible" emerging as a big success at grassroots level.

GIAN has been instrumental in helping the innovator for standardizing the design and parts mandatory for the testing and certification by CFMT&TI, at Budhni. Indian Institute of Technology (IIT) Bombay could develop the external design in 1996 under the guidance of Prof Munshi. The task of assessing the market potential of the product was taken up by some students of Indian Institute of Management, Ahmedabad (IIM-A). It is planned to send a full-scale model of the tractor to CFMT&TI, Budhni for testing and certification as soon as the development is over. Actual manufacturing will begin once the model receives roadworthiness certification. Registration of the design of the tractor was accomplished in January 2002. Bhanjibhai has also applied for a patent in India and USA with the help of NIF, GIAN and SRISTI.

extended family members also wanted similar tractor and he and his son with a nephew built about nine such tractors of three/four wheel. Once Regional Transport Officer challenged him when he was taking tractor on road to his village. He was asked to sign an affidavit declaring not to ever bring his tractor again on the road. His crime; He dreamt, he solved a problem at low cost, he innovated. He was honoured by SRISTI and also at the International Conference on Creativity and Innovations at Grassroots held at IIM-A, January 1997. He has continued to dream, innovate and build upon traditional knowledge as well. Soft spoken, man of few words, Bhanjibhai joined almost every shodh yatra so far and inspired thousands of farmers, artisans and young people we met during these yatras. He has been supported by TePP of Department of Science and Technologies and DSIR, and has become an ambassador of Honey Bee network and National Innovation Foundation.

National Innovation Foundation

National Award, Third
Farm Implements: Palm and coconut leaf mat weaving machine

Shri T.S. Pasupathy Marthandan

Palm and coconut leaf mat weaving machine

The mat making machine comprises frame, two palm leaf folders, a roller, a cross pave section and two pedal levers in left and right. It enables skilled operator along with an unskilled person to produce about 6 mats of 2 x 4 feet size in an hour. These mats can be used for packing items like fish, matches and jaggery. The machine can be adjusted for either criss cross knitting or 'V' shaped knitting. The machine can be made to operate either by pedal or by handle, though the basic design of the machine remains the same. With a capital investment of about Rs.10, 000 and a working capital of about Rs. 2500 for leaves, one can earn a net income of about Rs.75 per day. (This earning is calculated after deducting depreciation, interests on capital, rent, maintenance, sales commission etc). With manual mat making, one can hardly earn Rs. 25 per day. Now a days, mat making by hand is getting reduced due to high labour cost and also availability of cheaper plastic mats. With a little modification this machine can be utilized

Shri Pasupathy (65 years), belongs to an agricultural family and owns five acres of land. He is the proprietor of Anantha Rural Industries Research Center, Kuttam. During his school days he was nicknamed as 'scientist' due to his creative bent of mind towards developing innovative ideas. After completing SSLC, he joined as a clerk in the military. While in service, he learnt some basics of electronics and mechanics.
Recently he has developed a new machine for speedy weaving of mats from palm leaves. This mat-making machine would help to ease up the drudgery, increase productivity and thus help earn more revenue.

Anandha Rural Industries
Research Centre, Kuttam,
Taluka: Radhapuram,
District: Tirunelveli,
Tamil Nadu
Phone: 04637-579156

Scout: SEVA, Tamil Nadu

for “korai pai” mat (this mat is normally used for sleeping purpose) weaving. This machine will promote eco-friendly mats for packing purpose. Rural artisans, who are able to make only a subsistence living out of this handicraft, produce these mats in millions by hand. Imagine the welfare and efficiency impact, if such a low cost machine could be provided to these millions of manual mat makers !

National Innovation Foundation

National Award, Third
Farm Implements: Mobile defibring machine

Shri K. R. Chandran

Mobile defibring machine

The need for a machine to specifically defibre coconut husk/ frond was felt because the conventional method of beating the husks manually was a cumbersome, giving low output. It also damaged the fibre while separating the pith of the husk. This machine was devised with the object of removing the shortcomings of coconut defibrers available in the market. The idea was to get more output and employ least possible labour; while keeping the quality of fibre high and cost of the machine affordable.

The machine functions on a very simple principle. The integument of the coconut fruit, called husk, is manually passed through a conveyer. Spiked pressure plates located inside the machine work on the husk resulting in the separation of the pith from the fibre. Fibre and pith are delivered separately from the respective outlets. Minimal damage is done to the fibre during the process. Consequently, the fibre obtained from this machine is very strong and of good quality. About 3200 husks can be defibred by this machine

K. R. Chandran (46 years), is an expert technician of Alapuzha district, where he lives with his wife and two children. Although he had studied only up to the 5th standard, he became a highly skilled workshop mechanic through experience and hard work. He is interested in innovating machines related to agriculture. Earlier, he had developed a machine for threshing paddy, putting in one and a half years of hard work and experimentation. This machine has now become very popular in Kuttanad belt. Seeing his ability to innovate, the then Industries Minister Mrs. Susheela Gopalan requested him to develop a machine for coir defibring. Chandran developed this machine too by putting in years of persistent efforts and hard work. He spent around Rs 8 lakh for developing this machine in his workshop Sujit Engineering Works at Mohamma. Coir Board granted a loan of Rs 1,50,000/-. The condition was that he was to repay the loan amount along with 18 per cent interest even if he could not manage to manufacture the machine. This was the only option. He had to fructify

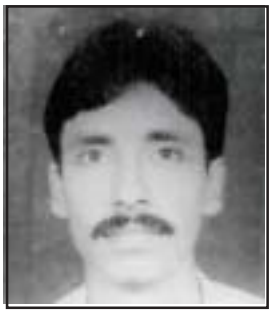
Sujith Engineering works,
Post: Muhamma, Taluka: Cherthala,
District: Alapuzha – 688 525
Kerala
Phone - 865703

Scout: PDS, Kerala

in a day. Only two people are required to operate this machine, compared to 12-15 people needed for operating a medium sized conventional machine. It works with a 10 HP motor as compared to the 37 HP needed by the old large sized machine. The machine is compact and portable. There are several models available in the market ranging from Rs 8 lakh to 25 lakh or so with a maximum output of 8000 fronds a day. His machine is far cheaper and productive, compared to the available machines.

his idea. “Taking loan from loan sharks would have meant paying an exorbitant rate of interest interest, to the tune of Rs 6 lakh, ” he says. “That would have broken the back of my business. Today I am paying only Rs 1500/- per month towards interest.” Coir Board also agreed to help him market the machine. The machine is sold at a price of Rs. 3,25,000/- . There have been a few differences that have cropped up lately between him and the coir board. However, technical director of the coir board was quite unequivocal in acknowledging that this was the first mobile defibering machine. He did have some doubts about output efficiency. But then struggles of this kind are part of every innovators life. Chandran awaits the next challenge to stimulate his genius and develop several more machines. This is a mission in which NIF will be a willing partner.

National Award, First
Energy: Transmission of energy from shock absorber for smooth riding of bicycle on uneven road



Shri Kanak Das

Transmission of energy from shock absorber for smooth riding of bicycle on uneven road

Bicycles continue to constitute a major means of transport by poor people in rural and urban areas. Given the uneven nature of roads, the rider on a cycle becomes very uncomfortable. Kanak Das had an old cycle, which required lot of effort to ride. He purchased a new cycle with a shock absorber, but he still wasn't satisfied. The major concern he had was that, the energy absorbed by the shock absorber was wasted. On August 15, 1999, an idea struck him about using the energy wasted in shock absorbers for propelling the rear wheel so as to supplement the pedal function. When cycle bumps on an uneven road or undulating terrain, the force induced by the bump and rider's weight is stored in a battery of six springs attached under the pedal. In the first prototype, there was a problem with reverse pedaling. It was overcome by designing a new model.

Kanak Das (29 years), is a young innovator who symbolizes the spirit of creativity. He lives about 70 km away from Guwahati. He is a calm and quiet person albeit a little sentimental but very practical in his work. Shri Das lost his father during his childhood and was brought up by his mother who passed away recently. He is an undergraduate. He could not study science due to poverty, but has a good understanding of the subject. He sometimes watches Discovery Channel on TV and has a keen interest to develop mechanical systems by which wasted energy can be utilized for useful work. His other hobbies are singing, playing tabla and cricket.

There have been occasions when he would not have enough to eat for several days. He used to spend whatever little he earned from a small area of land and a rice-processing mill that he has in the compound of his house. He lives all alone in a small house with tools and junk parts lying all over the place. He keeps a small diary in his pocket in which he notes down whenever an idea strikes him. His constant endeavour is to make everyday life of common people better by

Village: Mori Hira Gaon
Ward No. 3
District: Morigaon -782 105
Assam

Kanak Das's cycle would not slow down after bumps as conventional bicycles do. It would accelerate after every bump because of its ability to convert vertical movement due to bumps into horizontal propulsion. This could indeed become a commercial success within the country and even worldwide.

Although GIAN North-East acquired his bicycle for experimental purposes, Kanak Das has a sentimental attachment to it. With great reluctance, he gave it to IIT G for modifications. GIAN team has forged active link between him and the professors from IIT-Guwahati. The improvements made so far have not satisfied him. It is not easy for an innovator to accept technical advice from outside, headstrong as the innovators generally are. But it is hoped that a fruitful cooperation will eventually emerge to make his innovation more effective by blending it with the excellence in formal sector. Director, IITG has assured full cooperation in this matter. Provisional patent has already been filed and full application will also be filed shortly. Efforts are on for technology transfer to larger commercial firms.

making small improvements. He has made many improvements in the rice mill also. He has attached a blower to separate chaff from the grains after milling.

National Innovation Foundation

National Award, Second
Energy: Micro windmill for generating energy

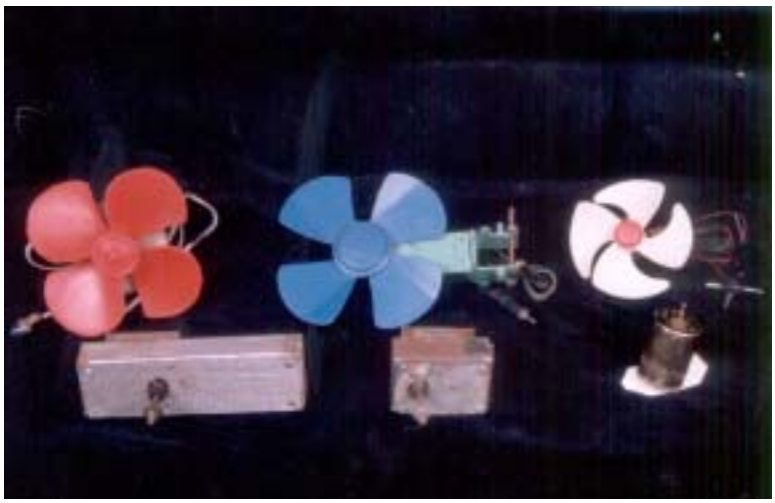
Shri N. V. Satynarayana

Micro windmill for generating energy

Shri. Satyanarayana has innovated Micro windmill driven battery charger. This device is miniature version of power windmills and harnesses wind energy to generate sufficient electrical potential to recharge batteries of cellular phones, walkman, palmtops, laptops etc. The portable gadget can be used when one travels long-distance in trains or buses for recharging the batteries. Cost wise, it will be much less expensive than using dry cells.

The windmill employs a blade measuring 10 cm in diameter and the overall size of the unit is 3.5 x 3 cm. It produces direct current (DC) flow of up to one ampere at a potential difference of 12 volts. The current generated is sufficient to operate most portable electronic devices, currently operated with the use of dry cell batteries. Mass production of the micro windmill and promoting its use among the travelling public using electronic gadgets will help to conserve resources by switching over to wind energy.

N. Satyanarayana is a science graduate, interested in identifying and inventing simple, low-cost appliances needed by the middle-class people. He is convinced that generation of energy using non-conventional, renewable sources will hold the key in future, when demand for energy will increase. Satyanarayana hails from Vishakapatnam in Andhra Pradesh. During initial stages of life he had to struggle a lot, both socially as well as economically, to obtain a decent education. Now that, he has found a private job and he is economically better off than in the past, his enthusiasm and ambition to invent useful methods of generating and conserving energy have intensified.



Door No. 34-13-1, Saali Veedhi,
Gnanpuram,
District: Visakhapattnam - 530004,
Andhra Pradesh.
Phone: 089-524041.

National Innovation Foundation

National Award, Second
Utilities and General Machineries: Handy auto air kick pump for two wheeler

Shri Arvindbhai R. Patel

Handy auto air kick pump for two wheeler

Imagine a burst tyre in a two-wheeler when the nearest repair shop is miles away. One has no choice but to drag the scooter or transport it in some other vehicle. Arvindbhai has faced this problem many a times. The idea of finding a solution to his problem came to him in 1985. He prepared the first prototype of an air kick pump within one and a half months, but that was without a pressure gauge. After that the innovation went through a series of improvements and the present prototype was developed.

The inexpensive device developed for inflating tyres of two-wheelers, uses the built-in kick-start mechanism of the vehicle. The compression of air obtained while cranking the cylinder of the engine is transferred to the tube with the help of this device. Applying gentle strokes to the kick of scooter/ motorbike, after unscrewing the spark plug and keeping the petrol cock closed expels residual petrol inside the carburetor. Then the adaptor of the device is screwed in the spark-plug hole while the other end is clamped onto the tyre valve. Applying a few kicks inflates the tyre. An

Arvindbhai (46 years), was born in Vanch, a village 10 km from Ahmedabad. He is the youngest among three brothers and three sisters. He has one hectare of land. None of his family members had any formal education. After completing school, he tried to enroll for a course in commerce, but the medium of education being english, he couldn't cope with it and discontinued it. He then joined a course in horology (watch and clock mechanism) at Industrial Training Institute. Even this he could not continue and finally he joined an automobile garage in Ahmedabad. He learnt practical skills of auto repairs for two years at this place.

In 1980, he got an opportunity to travel to Saudi Arabia. The experience in Saudi Arabia was quite valuable as he worked on the latest models of automobiles there. When Arvindbhai finally returned back to India in 1984, they settled down in his native village and lived there till 1993. Arvindbhai's wife Jaishree is a BA B.Ed, MA and works as a schoolteacher. They have a son (14 years) and a daughter (12 years), who also seem to have been bitten by the

92, Pragati Park-2,
B/h Dhruv High School,
Maninagar (East),
Ahmedabad - 380 008, Gujarat

Scout: SRISTI, Gujarat

on-line pressure gauge indicates the tyre pressure before, during and after every stroke. When desired tyre pressure is reached, the device is removed and the spark plug screwed back and connected. This would be particularly useful in motorcycles, in which carrying a spare wheel is cumbersome.

The innovation has already been listed among the top ten by NRDC and was also considered for an award in the year 1998. The innovation has undergone laboratory tests and recently this technology has been transferred through GIAN (West) on all India basis to M/s Janak Enterprises. During the journey of the innovation, the innovator had constantly been motivated by his family and also by the financial and technical support by organizations like GEDA, GIAN, SRISTI and NIF.

innovation bug of Arvindbhai. They too participate in the discussion on innovations.

At first, the innovator's spouse thought him to be over enthusiastic and would often ask him to start with a new job and leave the work on innovations as it did not earn him good money. But her views regarding her husband's zeal for innovation changed once he got recognition from National Research Development Corporation and GIAN, Ahmedabad. She says of her husband, "when he gets an idea, nothing can distract him till the idea becomes a reality. He always wants to do something different, what no one has ever done. He is always found at home working on his products. Earlier, neighbours thought that he was up to nothing; now they often inquire what's up. Particularly, when they see something unusual in our courtyard."

National Innovation Foundation

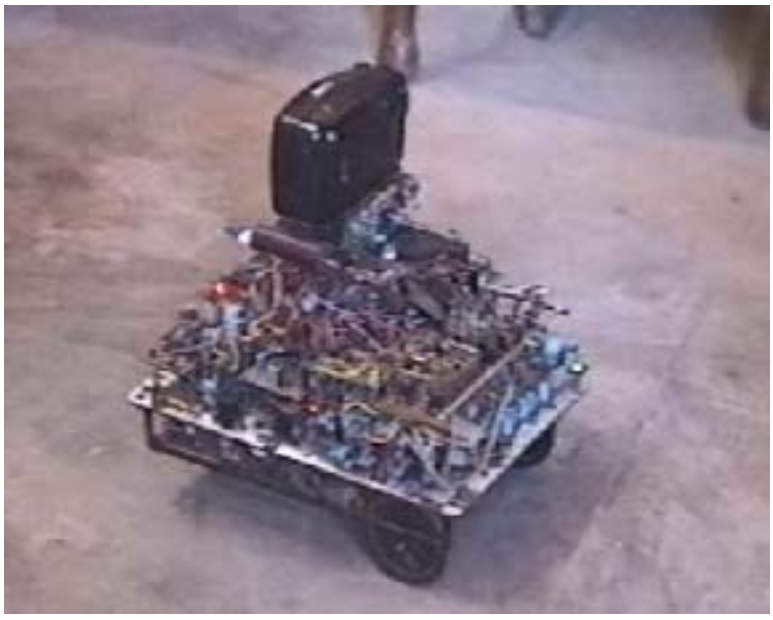
National Award, Second
Utilities and General Machineries: Electronic robot

Shri Prem Singh Saini

Electronic robot

The robot designed by Prem Singh can be guided by the modified remote control used for televisions. It can recognize the obstacles in its way and move in the desired direction through a visible light sensor. It can be adapted to take photographs with a camera attached to it. Due to its reach in some of the humanly inaccessible areas, it could help in mines, locating survivors in fallen buildings as well in defense. The robot has 40 ICs (integrated circuits), more than two hundred transistors and 900 resistors apart from other components. It also has 10 wheels, 5 motors, 6-volt battery and a few sensors.

The robot is also able to work as a fire alarm and indicate humidity levels. It also has a small device to launch a missile or a bomb for defense purposes. In addition, he has thought about ideas of giving automatic signal to the trains on a single track coming closer to each other within a specified distance, so as to avoid accidents.



Shri Prem Singh Saini (25 years), has studied upto eight standard. Since his childhood, he was not interested in the conventional education, but was very much interested in playing with electronic components. He bought old electronic magazines and books and started learning about circuits and applying electronics to different uses. He wrote to major laboratories within India as well as abroad. He got encouraging letter from US universities but often met with a silence within the country. However, he has not given up despite all the frustrations. Inspired by the pathfinder vehicle in space, he thought of making a robot. His interest in this field led to the innovation of an 'electronic robot'. Despite his family's low income and bad economical conditions he developed this electronic robot, which is the product of four years of his unrelenting effort. He claims that he can design better robot than this, but lacks the means to do so.

VPO – Pasiala,
District: Ambala,
Haryana
Scout: SRISTI GYAN KENDRA,
Uttaranchal

National Innovation Foundation

National Award, Third
Utilities and General Machineries: Safety device to prevent damage to the motor of the electric pump

Shri Bharat Shrirang Kamble

Safety device to prevent damage to the motor of the electric pump

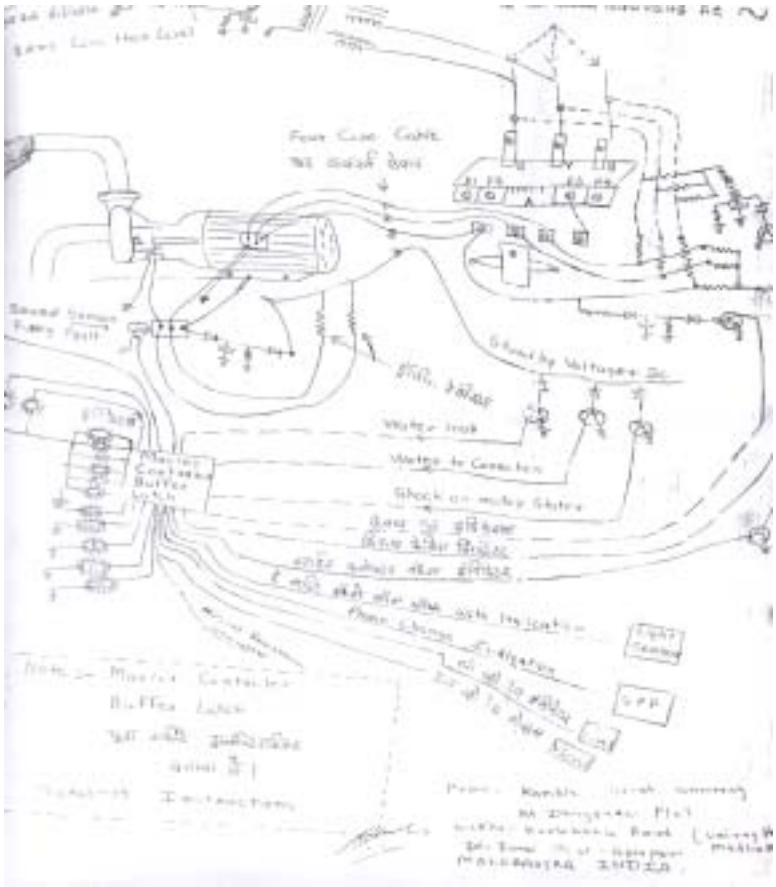
Excessive voltage fluctuation in electric supply is the curse that most of the rural people have to live with. Poor quality of the electric supply often leads to frequent or premature burn out of the coils of motors. None of the devices currently available in the market, such as single-phase preventors, earth-leakage circuit breakers, thermal relays, auto-start current regulators, overload-prevention relays etc., can avert the possibility of motor burn out completely.

The electronic circuit designed by Kamble attempts to provide a total protection to the motor as far as possible within a limited budget. It is specifically targeted at the motors meant for powering water pumps for agricultural applications. The circuit switches off the motor when any of the functional parameters gives rise to the possibility of burn out of the field coils. Some of the components used in the circuit are single-phase preventor, current sensor, overload timer, temperature sensor, voltage level sensor, day/night system, etc. Miniature pilot lamps light up to indicate the exact reason

Bharat Shrirang Kamble (48 years), is a talented electrician belonging to a poor family. He is a victim of polio and became physically handicapped at an early age. He has been interested in the study of physics since his childhood. He discontinued formal education after the tenth standard, but continued acquiring scientific knowledge through experimentation. His father worked as a driver and supported the quest of his polio-afflicted son by providing financial support to acquire items for experimentation. He gradually converted his hobby of experimenting with electronic gadgets into a profession and started repairing household gadgets. He became expert in repairing radio receivers. His workmanship was way ahead of his competitors. This knowledge about radio circuits gave him the confidence to proceed with other electronic circuits. He was ebbed on by local farmers to work on motor-protection circuits. Burn out of the field coils of electric motors was a long-standing problem of the local farmers. It was often due to excessive fluctuation in the voltage of the electric supply. Solutions available in the market were not effective enough. Frequent motor-burn out, has ruined economy of many a farmers because it often meant loss of the year's crop (if mishap happens at a critical crop growth stage).

Dhaygude plot, Sakhar karkhana Road, Vairag Barshi, District: Solapur, Maharashtra

for which the supply to a motor is tripped. By eliminating the particular fault, or by waiting till the fault automatically gets eliminated before restarting the motor, it is possible to eliminate motor burn out. Many farmers who have used the device and followed the instructions properly, have not faced problem of breakdown of their electric pump over past four or five years. The device can incorporate a log to record the operation of the pump and can help in regulating electricity use during periods of rationing. There are plans to introduce remote-control facility to the system so that an electrically operated pump can be controlled, sitting at home at a distance of even 10 km.



After several trials, he could arrive at the appropriate parameters and solved this problem. As the news spread, people started pouring in demanding the new gadget. Most of them were marginal farmers who could not afford to pay the full cost of the components going into the circuit. Consequently, the innovation has proved to be an economic burden to him but he has continued helping the people.

His wife is naturally unhappy with the state of affairs. She believes that it is more important to earn money and support the family; they have eight mouths to feed. Their elder son has had to discontinue the school and do odd jobs to help the family. Looking at their plight, one of his friends in the village Shri Dadarao Jungle Guruji' offered him a room which he had planned to use as a toilet. He was the first farmer who had recognised the talent of Mr. Kamble and assigned him the challenging job. Kamble has established his small electrical shop in the room.

He hopes that he would one day be able to convert his innovative circuit into wealth with the help of some philanthropic organization. Once this fructifies, he wants to accomplish two more of his dreams. One is the 'radar system' and the other is a 'raingun'. Kamble remains a good example of hope and enthusiasm that the spirit of innovation can bring to an economically poor and physically challenged person. GIAN (West) is taking up his technology for patenting and value addition.

National Award, Second
Livestock Management: Remedies for various veterinary diseases

Shri Rehmat Khan Pir Khan Solanki

Remedies for various veterinary diseases

Rehmatbhai has a very large repertoire of treatments. He often writes the prescription for various ailments so that people can make medicines on their own and use this knowledge for future. In that way, he shares his knowledge freely. The fact that people still come to him indicates the respect he commands for diagnosis as well as dispensing medicines. There have been times when people took him on a vehicle to get their animal treated and he had to come back walking from the far off village. He does not grudge such behaviour and feels that his duty is to serve the animals. Many villagers feel that he understands the pain of their animals better than they themselves do.

Examples of his treatment:
Anestrus in Cattle: About 200 g of 'bhilama' seeds (*Semecarpus anacardium*) is mixed with cattle feed and given to affected animals. Care has to be taken that the powder does not spill over any part of the body of the cattle lest it causes irritation or odema. In addition to above

Life of Rehmat Khan Pir Khan Solanki (75 years), better known as 'Goval Bapa' has been devoted to the cause of treating animals. The innovator earns his livelihood by grazing cattle. He has two sons, the elder son works as a labourer while the other provides a helping hand in all his activities. He has cured many complicated cases that the formal veterinary doctors have failed to cure. He does not ask for money from anybody and is happy with whatever he receives. He earns barely enough for the well being of his family and is unable to save anything. But he never regrets it and is quite happy with his life. He has been awarded the SRISTI Samman in 1995 after which the gram panchayat of his village also awarded him. The local community has contributed by conserving the biodiversity which Rehmatbhai draws upon while dispensing medicines. He has drawn upon the traditional knowledge reserve of animal healing practices and also modified a few treatments using his own ingenuity. In few cases his knowledge is found to be quite unique. He has attended several shodh yatras organized by Honey Bee network and shared his knowledge with people along the way during the journey.

Village: Char, Taluka: Keshod, District: Junagadh, Gujarat

Scout: SRISTI, Gujarat

treatment, he also recommends 100 g of pigeon excreta or two eggs mixed with cattle feed once or twice. Sometimes 100 ml of fresh and pure groundnut oil may also help.

Skin disease in cattle: 150 g pieces of roots of 'desi boradi' (*Zizyphus mauritiana*) is boiled in 500 ml of water and filtered. The filtrate is allowed to cool down and applied thoroughly on the affected body part. The treatment is repeated twice a day for three or four days.

Yoke gall in cattle: About 200 g roots of 'zipto' (*Triumfetta rhomboidea*) are boiled in water and allowed to cool. The affected part is washed with luke warm water followed by washing with the above solution. The treatment is repeated twice a day for two days. The wound begins to cure after two days.

National Innovation Foundation

National Award, Second
Livestock Management: Herbal cure for diarrhoea, conjunctivitis and other ailments of livestock

Shri Devkaranbhai Rabari

Herbal cure for diarrhoea, conjunctivitis and other ailments of livestock

Retention of Placenta: one kg leaves of *Madhuca indica* or tender leaves of bamboo (*Bambusa arundinacea)* are fed immediately after parturition and the placenta will drop within two hours.

Diahorrea: Juice is extracted from two kg bark of 'asitro' (*Bauhinia racemosa)* mixed with one-liter water and then it is filtered. The filtrate is administered orally once or twice a day for two days.

Conjunctivitis: Approximately 50 g bark of 'ingoriao' (*Balanites roxburghii*) is rubbed against hard stone and mixed with water and applied topically over the eyelid two or three times a day for 8 to 10 days. Care should be taken not to disturb the iris.

Prolapse of Womb: Dough of one Kg fine flour of 'adad' (black gram - *Vigna radiata*) is fed in the early morning for ten days. This is believed to solve the problem.

Arthritis: Roots of 'shatavari' (*Asparagus spp.)* are cut in small pieces and fed once a day for three to four days.

Devkaranbhai (70 years), is a highly skilled herbal healer especially concerning parturition. As a cattle gynaecologist and obstetrician he is reputed to handle cases of difficult calving due to abnormal foetal position of the calf in the uterus. He is also quite proficient in the treatment of bloat, urinary tract infections and diarrhoea with great expertise. He took to grazing cattle as a whole time occupation at a young age. It was then that he began to understand the behaviour of cattle and the various diseases that ail them. His father taught him all he knew about various indigenous medications to bring relief to ailing animals. Devkaranbhai learned several recipes and the process of preparation of important medications from this early training. When he became well versed in making the medicines himself, he took training in the other aspects of veterinary practice and became a full-fledged *pashu vaid*. Devkaranbhai has been a *pashu vaid* for the last 30 years.
He handles at least 100 parturition cases of buffaloes every year and has achieved 'normal' deliveries in more than 500 cases that had been diagnosed for abnormal foetal position by qualified veterinary doctors. He has five sons and two daughters. One of the sons, Laxmanbhai, has successfully picked up his father's skills. Everyone in the family believes that service to ailing animals, which unable to express their pain suffer mutely, is among the noblest of the professions.

Village: Mahudi Taluka: Megraj
District: Sabarkanatha, Gujarat

Scout: Dilip Koradia

National Innovation Foundation

National Award, Third
Livestock Management: Treatment for various poultry diseases

Shri S. P. Balu

Treatment for various poultry diseases

1. Ranikhet Disease (Newcastle Disease)
Symptoms
Diarrhoea with watery and green faeces; foul odor; discharge from the nose; coughing and sneezing; swelling of the head; head and neck twisted to one side; drooping wings, dragging legs; sleepiness; full, distended drop; convulsions and paralysis; death. Whenever such a disease occurs, the affected chickens are to be removed and kept separately. Shri Balu combines leaves of 'veliparuthi' (*Pergularia daemia*), leaves of 'kuppaimeni' (*Acalypha indica*), bark of neem (*Azadirachta indica*) and ark of 'velvelam' (*Acacia leucophloea*) to prepare the medicine. All the above ingredients are ground well and mixed with ragi flour and given to birds as feed. He has treated more than 100 birds over the last two years successfully.

2. Nutritious Feed for Turkey Chicks:- He has developed a feed for feeding young chicks to have quick body weight gain. The feed consists mainly of seedlings of black gram (*Vigna mungo*). Blackgram is sown in the nursery bed and three days old seedlings are utilized. The young chicks are allowed in the field to feed on the seedlings. In addition, for 15 days he feeds them omelet (egg roast) mixed with the leaves of adathoda (*Adathoda zeylanica*) and poduthalai (*Lippia nodiflora*).

3. To Prevent Deleterious Effects of Intake of Aflatoxin Infection:- If the feed gets contaminated with aflatoxin fungus, the following prescription is proposed. This is mainly suggested to prevent any side effect due to aflatoxin infected feed intake. He powders the roots of 'nannari' (*Hemidesmis indicus*) and 'vannan avuri' *(Indigofera tinctoria*), leaves of 'Veliparuthi' *(Pergularia daemia*), seeds of Moringa *(Moringa oleifera*) and garlic and administers a small quantity of this mixture along with the feed.

Shri Balu (35 years), has been maintaining a poultry farm for the last ten years. He had developed an innovative turkey incubator. He has promoted a small Animal Owner's association to extend animal health services and also for marketing milk.

Kulamangalam,
District: Pudhukottai, Tamil Nadu

Scout: SEVA, Tamil Nadu

National Innovation Foundation

National Award, Third
Agricultural Practice: Herbal formulation to control pests

Shri K. M. Chellamuthu

Herbal formulation to control pests

A year and a half ago Chellamuthu, experienced frequent headaches and nausea after spraying the chemical pesticides. He was admitted to a nearby hospital in Kodumudi town run by Dr. Natarajan, a civil surgeon. The doctor advised him to try a herbal formula developed by an NGO called "Nature Trust" in Pudukottai. This NGO has been advising farmers to undertake organic practices including spraying herbal pesticide. Shri Chellamuthu immediately accepted that idea and started preparing herbal formula.

Herbal pesticide for controlling nematode infestation in turmeric crop

For controlling nematode infestation in turmeric crop, 250 g ginger, 250 g chilli, one kg 'nochi' leaves (*Vitex negundo*), 500 g garlic, leaves of 'sotrukatralai' (*Aloe vera*), one kg neem seeds and one kg *Clerodendron inerme* are pounded well. This is mixed with 150-litre water and sprayed on 120th day of planting. The above-mentioned quantity is sufficient for one acre-cropped area.

Herbal Pesticide for Paddy

One kg each of 'nochi' (*Vitex negunda*), 'peenari changu' (*Clerodendrum inerme*), 'chothukathalai' (*Aloe vera*), Neem seeds, are pounded well by adding little water and then diluted in 100 litre of water for spraying one acre. Initially, many farmers were not interested in trying out his formula. So he secretly tested this formula on his uncle's field. After three days when his uncle noticed that the crop was good, Shri Chellamuthu revealed that he had actually sprayed herbal pesticide on that crop. Therefore his uncle gave him permission for spraying the herbal pesticide in another three acres of his fields.

Later on, many farmers came forward to accept this herbal pesticide. For paddy crop, he sprays the pesticide only

Shri K. M. Chellamuthu (36 years), is an agriculture labourer who lost his land due to family disputes. He lives in a village called Karukkampalayam This area is known for intensive farming. It is situated in the Bhavani riverbed area. Farmers grow crops like turmeric, onion and sugarcane, coconut and jasmine. There is a great demand of pesticides in this area especially during the months of October through December. Over a decade, he had been involved in spraying chemical pesticide by using a power sprayer but lately he has shifted towards herbal pesticide.

Karukkampalayam, Post: Oonchalur, Via: Kodumudi, District: Erode, Tamil Nadu

Scout: SEVA, Tamil Nadu

once after 25 -30 days of planting. It is reported to take care of all sorts of pest and disease problem. He charges Rs 20 per spray tank (Rs 12 towards the cost of herbal pesticide preparation and Rs 8 as rent for spraying operation). Since then, the demand for herbal pesticide has been growing in neighbouring 10-20 villages. In order to meet their demand, he has purchased a wet grinder (power operated) and uses it exclusively for grinding herbal ingredients. However, when the capacity of the wet grinder is not sufficient, he utilizes the rotary extractor/machine for grinding his herbal ingredients in nearby villages by paying a rent of Rs 50 per hour. The mixture is kept overnight before it is used for spraying.

Herbal formula for control of Eriophyid mite: He has developed a new formula for control of coconut Eriophyid mite. Due to the incidence of the mite, the nuts shrink and become small in size thus affecting their marketability. Further minute cracks and dryness is found on the husk, which makes the husking operation difficult. Consequently the coconut growers incur significant loss.

He has also tested this formulation successfully in the garden of some farmers in his village having about 2000 trees. The herbal ingredients include one kg each, leaves of Custard apple (*Annona squomosa*), turmeric rhizome, 'peenari changu' (*Clerodendrum inerme*), 'chothukatralai' (*Aloe vera*), 'nochi (*Vitex negundo*), Neem kernel (*Azadirachta indica*) and *Calotropis sp.*. These ingredients are pounded well and made into a paste by adding sufficient water and about five litre of juice is extracted. The juice is further diluted with another 15 litre of water to make it 20 litre. This herbal extract is administered into the crown region at the rate of two litre per palm tree after the harvest of nuts. This treatment can be repeated once in two months during the harvesting period. He charges Rs.10/- per coconut tree for applying this treatment.

National Innovation Foundation

National Award, Third
Agricultural Practice: Use of tamarind and lemon for pest control

Shri Banidan Mavaljee Gadhvi

Use of tamarind and lemon for pest control

The idea of using tamarind and lemon juice mixed with water occurred to him when he thought that even human beings find it difficult to bear the sour taste of lemon and tamarind. Then why not test it on insects? And he succeded in his effort ! The method involves mixing 500 ml juice of tamarind with 500 ml juice of lemon in 15 litres of water. This mixture is then sprinkled over the infested crop in 0.25 ha. He and other fellow farmers report almost complete control of this pest in castor crop. Looking at his experience, other farmers also started following his method to control the pest. An individual innovation may eventually become the traditional knowledge in due course.

Banidanbhai (46 years), has a small family comprising his mother and himself. There are 15 families of Gadhvi community, in the village. His nephew helps him in farming. Several years ago, Banidanbhai faced the problem of hairy caterpillar in castor crop. He developed an herbal extract to solve this problem which he still finds effective.

At: Aghatna Muvada
Post: Bhailabhai kui
Taluka: Kapadwanj
District: Kheda, Gujarat
Ph.No.: 276828/29/30

Scout: SRISTI, Gujarat

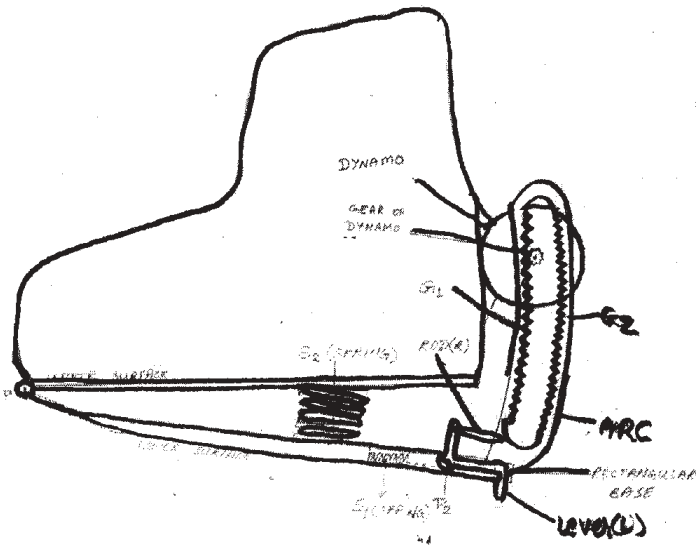
National Innovation Foundation

National Award, Third
Idea: Battery charging shoes

Shri Rajesh Ranjan

Battery charging shoes

In the lower layer of the shoe, a dynamo and a gear could be attached. When the shoe would be pressed against the ground, the rotor of the dynamo would rotate due to the weight of the body. Hence, electricity would be generated and the rechargeable batteries would get charged. There was no product of this kind in the country. However, PCT application 0221955 (October, 2002) resembles the concept but not the mechanism. The fact that there is only one such prior reference, highlights the importance of the idea and proposed mechanism.



Rajesh is an unemployed graduate. He has recently been selected for the post of Sub Inspector in BSF. He had been attracted towards machines since his childhood. He has many imaginative ideas to make new machines, but lacks technical education and resources. Family reaction to his work was also not very encouraging and it depressed him a lot. He received constant motivation, encouragement and valuable suggestions from his cousin Shailesh and his biology tutor Mr. A. K. Singh.

Qr. No. B-92, Sec-1,
Post: Dhurwa,
District: Ranchi- 834 004
Jharkhand

National Innovation Foundation

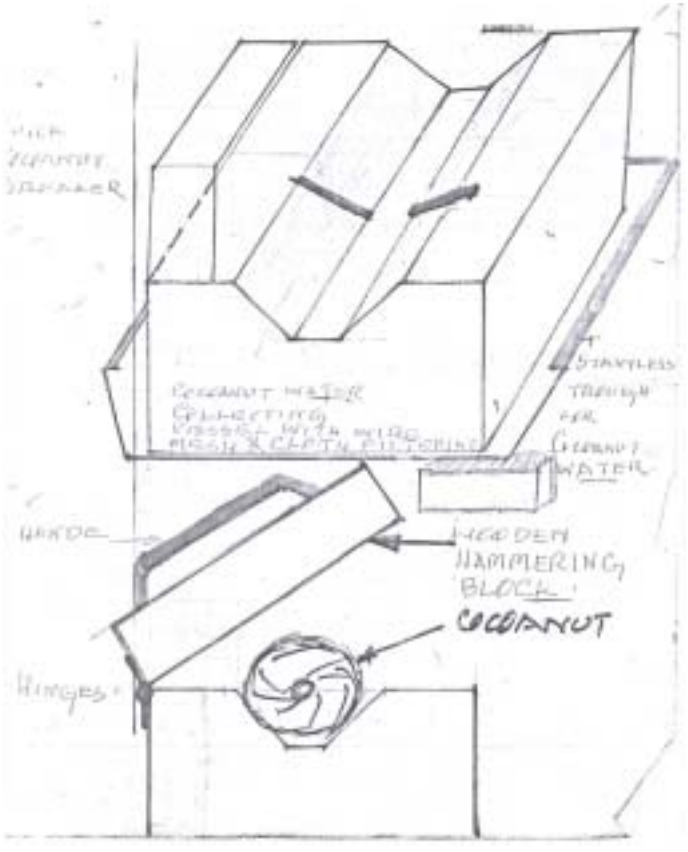
National Award Third
Idea: Coconut breaker and water collector, cello tape- end finder and various other ideas of day to day utility

Shri M. S. V. Naidu

Coconut breaker and water collector, cello tape-end finder and various other ideas of day to day utility

Few of the innovative ideas that are worth exploring are, Coconut breaking machine, searching a cello tape end and a device to repair the damaged punch holes in files.

Coconut breaker and Water collector
The innovator suggested a very simple and elegant design of the coconut breaker, which overcomes some of the problems of the conventional method. The innovator has prepared a prototype of the design. It consists of a wooden box, which has a semi-spherical cavity in it on which the



An innovative mind has no boundaries that can stop it from coming up with new ideas. Similar is the case of Shri M.S.V.Naidu who even after retirement has not stopped innovating new things. Retired from West Coast Paper Mills in Karnataka, Mr. Naidu has 32 innovative ideas to his credit. The journey of innovations has been very difficult for the innovator, as he had to face several financial constraints. His spouse thought that he was wasting money and that nobody would appreciate his work. He had to face lot of difficulty in making prototypes and arranging for various testing facilities. But still this could not stop him from innovating things.

273,27th Cross,11th Main,
Banashankari II Stage,
Bangalore - 560 070, Karnataka

coconut has to be placed. Inside this cavity resides a hard thick metal piece which has a blade embedded in the middle and whose level could be changed with the help of screws. Since the breaking of the coconut takes place in the box itself, the water gets collected in the box. It can be taken out by providing a small outlet pipe. It is a simple idea for a recurrent widespread problem.

Cello tape-end finder

Almost each one of us has spent frustrating moments searching for an end of the cello tape. And it's not a one-time problem. It happens again and again. But still we don't think anything about it. Mr Naidu has tried to find a solution to this. A small bead is provided on the cello tape. The bead is located on the roller by the nylon thread as shown in the sketch. It is better to provide it in the manufacturing stage itself. The device is extremely simple and highly useful.

Yet another problem. Often filed paper with punched holes gets torn, when used frequently. Sticking a cello tape of 5 mm diameter at the punched holes can solve this problem. One can manufacture cello tapes with holes of this size at prespecified intervals.

These are just a few ideas that have strong potential and can be converted into product. Thus the innovator's zeal to innovate can solve many problems.

National Award, Second
Community Knowledge - Collective community efforts to use herbal extract for preventive health care

Titoi Nadarva Utsav Samiti

Collective community efforts to use herbal extract for preventive health care

The Village Titoi is a multicaste village having Choudhary, Gamit, Vasava and Harijan communities. The main occupations are farming and cattle rearing. The crops cultivated are sorghum, pigeon pea, maize, black gram and paddy. The village has post office, primary school,veterinary clinic, milk cooperative and a plant- nursery. Literacy level is high with people having studied up to graduation and post-graduation level.

The villagers select one day after the first rainfall before '*divasa,*' a particular day in Gujarati calendar for the performance of 'Nadervo'. The day is selected in such a way that the festival does not hinder the sowing activities, hence it varies according to rain. The entire village takes part in this institution and abides with its rules. On the selected day of the festival, the herbal experts, elders and youth of the village go to the nearby forest to collect one hundred and twenty five herbs. One important point to note

Village:Titoi,
Taluka. Mandavi,
District Surat

here is that collection of herbs is a collective and community work. The forest near the village does not have all the herbs needed. Therefore, herbs are also collected from the forests of nearby villages like Jetpur, Kavadiya, Karitha and Sangalvadi. While collecting the herbs nobody speaks the name of the plants and hence all the names are not known to the everybody though they can identify the plant by its appearance.

On the next day, '*sag*'(*Tectona grandis*) leaves are spread and the collected herbs are placed on them. The herbs are then ground and kept in a large vessel. It is customary for each household to bring a litre of water and pour it in the vessel having the ground herbs. The village priest stirs the mixture very well, which is then filtered. Each household gets one litre of the filtrate with some part of the residue. The male member of the family brings this filtrate and sprinkles it in the entire house, in the cattle shed and on the cattle. Women are not allowed to touch this filtrate or take part in this whole ritual. It is believed that sprinkling of this concoction keeps ailments like fever, common cold, and all contagious diseases away. It is also claimed to keep the livestock healthy and fit.

Another festival known as 'Paki bandhi' is celebrated on the Sunday or Wednesday before 'raksha bandhan'- a national festival generally occurring in the month of August. On this day, a 'toran'/ festoon (kind of a door hanging) made of 'asopalav' *(Poliyalthia longifolia)* leaves and coconut fruits is tied between two poles erected on the either side of the road leading to the entrance of the village. Also hung with the 'toran' is, a two feet long hollow bamboo stick filled with the residue of the filtrate and the holy water brought from a temple in a nearby village 'dhoran Pardi'. The priest of temple in 'dhoran Pardi' gives this water to perform the ritual. A procession of all the villagers with their domesticated animals passes under the 'toran'. This procession finally stops at the nearby tree where memorials of the ancestors of the villagers have been made. There they pay homage to the forest for providing these herbs by burning incense sticks and offering coconut fruits. No food is prepared in the village till the procession is completed. From this day onwards the people stop the consumption of non- vegetarian food, garlic, onion and liquor for three to four days. No outsiders are allowed to pass under the 'toran' on this day. Even animals like cats and dogs are prevented from passing under the 'toran'. Each household contributes towards the expenditure made on collecting the herbs from the forest.

The significance of these cultural institutions in reinforcing conservation ethics has to be appreciated. While some of the ritual might not have any significant technological effect, these may cement the ties of the people with nature.

Challenge Ahead

The youth of this village is eager and enthusiastic to carry on this health institution. But the elders and the herbal experts of the village do not reveal all the names and uses of the plants. In spite of that, they are able to identify many plants and their uses owing to the experience of so many years. They say that they are committed to keep this institution alive, which shall go on with mutual cooperation. The example set by this village by celebrating this institution of health so religiously is worth emulating by other villages too. Probably by not sharing the names of the herbs, the elders are trying to maintain their control over knowledge and perhaps also avoid over exploitation of the resources. However, village elders believe that the effectiveness of the herbs will reduce if they reveal the name and uses of plants.

The names of the plants which are well known among the 125 species used in this institution are: 'gandhati' (*Lantana camara*), khakhra' (*Butea monosperma*), 'limda' (*Azadirachta indica*), 'khajur' (*Phoenix sylvestris*), 'timru'(*Diosypros melanoxylon*), 'danto' (*Amaranthus gangeticus*), 'amarvel' (*Cuscuta spp*.), 'sag' (*Tectona grandis*), 'kuvado' (*Leucas lavandulefolia*), 'gudlu' (*Rhamnus triquetra*), 'khai' (*Acacia catechu*), 'biyo' (*Pterocarpus marsupium*), 'thor' (*Euphorbia spp.),* 'aakdo' (*Calotropis spp.),* 'ambda' (*Emblica officinalis*), 'baman jali' (*Premna herbacea*), 'panipoth' (*Terwia nudiflora*), 'pai' (*Dalbergia paniculata*), 'samlo' (*Bombax malabaricum*), 'bili' (*Aegle marmelosa*), 'anuchadi' (*Annona squamosa*), 'ratanjyot' (*Jatropha curcas*), 'kamboi' (*Breynia retusa*), 'royani' (*Soymida febrifuga*), 'ragatrohido' (*Tecomella undulata*), 'nilgiri' (*Eucalyptus spp.)*

National Innovation Foundation

State Award, Meghalaya
Integrated Pest Management: Value addition to traditional knowledge for pest control in paddy

Shri K. D. Kharkongor

Value addition to traditional knowledge for pest control in paddy

Rice bug *(Leptocorisa sp.)* is a serious pest of paddy crop. The pest attacks the standing paddy crop during the milky stage period of 10 to 15 days. Loss by this pest may go up to 70-80 per cent if left uncontrolled. It is encountered both under upland and lowland conditions in Meghalaya.

Crabs can damage the bunds by burrowing holes, thus leading to drainage of water and effecting the level of standing water in the paddy field. In fishponds also, crabs are known to cause similar damage.

Spraying or dusting of chemical insecticides before flowering usually controls the pest. But chemical pesticides also kill natural predators apart from causing other adverse side effects. There exists an age-old traditional method practiced by the farmers of Meghalaya for controlling this pest. The farmers hang dead crabs in the fields. Foul smell from these crabs attracts the pest of paddy. The bugs tend to congregate to suck the fluid and the soft rotten flesh. These bugs are

Shri K. D. Kharkongor (43 years), is an assistant agronomist in the District Agriculture Office, Ri- Bhoi district, Nongpoh. The idea for the innovation flashed into his mind when the use of Baffle traps was introduced as one of the tools of integrated pest management. The purpose was to blend the modern technology of using Baffle Traps with the indigenous practice of using dead crabs to attract insect pests from attacking standing crops. Since 'Pheromone lure' are expensive, he thought of an alternative locally available material to replace the pheromone lure. He was aware of the widely used traditional technology of using dead crabs to attract pest of paddy crop. The encouragement and suggestion of his wife and son were very helpful all through his experiment. He says that the success of the innovation has inspired him to go further for exploring more innovations based on traditional technologies. Criticism is one thing that he openly welcomes but he despises humiliation.

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then collected in a container and are destroyed before they start migrating back to the rice plants. One drawback of this method is that it calls for a constant watch. The insects need to be caught while they are feeding and many of them manage to escape.

The innovator has developed a new technique for trapping rice bugs by blending traditional knowledge of *'Khasis'* and 'heli catch technique' developed by a private company. He has thus come up with the idea of using Baffle Traps with dead crabs to attract rice bugs instead of 'Pheromone lures'.

He first experimented in the field of Shri B. Ranee of Mawtnum village in the year 1999-2000. Dead crabs could attract both male and female rice bugs. He validated the method again in July, 2000, using four traps in the field of Shri Jiton Lyngdoh of Marngar village and six traps in the field of Shri Rishon Rympei of Umta village.

One needs minimum of four traps in one field and maximum of seven to eight traps in a field with heavy infestation. He also experimented by using intestines of chicken/goat

and other materials emanating similar foul smell, in place of crab and got good success.

Using this technique, an average of 170-180 bugs per trap could be eliminated. Besides, other insects like houseflies, flying cockroaches etc., are also caught. When four dead crabs are placed in each trap, a total number of 900-1000 bugs were recorded in each trap during the entire milky stage to the grain formation stage. However, the skeletal portion left of the dried crabs are required to be replaced by fresh dead crabs after two to three days.

Government of Meghalaya has started propagating this technique within the state as a cost-effective method to trap rice bug. With the help of an NGO, 'Ri-Bhoi Area Welfare Association', Shri Kharkongor has provided training to approximately 3000 farmers of the state.

This technique has become one of the components of Integrated Pest Management (IPM) for rice bug in the state.

National Innovation Foundation

State Award, Gujarat
Utilities and General Machineries: Multiple innovations for everyday problems: nursery bag filler, gum scrapper, sprayer etc.

Shri Khimjibhai Kanadia

Multiple innovations for everyday problems: nursery bag filler, gum scrapper, sprayer etc.

A couple of years ago, Khimjibhai got an assignment from the forest department to raise a nursery of 10,000 seedlings in Gadha. The work involved filling small polyethylene or polypropylene bags with soil, which proved to be quite a tedious job. When the work began, he noticed that the mouth of the plastic bags often closed down while these were being manually filled and the soil fell outside. The result was that the labourers were not able to fill a bag with a single scoop of soil, as it should have been. Using a scoop or hand fills several times to fill one bag-wasted time and the output was poor. Khimjibhai felt the need to speed up the process drastically. He watched the operation meticulously and came out with a gadget to provide a simple solution. *Kittanal* was born as a result.

Khimjibhai demonstrated the *Kittanal* to the District Forest Officer of Himmatnagar, who placed an order for 200 pieces right away. Gujarat Grassroots Innovation Augmentation Network (GIAN) sent a sample of the *Kittanal* to Ballarpur

Khimjibhai Kanadia (62 years), a retired schoolteacher, has more than 50 ideas and innovations to his credit, all of which have potential to reduce drudgery and improve work efficiency. Whenever he makes it big by successfully implementing any of his own several ideas, the innovator wants to establish a Trust where innovators would be enabled to transform their ideas into products without facing any financial constraints.

Khimjibhai Kanadia lost his parents at a very young age. When he was eight years old, his parents died. He has two elder sisters and a younger brother. His uncle brought him up and got him educated up to middle school, after which he took up a job. He began studying for secondary school certificate (Class X) apart from helping out his uncle on the farm while performing well in the job. In 1962, he sat in the secondary school examination, he secured first place in the school examination. Continuing with part-time studies, he appeared for Primary Teachers' Certificate (PTC) examination in 1965. The certificate secured him the job of a teacher in 1967 in Dhuleta village, Idar

Village: Gadha, Via Vaktapur,
Taluka: Himmatnagar,
District: Sabarkantha, Gujarat

Scout: SRISTI, Gujarat

Industries Ltd, major player in paper-and-pulp industry, to get it evaluated. Manager—Raw Materials of the company said, "We do want such a device. *Kittanal* is more effective than the device currently used for filling polythene bags." BILT placed a trial order for 100 pieces. Self Employed Women's Association (SEWA) also felt that *Kittanal* could improve the earnings of the rural women who raise nurseries for the forest department and who are paid their wages on piece-rate basis.

In 1965, Khimjibhai had designed and developed a sprayer, which he used to sell under the name Kushal Sprayer. He had manufactured approx 200 units and sold them in adjacent villages before quitting about 18 years ago. Some of them are still in use.

In 1997, Khimjibhai came in contact with Society for Research and Initiatives for Sustainable Technology and Initiatives (SRISTI) and GIAN, which encouraged him to revive the project. GIAN arranged financial aid of Rs. 80,000 from Technopreneur Promotion Programme of DST as well as design inputs from National Institute of Design (NID) Ahmedabad. To initiate large-scale production, GIAN arranged a soft loan of Rs 2,20,000 from Technology Information Forecasting and Assessment Council (TIFAC) of DST. He set up a new workshop in 1999. This workshop presently has machines for drilling, hand moulding, cut-off, welding etc., used in the manufacture of the sprayer. Kushal sprayer was relaunched in the market in 1999. He could reach a taluka. In the meantime, he worked for a private organisation in Rajasthan, marketing handicrafts. Khimjibhai got married at the age of 15. As he and wife Shantaben found it difficult to make both ends meet from his meager income from the job, they opened a tailoring shop to supplement the family income. Despite having to struggle for long hours to eke out a living, Khimjibhai started a night school for promoting adult literacy in the village.

Khimjibhai concedes that his family members have contributed very significantly in turning his wild ideas into useful innovations. His wife Shantaben and their four sons have been as responsible as himself in fructifying his dreams. Shantaben accompanies him on all business missions. Khimjibhai is proud that she is aware of all the technical aspects of the innovations. Three of the four sons currently hold responsible government jobs. One son, Rajinikar, assists him fulltime to run the workshop and to market the Kushal sprayer, Kittanal and other devices.

production level of 300 units a month. Students of Indian Institute of Management (IIM), Ahmedabad designed a marketing strategy for the product. It received a favourable response in Gujarat particularly because of its low cost, just Rs 450. These sprayers were sold initially with a book containing 75 solutions of herbal pesticides based on farmer's innovations taken from Honey Bee database.

Khimjibhai received an award for the low-cost sprayer at the Science Fair held in village Vadali. He demonstrated his Kushal Sprayer at the SRISTI Shodh Sankal meeting and received orders on the spot for six units from farmers assembled there.

Since last year, Khimjibhai has stopped production of Kushal Sprayer in his workshop. He had no other choice as the main electric motor of the factory burnt down repeatedly, due to severe fluctuations in the voltage and irregular frequency of the electric supply. At present, he gets job work done elsewhere and assembles the sprayers in his workshop. He manufactures them only on confirmed orders.

Gum Scrapper
The innovator has developed a small apparatus to make process of scrapping gum from *Prosopis* tree simpler and safer. A saucer shaped plate along with sharp blade on the top of bamboo stick or a plastic pipe, is used which prevents the gum from falling on the ground. It prevents injury and adds to safety and increases the efficiency. The cost comes up to around Rs.15.

Paniharino Visamo (Water lifting aid for woman)
The innovator has devised a simple apparatus to ease burden of rural women carrying load on their head. This could be done with two extended rods supporting the circular disk that is put on the head to keep the vessel. There is no need for help from a third person for the transition. The load rests on shoulder instead of head, when needed.

National Innovation Foundation

State Award, Tamil Nadu
Herbal Drugs: Human Health Practices
Siddha medicine for leprosy and traditional knowledge documentation

Shri S. R. Muthusamy

Siddha medicine for leprosy and traditional knowledge documentation

Muthusamy read a couplet in 'Yogagnana Thirattu' about a salt which could help in alchemical work required for preparing the remedy for leprosy. After lots of hard work he was able to identify six different salts e.g. Sodium Carbonate, Silicon Nitrate, Copper Sulphate, Ammonium Carbonate, Calcium Carbonate and Sodium chloride. He discarded three salts out of six by trial and error process and finally learnt the art of using Cl (-), NO3 (+), SO4 (+) ions, which could help alchemical process to add potency to herbal preparations. He struggled for years together to standardize the protocol for combining these three salts and developed the 'Trine salt'.

Symptoms associated with various stages of the leprosy

Sri Muthusamy has formulated treatments for three distinct stages - initial, intermediate and advanced stages of leprosy. Appearance of yellow spots on the skin is the first sign of leprosy. The skin becomes hard at the spots and gradually

S. R. Muthusamy (70 years), is educated up to fourth standard. He has rich traditional knowledge about the uses of nearly 700 herbal plants. He has practically demonstrated the protocol for using 200 herbal drugs and is very good at the art of alchemy for the medicinal purpose. Every Saturday he addresses a group of traditional healers to share his experience and to sustain the knowledge for the posterity free of cost. At the age of four, he started learning by writing the alphabets in sand. The master happened to be a sound Siddha practitioner. So, the interest to know about plants was kindled in him naturally. When his master advised him to love leprosy patients on Gandhian lines, he retorted back as to why not remove leprosy itself and love all? The master replied that the cure was there in traditional systems of medicine and is about to become extinct because there are no supporters of this traditional knowledge. At the age of 13, he left his home and was wandering along with sages right up to the Himalayas. The Siddha literature attracted him and he dwelt upon it for months and years to decode the verses of Siddha books. He

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Scout: SEVA, Tamil Nadu

nodules grow. More spots appear around the first one and patches of horny layer develop. The skin loses sensation in the region. The intermediate stage is keratodermatitis or the inflammation with proliferation of the horny layer of the skin. The patches turn into abscesses all over the body. The extremities start wearing off as new cells fail to form to replace the dead cells of the skin. The advanced stage is reached if the patient continues to use his fingers, and to ambulate. The disease spreads from the outer skin to invade the cartilage. Fingers and toes disappear. Facial features are distorted. The tip of the nose wears off and the nose becomes flat and sets deep into the face. Lesions and sores appear and the patient is unable to ambulate. The formulations containing the triple-salt compound is administered to patients in each of the stages and is supplemented with herbal preparations.

Treatment associated with various stages of the leprosy; Initial stage:
Oral administration of Vilvanga Bhusbam - 100 mg. with ghee , once a day and Sivanar Vembu Sooranam prepared from leaves, flowers and tender shoots of indigo (*Indigofera tinctoria*) known as *sivanimba* in Sanskrit and *sivanar vembu* in Tamil - one g a day . The treatment is recommended for 30-60 days. The process to prepare Velvanga Bhasbam: Take 50 gm of lead, heat it till it melts. Pour the liquid lead into castor oil (250 ml). Allow it to solidify. Heat it and cool it. Repeat the process for seven times. This will purify the lead. Wash and clean this lead with a clean cloth. Cut it into small flat pieces/chips. Obtain saw dust from one foot diameter wood-piece of *Thespesia populnea* (L.) Sol. Place the lead chips in this saw dust. Cover it with 8 kg of rice husk. Ignite the saw dust and rice husk. After 3 days remove the ash and retain the lead-ash. Add 1 g of trisalt muppu to 10 g of lead-ash. Mix them with the help of mortar and pestle for three hours. Filter the dust with cloth. This is the 'vilvanga bhasbam'. Oral administration has cured 2112 leprosy patients so far.

There were several occasions when his wife was very unhappy with her husband for what she considered his wasteful practices and squandering of money on medicinal plants. She even threw one of the salt sedimentation out of the house. Mr Muthuswamy also threw the cash chest onto the street expressing frustration with constant demand of money. But now the initial anger has been replaced by reverence. One of his grandchildren, Sulochana has become a disciple of Muthuswamy. Mr SKM Maeilanantham extended some support for his R & D work on herbal plants. What seems to be a unique case, BSMS students are under him every year for training. He has been invited by universities and colleges to lecture on Siddha medicine. SKM health and mind welfare charity trust are manufacturing 220 products based on the recipes provided by Mr Muthuswamy. Dr Vadivel, Professor of Horticulture at Tamil Nadu Agriculture University has spent a great deal of time and energy in getting medicines properly documented and validated.

of 100 mg of Vilvanga bhasbam with ghee once daily is the recommended dose. Length of the treatment depends upon the condition/stage of leprosy.

Intermediate stage (to cure cutaneous afflictions related to keratodermatitis):
Oral administration of Velvanga Bhusbam - 100 mg twice a day in ghee and Rasagandhi prepared from 41 different ingredients - 850 g to be mixed with buttermilk and drunk in the morning. A fluid prepared from thornapple (*Datura stramonium)* called 'shivapriya' in Sanskrit and 'ummatta' in Tamil is prescribed for topical application over abscesses and sores. Stramonium is a narcotic, anti-spasmodic and anodyne and it avoids the sores from causing excessive pain. The treatment is to be continued till the wounds are completely cured, which may take about one year or more.

Advanced stage:
Oral administration of Velvanga Bhusbam - 100 mg with ghee once a day. Sivanar Vembu Sooranam prepared from leaves, flowers and tender shoots of Indigo (*Indigofera tinctoria*) known as *sivanimba* in Sanskrit and *sivanar vembu* in Tamil - one g a day; a gel prepared from sal butter (*Shorea robusta*), the oleoresin known as *dhup* in Hindi and *kungiliyam* in Tamil, is prescribed for topical application over abscesses and sores. The treatment is to be continued till the wounds or completely cured, which may take about one year or more.

It is important to note here that the salts he extracts are not pure salt. For instance, 'boominatham' is extracted from soil but is not pure copper sulphate. When the sample was sent to National Institute of Pharmaceutical Education and Research, Chandigarh, it was found to contain more than 29 components.

National Innovation Foundation

State Award, Karnataka
Utilities and General Machineries: A modified hydro electricity Turbine

Shri G.K.Ratnakara

A modified hydro electric turbine

Mr. Ratnakara lives in a hilly region having many natural water streams. Supply of electricity is quite uncertain. In power-starved state of Karnataka, any effort to supplement the power generation either individually or collectively attracts attention. He first generated hydel power to meet his domestic power requirement. Later, he started manufacturing turbines on demand for other users as well. He has set up 21 power generation projects with a generation capacity of one or two KV in Dakshina Kannada, Kadagu, Hassan and Chikmagalur districts. In the beginning he tried power generation by supplying water from a stream to a moving turbo. He spent Rs. 30, 000 to supply water from a stream to a turbo by laying water pipes. The power plants, which he plans to set up, are highly economical and require only small amount of money. He says that he can set up three such plants per month. Ratnakara started the experiments on a trial and error basis by assembling the necessary turbine. He started assembling his own turbine so that it could run under the pressure of water falling from 100 ft. The turbo consists of alternator and can produce 3.5-unit electricity per hour. It can generate 60 watt of power. Within a month, he successfully generated 1.5 KW of power to run basic domestic electrical appliances at his home. He has now become an expert in assembling the necessary equipment. The approximate weight of the machine is 300 kg. The cost of the turbo is about Rs. 30,000.

Ratnakara (40 years), is educated up to SSLC only. He possesses 1.75 acre of land where he cultivates arecanut and paddy. He grew a unique ladysfinger vegetable at his farm that won award at district horticultural show at Shimoga. His family comprises wife and a son. He runs a small turbo manufacturing unit for last six years at his native village Jayapura. His innovation when displayed at an agriculture exhibition in Bangalore, facilitated by NIF, attracted lot of media attention. He got several orders after this exposure.

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National Innovation Foundation

State Award: Andhra Pradesh
Artisanal: Dyes and dexterity: Revival of dye-ing skills

Shri C. V. Raju

Dyes and dexterity: Revival of dye-ing skills

When some buyers rejected the goods on the basis of the lead content in the synthetic dye, Raju, through research, revitalized the age-old practice of using tree-based colours. Shri Raju attended some workshops and training courses organised by Crafts Council of India and Dastakar group on making natural dyes for textiles. In one of the workshops, Shri Raju met Shri K V Chandramouli, an expert in dye-making. Shri Chandramouli encouraged and helped Mr Raju to work on natural dyes that can be mixed with lacquer. Mr Raju began to experiment on tree and plant based dyes. His experiments resulted in natural dye concentrates over wide ranging colours. These concentrates do not require any binding material such as Titanium dioxide. Crafts Council of India helped Shri Raju to get these dyes tested for their toxicity. Most of these dyes proved to be lead-free. Those which showed signs of toxicity also developed micro-toxins only if they were preserved in the form of slurry or liquid form over long durations. Mr Raju developed an innovative technique to preserve them in the form of cakes, thus avoiding development of micro-toxins.

Shri Raju (41 years) is an agricultural graduate and belongs to a landlord family in Etikoppaka. Etikoppaka is a large village having a population of around 12,000. Village economy is mostly farming based. It is situated adjacent to a stream and blessed with good rains and fertile lands. More than 200 artisan families live in this village. According to Raju and some elderly artisans, before 1910, the dyes were made from a tree called 'divi-divi' (*Caesalpinia coriaria*). From this tree, the artisans could get only red colour in different shades. This tree has become locally extinct now. After 1910, synthetic dyes were introduced in the market replacing the traditional practice of using tree-based dyes. These were available in wide ranging colours. However, when they were used, it was necessary to add another chemical, Titanium dioxide while mixing with lacquer. The artisans in and around Etikoppaka, since then had been making wooden artifacts using synthetic colours. In the post-independence period, lack of demand in the local markets and low prices forced the artisans to migrate to urban areas. Raju's

Village: Ettikoppaka,
Disctrict: Visakhapatnam,
Andhra Pradesh

Scout: SRISTI, Gujarat

The natural dyes add shine to the colors and have an advantage of getting wide variety of colours and tones and shades (except white and pink). The colors have better lustre and are transparent as compared to the synthetic ones. Probably the titanium dioxide reduces the lustre in synthetic dyes. It is also possible that the natural dyes mix with lacquer much better than the synthetic dyes.

His experiments in this regard resulted in a wide variety of tree-based dyes. Since they were lead free, Padmavati Associates made considerable profit in the market and got orders from international clients.

The dyes, whether natural or synthetic, are generally available in powder form. Lacquer pellets are heated slowly in an open oven while the colours and titanium dioxide in powder form are applied to the fluid in small quantity at regular intervals. The thick fluid of the lacquer is stretched and twisted on the oven for proper distribution of the colour with lacquer. This process of applying colours over the oven is continued till the lacquer turns into required shade.

family, erstwhile estate owners of Etikoppaka, took up the task of stemming the erosion of skills of the artisans, who would have otherwise migrated to urban areas as unskilled labourers. The first step was to encourage quality products, which would fetch higher value in markets beyond the local market. High prices and increasing demand for their products made the artisans realise the value of their skills.

Shri Raju initiated the process of creating a separate co-operative association of the artisans called "Padmavati Associates". His key strategy has been to strengthen local knowledge traditions of making vegetative dyes, develop new tools, techniques and methods for increasing shelf life of the dyes and generates new uses. In addition, he has also received the vegetative dying traditions for local textiles. He has developed many new toys for which market is slowly emerging in India and abroad. With the passage of time, the supply of many of the source trees for vegetable dyes started dwindling. Raju drew attention of the artisan to the future implications of declining supply of raw material. With the initial support from National tree growers' cooperation and Andhra Pradesh Forest Department, 'Etikoppaka Vana Samrakshana Samiti (Forest protection committee) was

This coloured lacquer is stretched, cooled and cut into small sticks. These sticks are applied to the toys and artifacts while turning on lathe. Dried leaves of 'mogali' (*Morinda citrifolia*) are used for finishing and polishing.
Raju further experimented with tree and plant based dyes, which did not require any binding material such as titanium dioxide and most when tested, were lead-free. Those that showed signs of toxicity developed micro-toxins only if they were preserved in the form of slurry or liquid for a long duration. Raju developed a technique to preserve them in the form of cakes, thus avoiding development of micro-toxins. The natural dyes add shine to the colours and are available in wide variety of colours, hues, tones and shades (except white and pink). The colours have better lustre and are transparent as compared to the synthetic ones.

Natural dye/colour preparation
There is a specific procedure for preparing different dyes. The raw material derived from different parts of various trees or plants are powdered and boiled to form a thick solution till it starts producing lather. The concentrates are then filtered. The colours and shades depend on various factors –such as the temperature at which it is boiled, duration of boiling, quantities of water and raw material boiled. For instance, to prepare a concentrate of red or orange, one kg seeds of *Bixa orenella* are mixed with two litre of water and boiled on a small domestic oven for twenty to thirty minutes. The concentrate is cooled and filtered to mix with lacquer. However, some colours have complex and systematic process of preparing the concentrate.

One of the major hurdles is the availability of the wood. 'ankudu' (*Wrightea tinctoria*) wood is most suitable for making toys. Forest department imposes fine on these artisans. There is no legal means of obtaining wood directly from the forest other than buying from the vendors. Each member had to pay Rs 10/- a month as a tax in past, irrespective

established four years ago. It aims at conservation of dye bearing species, plantation, rejuvenating existing root stock etc. The Samiti is protecting 120 hectare through 165 members. About 67,000 'ankudu' (*Wrightia tinctoria*) tree saplings were planted during 1998-2001. The government permission is awaited to start harvesting the material from trees planted few years ago. Raju has thus not just conserved the knowledge traditions but also associated biodiversity. And not just that, he has also augmented the traditional knowledge base through contemporary technical, process and institutional innovations and initiatives.

of whether the artisans used the wood from the forest or not.

The Forest Protection Committee has now solved this problem through plantation of this species over last four years.

Another difficulty is the storage of wood. The wood can develop cracks even though necessary care is taken. Once the wood develops cracks, it becomes obsolete and the investment is a waste.

Other hindrance for the artisans in Etikoppaka is power supply to run lathe. Etikoppaka gets power effectively only for six hours during the day. This reduces the total man-hours of work. Working in the nights not only affects the artisans health but also the quality of the product.

National Innovation Foundation

State Award, Kerala
Kandakayam system: a new innovation in Vanilla cultivation

Shri George Mathew

Kandakayam system - a new innovation in Vanilla cultivation

George Mathew has developed a new method for the cultivation of vanilla in order to get more yield as well as some other advantages. A one-metre long stem of vanilla is planted initially. After six months, it starts sprouting from where it was bent below the node. After nine months, it starts flowering between the sprout and the point of cut. After one year, the second sprout starts at the point of initial bend. The stem is cut one metre away from the point of second sprout. It starts flowering and fruiting in bunches from all the stems that have got cut at their end. These bunches are tied to the stem to make them grow straight. Sprouts arise at every bending point of the stem.

Some distinctive features of this variety are: farmers can decide the exact place to grow the shoots and pods, the total length of the stem can be controlled to 18 metres thus reducing the load on the supporting tree, since stem is not entangled, the problem of disease is minimized. Stem growth being controlled, new unwanted sprouts and suckers are also averted. About 2500 plants can be grown per hectare. Supporting trees need not be interconnected for reinforcement and the expenditure on labour is reduced. Some amount of rainfall during November to February will not affect the yield adversely. The plants start yielding within one year, bunches of pods spring up from many nodes of the same branch and 20 to 25 fruits are obtained from each bunch. Indian Institute of Horticultural Research, Bangalore in its comments acknowledged that induction of flower from the cuts on the stem was a novel technique.

George Mathew (50 years), has completed his pre degree course and is an executive member of 'Karshakavedi'. He hails from a business family. All his four brothers are well settled in their businesses. He owns 0.8 ha of land and lives with his wife and two children off the land. Lately he developed an interest in agriculture.He is a member of Organic Spices Growers Forum and Participatory Technology Development (PTD) Initiative, the institutions supported by Information for Action (INFACT).

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Scout: PDS, Kerala

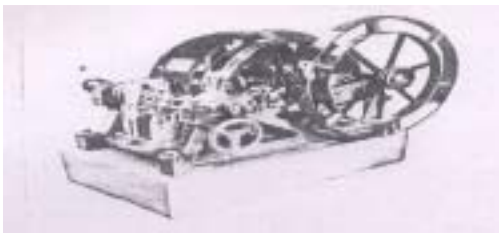
National Innovation Foundation

State Award, Posthumous
Mechanical - Wise platform ticket machine, automatic air pump for bicycles and other innovations

Late Shri PL Misty

Wise platform ticket machine, automatic air pump for bicycles and other innovations

He invented a device to catch unauthorized person's wristcuff trying to open a locker/safe using wrong key. Initially, he was not aware of the provision of patent law and could not get protection for some of his innovations. However, later he started patenting several of his innovations. 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. The machine was demonstrated before the railway authorities at Bombay in 1941. It satisfied them fully and they placed an order for six more machines to replace the British made machines. He did not stop at that. 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. The other innovations that he had developed and in most cases patented are: (a) improved tea coffee maker, (b) animal body weight drawn water lifting pump, (c) device for constant pressure of water in pipeline/tap, (d) improved machine for making *chapatis/puris*, (e) system for prevention of train collision and accident due to derailment and sabotaging, (f) improved churner, (g) small flour mill, (h) folding cradle, (i) cloth washing and drying machine, (j) folding swing bed, (k) automatic lighting and delighting kerosene lamp and (l) power generation from road traffic. He is no more now but by honouring him we are saluting the spirit of innovation at the grassroots from one of the most economically backward regions.



Late Shri Poonamchand Lakha Mistry born in 1914 in a poor family, was an outstanding innovator of his time. He was the eldest among four brothers. He thought about several problems affecting common people as well as large systems like railways. In some cases he succeeded with the actual prototype and a few remained just as his dream. Poonamchand couldn't continue his education after fifth standard because he had to assist his father in carpentry work. While pursuing carpentry, he developed interest in creative activities, and at the age of 17, he prepared a functional miniature steam loco-engine. The then administrator of British government instead of encouragement, advised him to destroy his loco-engine. He, however, stashed away his creation but this incident couldn't suppress his creative talent to develop innovative things. In due course, he established a flour mill and a motorcar repair workshop. Most of his income had been spent on experimenting his ideas. He received financial and moral supports from his brothers for pursuing his innovative experiments. During his lifetime he made 33 innovations and of these 25 have been granted patents in India. Such a crazy innovator left for his final abode in 1981 leaving some of his innovations incomplete worthy further research and development even today.

Takhatgarh, District: Pali, Rajasthan

Scout: Sri Mohan C Mistry, Takhatgarh

National Innovation Foundation

Student Award
Farm Implement: Battery operated seed broadcaster

Shri Dharmendra Patidar

Battery operated seed broadcaster

A tinned cylindrical container is cut from the center and a rotor with metal blades is fitted to it. The rotor is attached to a motor driven by battery power from torch. Regulator is attached to a fan and a scattering machine. The quantity of seed or fertilizer scattered can be regulated with it. Seeds are fed into the machine from top. The implement weighs 800 g and costs Rs 280. A motor of tape recorder can also be used for dispersing the seeds.

Dharmendra Patidar (17 years), is a student of science. While helping out in the farm, he found that hand broadcasting of seeds and manure resulted in wastage. When he visited a science fair, he thought of preparing a device for uniform distribution of seeds. One of his friend Suresh Jat helped him developing this implement. He got the idea of this innovation when he found that his father was not able to broadcast fertilizer granules uniformly. He got help from his teacher Shri G.L. Dhangar to persist with the idea. Using his own skills, he finally developed the seed scatterer.

Sh.U.Ma.
Village:Janakpur-Mokhan,
Taluka: Javad,
District: Nimuch,
Madhya Pradesh

National Innovation Foundation

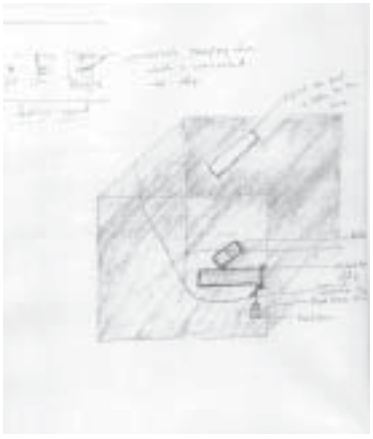
Student Award
Idea: Post box alarm

Kum. B. Swetha

Post box alarm

Post box alarm is a device to sound an alarm as soon as something is dropped in a letterbox placed far away at the main gate of a large farm or housing premises. It has a light-spring-loaded flap fixed at the bottom of the letterbox. When the postman drops the day's mail, the flap is deflected and this is made to give out a pulse-alarm in the household. The alarm may be a short-duration hoot or light flash. Emptying the letterbox automatically resets the device.

There are several patents granted to various innovations concerning post-box delivery systems. Almost invariably every system does indicate when mail is dropped in the box. However, the exact method to achieve this varies except USPTO (United States Patent and Trademark Office, no: 6433684) (filed Dec. 21, 2000 and granted in Aug. 2002) which is very similar. However, her entry was received by N.I.F. in July 2001. In many cases the principle used is that, opening of the mailbox sets off an alarm. Swetha's idea is to use a down-to-earth, simple mechanism that would cost almost nothing to maintain. The innovation, considering especially that it comes from a school student, is indeed noteworthy and deserves appreciation.



Swetha is a twelfth standard student of J M J High school, Hanam Konda, Warangal district, Andhra Pradesh and has become a 'habitual innovator'. She had won an award in the NIF's first competition also. With her innovative mind, she keeps on thinking about the ways and means to make life comfortable for ordinary people. Her technique is simple. She keeps on searching for little problems in day-to-day life and does not rest till she finds some solution to each of them. Despite the preparations for the examinations, she spends some time every day for thinking about the innovations.

House no. 3-10-227. Reddy colony, Hanamkonda, Warangal, Andhra Pradesh.

National Innovation Foundation

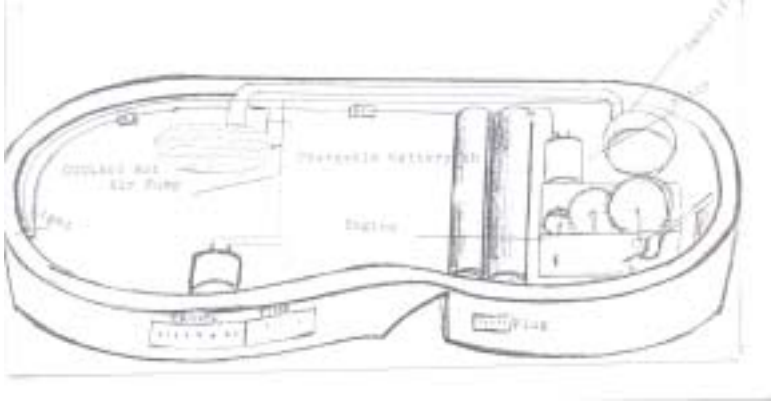
Student Award
Idea: Dynamic shoes generating energy

Sunil Kumar, Pankaj Sharma, Pooja Sharma

Dynamic shoes generating energy

The idea is to design shoes, which can tap energy generated/ produced at every step while walking. At the base of the shoes a device may be fitted, which could regularly run a small dynamo while walking. The energy could be transformed into electric energy and stored in chargeable battery, which can be used as the energy source for gadgets like cellular phone or hearing aid.

A small heater may also be fitted inside the shoes, which could help to keep the feet warm during acute winter. It may be fitted with small air pump, which could work with pressure of feet and help to circulate air within the shoes, thereby reduce perspiration of the feet in shoes, foul smell and risk of infection.



Three students have put in a combined effort to develop this idea. Pooja is student of ninth standard, Girls Senior Sec. School, Kullu. Pankaj and sunil are in eleventh standard, Government Boys Senior Sec. School, Kullu. Smt. Bhavneshwari Devi, mother of Pooja and Pankaj Sharma helps them in nurturing these creative ideas, and other projects. They have high hopes to do some thing innovative, new and scientific in future when they grow up.

C/o Ashok K Sharma, Lecturer
Dept. of Chemistry ,
Govt Senior Sect.School, Bhutti,
District: Kullu ,
Himacha Pradesh

National Innovation Foundation

Consolation Award
Artisanal and Agricultural Practice: Sculptures made from the secretion of termites and pest management for Sal trees

Shri Ravindra Mishra

Sculptures made from the secretion of termites and pest management for Sal trees

Termites for Sculptures:
While roaming around the forest, he noticed that some trees were affected by the termite attack more than others. 'Harsingar' *(Nyctanthus arbor-tristris)* and 'gotra' were two trees whose roots and stems were affected by termites more than others. He also noticed the selective nature of termite attack. The unusual shapes of the affected wood gave him an idea of using termites to shape sculptures.

He would identify the tree with some of the dried parts already affected by the termites. He would apply chemicals to the parts that he did not want termite to attack. Over a year through periodic treatments and monitoring the shapes, a sculpture would emerge. He would then cut it away from the tree and give it final shape using knives and other tools. This process did not damage the trees because he applied the chemicals to the healthy part. This in fact helped the trees. He polished the sculptures to make it look better. Thus has been born a new art, using termites as biological tool.

Ravindra Mishra has been interested in nature right from his childhood. He works in a local company as an electrician. He has two children, a son (10 years) and a daughter (7 years). Even in childhood, when he noticed a fallen tree or some other damage in forest, he would come home and talk to his elder sister or others in the family. His sister recalled how natural diversity fascinated Ravindra during his childhood, and influenced his ability to become a very devoted student of ecological conservation. His wife encouraged him to pursue his passion towards art of making sculptures using termites. He has also worked relentlessly for last several years to advocate eco-friendly ways for control of pest of 'Sal' trees.

B, Rajbhawan, Doctor Street,
Shri Gangadhar Mahadev Nagar,
Bheemgoda,
Uttaranchal, Haradwar - 241 401

Pest Management:
Having been a keen observer of the forest, he noticed some years ago in Rajaji National Park, a thick layer of reddish powder at the base of sal (*Shorea robusta*) trees. It was caused by the insect locally called 'hopelo' or gujeri (*Hoplosorvix icnorvix*) which made a deep bore inside the tree, lived off the sap and laid its eggs in the burrows. Eventually, the tree dried. He informed the forest department about it and media also took notice of this very serious menace.

Research showed that the pest was attracted by the fragrance of 'dammar', the oleoresin produced by the tree. The resin known as 'dhup', 'guggal' collected from this tree is widely used as incense, especially as an ingredient of 'samagri' (a herbal mixture used for 'havan'). He then started an intensive search for such herbs that repel the insect. Several species of vascular plants were found to be disliked by the pest. Some of them were 'kachnar', 'har singar', lantana, 'amaltas', amla, wild tulsi, 'harad', 'bahad', sirus, 'rohini', 'kinkar', 'dumsal', etc. A local bird named Ladies kittil was identified as a predator of this pest. He then wrote to the Chief Minister giving full details. As a result, large numbers of saplings of aromatic herbs were planted in the forests to protect sal trees.

Mishra says that termites convert organic matter into compounds that are essential for growing plants. This ability of termites is well documented. He wants to relate his work in future to the technology of using the soft soil that termite hills are made of, to prepare medicinal materials.

National Innovation Foundation

Consolation Award
Energy: Energy saving battery driven motorcycle

Shri Mrinal Kanti Bandopadhyay

Energy saving battery driven motorcycle

Given the high pollution levels in cities, the need for battery-powered vehicles has been felt worldwide. Several models have been developed abroad, but there isn't a tried and trusted model available in the country.

His focus has been on improving the efficiency of the conventional system and reducing the wastage of motive power. The front of the motorbike has been redesigned to overcome air resistance effectively. The chain sprockets have been sized according to the diameter of the rear wheel, the motor speed and torque developed, in order to obtain minimum current consumption under normal load conditions. The front wheel size has been increased so as to encounter less obstruction while riding on rough roads.

The motor bike uses two 12 volt, 75 ampere-hour lead acid batteries. One aerodynamic fiber sheet is fitted onto the handle bar of the motor cycle, which decreases the battery consumption when speed increases beyond 25 km/h.

Shri Mrinal Kanti Bandopadhyay (55 years), did his graduation with honors in Physics from Calcutta University in 1970. Since childhood, he was very keen in doing experiments to develop things for the benefit of the society. As a student, he participated in several science exhibitions. After entering into Government service in Land Reforms Department, he devised a new method and instrument for preparation of maps. Later, after joining the administrative department, he took up the idea of building a pollution free motorcycle in his free time. Although, the idea of such a motorcycle struck him more than 25 years ago, it could not be fructified due to lack of workshop facilities and funds. He is also thinking about the idea of constructing a new type of eye testing instrument.

50, Canal side Road,
Village: Barhans
Post: Garia
District: Kolkata: 700 084
West Bengal
Tele-Fax No.: 033-6806457

The bike achieves a maximum speed of 40 km per hour on normally encountered road conditions. Maximum continuous journey recorded is 120 km at an average speed of 30 km/hr and 150 km at an average speed of 25 km/hr. Velocity and at-a-stretch journey capacity of the motor cycle will vary according to the quality of the batteries used.

In addition to the normal control functions of the motorcycle, he has attached a display to indicate the status of battery consumption. This will enable the rider to decide when to recharge the batteries or how far to go.

The innovator believes that performance of this motorcycle can further be improved to a large extent by some modifications. It will however require some components to be manufactured specifically for the purpose.

National Innovation Foundation

Consolation Award
Utilities and General Machineries: Gas based water pump

Shri Rambilas Sharma

Gas based water pump

In this innovation a moped engine is used to lift water. The important feature of this innovation is that it is driven by LPG, which makes it economic. Besides this gas based pump, innovator has also made a gas lamp. This gas lamp is a very simple attachment of a lamp with the gas stove. At the time of power failure, this lamp can be simultaneously used with the gas stove. He has also made a LPG driven three-wheeler. This is a hybrid of a motor cycle and three wheeler. The front portion comprises the motorcycle and the rear portion has got two wheels. A chain that drives the rear tyres is attached to engine of the motor cycle. The energy required for its movement is provided by the LPG. The cost is around 16000/-. The fuel efficiency is 1000-1200 km per LPG cylinder that turns out to about Rs. 0.28 per k.m.

Innovator is educated upto eighth standard. He is 42 years old, married and has three children. He used to work in a LPG cylinder agency as a cylinder vendor. He has made an irrigation pump that runs on gas (using LPG cylinder) and running cost comes to only Rs 1.00 per hour. The innovator had already developed a gas driven motorcycle when he started experimenting with two–stroke engines of two-wheeler. After trying out Yamaha and Rajdoot engines, he selected the TVS moped as the most efficient and suitable one for his gas–driven pump. He took a water pump and fixed it to the TVS engine. The first problem he faced was that not enough torque was generated to start the engine. He also had to design a gas inlet. To convert the petrol engine into a gas-driven one, he removed the carburetor of the engine and made his own carburetor with a plastic box. To start the engine, he used the free-wheel of a bicycle. He wound a chain around the free wheel and made a pulling arrangement to start the engine. Once the chain is pulled, the free wheel rotates. Thus in turn rotates the coil generating current that goes to the spark plug. Rambilas is now a source of inspiration to his friends and people working with him.

Near New Bus stand
Rohtak –124001, Haryana

Scout: SRISTI GYAN Kendra, Uttaranchal

National Innovation Foundation

Consolation Award
Farm Implements: Mini tractor drawn ridger, weeder and sugarcane leaf mulcher

Shri P. K. Jeyakrishnan

Mini tractor drawn ridger, weeder and sugarcane leaf mulcher

The ridger weeder developed by Shri Jeyakrishnan, attached to a Shakthi-Mitsubishi mini tractor, performs the weeding as well as earthing up operations simultaneously. Hence, there would be no need for separate weeding operation prior to earthing up. Moreover, the earthing is required only once, when this equipment is used.

The ridger is developed as an attachment to the three point hydraulic linkage of the mini tractor. The ridger comprises an upper main frame, a central shank and a ridger bottom.

The distance between the outer edges of the rear wheels of the mini tractor is 1.2 m and total width of the implement is about one meter. Hence, in crop rows of 1.5 m normal spacing, the implement can be very easily used without damaging the crop. The moisture level of soil should be enough for the tool to penetrate. The cutting tool penetrates and cuts the soil. The soil is cut up to 22.5 cm depth and is lifted up on the wing board on each side. The lifted

P.K. Jeyakrishnan (48 years), has studied up to eighth standard. He possesses about four acres of land and cultivates sugarcane, paddy and turmeric. Since his childhood, he was interested in developing new gadgets and he was very fond of making clay toys. In the initial years, he owned a power tiller and later he purchased a mini tractor. He has tried to invent and develop need based implements and tools for sugarcane fresh crop as well as for ratoon for weeding and earthing up the sides. The same can be used for turmeric also. Recently, he has developed a tractor drawn sugarcane leaf mulcher for ratoon crop, which is used along with the ridger and weeder attachment.

Erankatatu Thottam,
Post.:Keltisamuthiram, Pudhupalayam,
Via: Andhiyur, Bhavani,
District: Erode. – 638 501
Tamil Nadu
Phone – 04256 - 62267

Scout: SEVA , Tamil Nadu

soil is thrown on both sides. The tractor is moved in 'alternating field machine pattern' in the field by going from one end of the field in one direction between first and second row and coming back in opposite direction after skipping the next two rows through fifth and sixth rows and alternating in a similar fashion. The machine can cover about 0.8 ha per hour depending upon soil type.

The ridger-weeder is unique as it does both weeding and earthing-up in a single operation in sugarcane crop. There is a saving in cost and time by more than 60 per cent. Since it helps in trash mulching and obviates the need for burning the same, it also contributes towards conserving moisture and improves organic matter content in the soil.

National Innovation Foundation

Consolation Award
Farm Implements: Bicycle weeder, tiller and harrow

Shri Gopal Malhari Bhise

Bicycle weeder, tiller and harrow

The innovation of Gopal Malhari Bhise is a multi-purpose farm implement fashioned out of inexpensive bicycle components. The main part of the implement consists of the front portion of a bicycle, namely handlebar, front axle and the wheel. A steel fork is connected to the axle and the other end carries different kinds of attachments. Separate attachments for weeding and tilling or a harrow are attached to the working end, using bolts and nuts. This helps in changing the attachments as needed. Suitable slots are provided for attachment so that the distance between blades can be adjustable to suit specific requirements. Safety provisions are incorporated so that the blade did not injure the farmer at the time of reversing the device during weeding. The weeder costs approximately Rs 1200. With it, a person can weed 0.08 ha per hour. It is very easy to operate and is ideally suited to the needs of marginal farmers who cannot afford to maintain bullocks.

Gopal Malhari Bhise (64 years) is a marginal farmer. As a child, he was fond of making replicas of airplanes out of paper, leaves and waste fabrics. He often dreamt of darting from place to place despite not being blessed with wings like butterflies. After completing matriculation he loathed taking up a routine, desk-bound clerical job. Instead, he attempted to make a living out of his meager landholding in Ahmednagar district of Maharashtra. When there was no work at the farm, he worked as a manual labourer, doing odd jobs for others.

Bhise feels vindicated about his commitment toward productive physical work close to earth. More than 200 farmers who use the multi-purpose cycle weeder/hoe developed by him, vouch for his success. Bhise had to dispose off his land and migrate to Jalgaon district as he could not make ends meet. He settled down in Shendurni village. He purchased 0.8 hectare of fallow land and started cultivating it. It was a tough job because he owned no bullocks and the land was rainfed. Though the land was quite fertile, he and his wife Mainabai had to toil hard to make a living out of it. They even dug a well, all by themselves.

At Post: Shendurni, Taluka: Jamner, District: Jalgaon - 424204 Maharashtra

Scout: Ramesh Mahajan, Maharashtra

The tiller attachment enables the farmers to cultivate medium-hard soil up to a depth of two cm. The load in digging out the soil has been kept to the minimum by providing appropriate profiles and curvature to the implements through a process of trial and error. Bhise uses the device to carry out most of the farming operations on his own land. He no more needs bullocks for cultivating his land. The device is so simple that even his 12-year-old nephew can operate it safely without difficulty.

However, they had to hire bullocks to do the strenuous tasks of cultivation, like deep-ploughing and harrowing. They had to contend with the harsh reality that the bullock owner would often not spare the animals when these were actually needed the most, leading to crop failure or lower productivity.

It was his frustration at the plight of marginal farmers like him that led him to develop this device. One day he saw a grocer transporting four big sacks of flour on a bicycle. Although it was quite tedious, that saved him the cost of cartage. The sight gave Bhise an idea, "Why should I not modify the bicycle for the purpose of farm operations?"

After a lot of trial and error, he came out with an implement, fashioned out of the front axle, wheel and handlebar of a standard bicycle, that can be used by the marginal farmers to conduct operations normally carried out by bullocks or tractors.

People used to laugh at him but he never gave up. Other blows in life also took their own toll. His first wife died at the age of 36, and he married again. The responsibility increased. He had to feed four children by first wife and a daughter by second wife, Ranjana alias Mainabai. In all his endeavors, Mainabai and his close friend Subhash Jagtap stood by him solidly. The latter, owner of Sachin Welding Works, helped him with his

expert welding skills. Perseverance finally paid off and his portable implement, christened *Krishiraja,* was received very well in the local market. He has fabricated 213 devices so far. The whole set currently sells for approximately Rs 1200 a piece. '*Krishiraja'* makes a raja out of the marginal farmer. It gives the much needed independence to the small farmer who cannot obtain bullocks or a tractor in time," says Ramesh Mahajan, an extension worker in the Department of Adult and Continuing Education and Extension Services of North Maharashtra University, Jalgaon. He is the scout who introduced the innovator to Honey Bee Network and NIF. With the help of GIAN- West, his innovation has transformed into a motorised device. Help from his mechanic cum electrician friend Mr. Subhash Jagtap has proved very crucial in materialising his ideas into innovation.

National Innovation Foundation

Consolation Award
Farm Implements: Device to climb arecanut or coconut tree

Shri M J Joseph alias Appachan

Device to climb arecanut or coconut tree

The palm climber consists of two metal loops of 10 mm MS rod having sub-loops, rubber belt, wire ropes, connecting clamp, MS plates etc. One loop is intended for the right leg and the other for the left leg. These are called right leg loop and left leg loop respectively, the left loop (main loop) being slightly bigger than the right loop. The top of the main loop is bent forward to form handle and just below this part, two metal plates are attached with holes with a long rubber belt. On the rubber belt a wire rope having rings on each end is fixed. The bottom most part is a plate and a clamp is provided above it. A long holed plate is fixed on the main loop, which is used as parking brake. Ropes attached to the climber are used to fasten it to the palm. The ropes passes around the tree and through hooks provided in the climber. A pedal is provided for resting the foot. Raise the right side peddle a little upward so that the grip of the right hand part of the climber will become loose facilitating upward movements by using the right hand and the right leg. Once the right part is moved up the weight of the body rests on the right hand part of the climber. The whole process is repeated for the left hand side. In this way one can easily climb coconut or arecanut palms.

M J Joseph alias Appachan is an innovative farmer. He has studied upto fourth standard and could not continue further studies due to financial problems. Though Appachan could not get much formal education, he had the gift to learn from his surroundings. His first invention was an instrument that could squeeze coconut milk and juice from fruits. It could not gain popularity, as the instrument was expensive. He has tried several other innovations.

Muthukulathil House,
St. Mary's Industrial complex &
Research Centre,
Puranjan, Chemperi,
District: Kannur– 670 632
Kerala

National Innovation Foundation

Consolation Award
Farm Implements: Self-propelled weeder

Shri Ram Kumar Patel

Self-propelled weeder

The weeder is propelled by a 2-2.5 HP Rajdoot engine and is easy to handle. It is made up of used iron angle, gears, chain sprocket, clutch, tines, lever and an engine of motorbike powered by fuel. The clutch is positioned in between the handle bars. Weeds can be removed from one hectare land in roughly five hours. Without engine, the weeder costs Rs. 3,000 and with engine it costs Rs. 20,000. By hiring laborers for removing weeds earlier, he used to pay Rs 500 for an acre, whereas now it costs only Rs 60-70 for petrol. He saves about Rs 400 acre. One can fix or change the gap between two tines while weeding and thereby area of coverage of tines can be altered. Depth of rows can also be altered. Small sprayer pump can also be operated with this instrument.

Ram Kumar Patel (46 years), has studied till standard eight. He lives in a joint family with his parents and brother. He owns about nine acres of land. In 2000, while cultivating soyabean, he developed the idea of making a weeder. His wife supports his efforts and helps him a great deal in maintaining and cleaning the spare parts of the machine as and when required. He has received full cooperation from Mr R L Mishra, Agriculture Development officer, Karakvel, in developing this weeder and the Agriculture department has also given a letter of appreciation.

Village: Karkvel,
Dev. Off: Gotegav, Post: karkvel,
District: Narsinhpur,
Madhya pradesh
Phone no: 07792 63129

National Innovation Foundation

Consolation Award
Farm Implements: Seed cum fertilizer drill machine

Shri Hazarilal Ozha

Seed cum fertilizer drill machine

Many farmers use single vessel drill machine in which seeds and fertilizer are mixed and kept together. In such a delivery system, seeds and fertilizer fall together at the same level/ surface. Due to this, seeds get damaged from localized concentration of fertilizer during germination. The fertilizer is also not utilized by the crop roots efficiently. This increases the total need of fertilizer for a farm.

To overcome the problem, farmers started using separate drives to drill fertilizer and seeds. This method improved the yield of crop, but also imposed expense of an additional drill drive on the farmers. In 1999, Hazarilal attended an agricultural fair in Anta (Baran) where local agricultural scientists (KVK, Baran) addressed an appeal to all people to develop such a machine which could deliver fertilizer and seeds in single operation but at different depths and also suitable for hard black soils. Hazarilal took it as a challenge as he was already familiar with the operation of agricultural implements. He did intensive work on the

Shri Hazarilal Ojha (55 years) has studied upto higher secondary in Science. He has taken keen interest in technological activities from his younger days. He started a workshop for carpentry and small agricultural implements (repairing and sale) in order to fulfill his aspirations. His wife is also educated and cooperates in his activities. His son Jitendra also assists him actively. Important implements manufactured by him are hoe, sickle, spade, leveler, cultivator, ridger plough, seed drill and soil scoop.

Khajurpura,
Jhalawar Road,
District: Baran
Rajasthan- 325 205.

problem roughly for one year and developed a bullock drawn two boxed seeds cum fertilizer drill machine. This machine, on examination by scientists at KVK (Baran) was found efficient enough and received appreciation by them as well as the farmers. Encouraged by this, he started to work on the development of a tractor drawn seed cum fertilizer drill machine with higher capacity. And he successfully made it within few months. Demonstration of this machine made before several agricultural engineers/experts earned their satisfaction about its performance. They considered it an useful innovation. Hazarilal's machine comprises three main parts - box, cultivator and arm wheel. His machine is able to drill fertilizer and seeds together but delivers them separately in a single drive and also at different depths. His machine saves not only seeds and fertilizer but also supports optimum growth of saplings. The cost of his one machine is Rs 16,500.

National Innovation Foundation

Consolation Award
Farm Implements: Battery operated sprayer and duster

Shri Lalit Surana

Battery operated sprayer and duster

Two models of sprayers have been designed to run with six and twelve volt batteries. The sprayer can also be attached to folding stick so as to spray the tall trees. The adjustment exists to modify the quality of mist as desired. The cost of 6-volt sprayers is about Rs. 200-250/- and the 12-volt sprayer costs about Rs. 500/-. One can spray one hectare in two and a half hours. Battery normally works for six hours.

He has also developed a duster, which can dust one to five kg dusts with the help of six to twelve volt battery. It can dust one hectare in two and a half hours, just like the sprayer.

Given the light weight, low cost and flexibility of use, the duster and sprayer can have multiple uses.

Lalit Surana (48 years), is a graduate in mathematics and later took admission in Law. But after studying upto second year, he discontinued. Because of the difference of opinion in family matters, left his parents and started living independently with his family. He sold 55 acres of land out of his share of 100 acres. He supports his family out of the interest that he receives regularly on the fixed deposits. He got the idea of this concept from water sprayers used in hair dressing saloons. He has received full support from his wife for pursuing his aspirations. This innovation relates to a multi purpose, adaptive battery driven sprayer for spraying liquids or suspension in gardens, for fumigation or for spraying on tall trees.

Tilak Ward, Kandeli,
District: Narsinhpur, Madhya Pradesh.
Ph: 07792-231130.

National Innovation Foundation

Consolation Award
Plant Variety: Dwarf, high yielding arecanut variety

Shri Narayan Bhatt

Dwarf, high yielding arecanut variety

Shri Narayan Bhatt has a large number of arecanut trees at his farm. High yielding areca trees grow up to a height of 13-16 meters at the age of 30-35 years. Climbing these trees is a risky job for which skilled labour is required. Shri Bhatt faced the problem of getting good skilled labourers for the task. This made him to think of developing a dwarf arecanut variety. Eighteen years back he brought and planted 'Hirehally Dwarf' variety, which is dwarf and for which spraying and harvesting was very easy but yield was only

Shri Narayana Bhatt (65 years), lives with his wife and three children. Shri Bhatt, a graduate is cultivating around 12 acres of plantations crops like arecanut, spices, fruits and medicinal plants at Bantwala taluk in South Kanara. He is a member of local education trust. Being a good orator, he is invited regularly to farmer meets to deliver lecture on issues related to systematic farming. He is having a nursery to sell seedlings of plantation and spices crops.

Pelathadka House,
Post: Adyanadka -574 260,
Karnataka

Scout: PRITVI, Karnataka

two to three bunches and distance between internodes was one cm. It was very easy to protect plant from direct sun light. He had also planted another high yielding tall variety 'Mohith Nagar', in which spraying and harvesting was very difficult. He thought of crossing these two varieties to get, a dwarf and high yielding variety.

For this purpose the innovator sent his eldest son, Vinay to learn the technique of cross-pollination at CPCRI, Kasargod. They tried cross pollination in arecanut tree and have now come up with dwarf areca nut variety. He started this experiment in 1997 and crossed Heerehally dwarf (male) x Mohith Nagar (female) and also Mohith Nagar (Male x Heerehally (dwarf). The nuts obtained were planted in the next season. He got dwarf, tall and medium height plants in F_2. He removed tall plants and selected dwarf and medium plants.

At present the dwarf plants are in the field and are about two years old. Tall variety grows to 50-60 ft., bears 4-5 bunches, yields about 450-500 ripened nuts. Heerehalli Dwarf grows to 20-25 ft, bears one bunch and yields 100-150 riped nuts. He had crossed these two and developed a new variety that is 20-25 ft and yields an average of 400-500 nuts.

National Innovation Foundation

Consolation Award
Plant Variety: New varieties of wheat, rice and pigeon pea

Shri Jay Prakash Singh

New varieties of wheat, rice and pigeon pea

In 1988 Jay Prakash Singh developed new varieties of wheat like Dollar, Mahesh, Safed Baal Dana, JP 61, 33, 64, 52 and T- Hindustan.

The salient features of some of the varieties of the three crops developed by him are given below:

Jay Prakash Singh belongs to farmer's family. He studied up to the ninth standard. His father owned a seed company. He used to watch farmers coming to buy seed from his father's shop complain about the quality of seed and thus crop loss. They were looking for better quality seeds. Oit is at this time that he thought about developing varieties of his own. He developed varieties through recurrent selection of desirable plants and through crossing of the preferred parents.

Jay Prakash Singh, Village- Tadiya,
Post- Dadhorpur,
Javirnee, Rajatalab,
District:Varanasi, Uttar Pradesh

Wheat
JP 61 (Safeed Baal Dana): Length of earhead is 9 inches; One earhead gives 140 grains; yields, 2000 Kg per acre (50quintals/hectare).
JP 33: Seed is red in color; seed rate 40 Kg per acre; yields, 1600 Kg per acre (40q/ha).
JP 64: Sown in November; yields, 2400 Kg per acre (60 q/ha).
JP 52: Yield, 1600 Kg per acre (40q/ha).
T- Hindustan: Sown in November; yields, 3000 Kg per acre (75q/ha).

In addition to it he also developed the following varieties of Pigeon pea and rice

Pigeon pea
Mohit 07: The seeds cook very easily and the daal prepared is sweet in taste; yields, 1500 Kg per acre (38q/ha).

Rice
J.P 51(Mansuri): Maturity period is 140 days; seeds are long and thin; yields, 3000 Kg per acre (75q/ha).
Sundari101: Maturity period is 100 days; yields, 3000 Kg per acre (75q/ha).
Radha104: Maturity period is 120 days; grains are long and thin; yields, 2000 Kg per acre (50q/ha).

National Innovation Foundation

Consolation Award
Plant Variety: New variety of hyacinth bean

Shri Jitabhai Kodarbhai Patel

New variety of hyacinth bean

It was in 1987 that Jitabhai started his search for developing a high yielding variety of Hyacinth bean.The area had been hit by severe drought due to the failure of monsoon. The productivity of grazing land was very poor and the stored stock of fodder was exhausted. Fodder for cattle had to be bought from about 40 km away.

Jitabhai chanced upon attractive 'valol' beans on vines included in the fodder brought from village Limbhoi. Some of the vines had young pods. Jitabhai got quite impressed by the size, appearance, flavour and taste of the young tender pods of 'valol'. Being a connoisseur of the vegetable, he immediately collected as many ripe pods of the legume as he could from the vines in the fodder. He sun-dried them and carefully preserved the seeds.

Jitabhai sowed the 'valol' crop next year in his fields and closely monitored the plants from the seeds obtained from the 'limbhoi' fodder. The family had vast quantities of 'valol' *shak* (vegetable) that year and liked the taste. The rest of the crop was sent to the market.

Jita Kodar Patel (55 years), owns 65 acres of land in village Vetla. Twenty years ago at the age of 20, he inherited ancestral agricultural land following partition of family property among brothers. He had got married at the age of 10. He had dropped out of studies early, just after completing primary school.

Jitabhai resides in a semi-permanent house along with his wife, daughter and son-in-law. The attached cattle shed houses one bullock and three buffaloes. He grows cotton, wheat, sesame castor and pigeon pea. These crops are rotated depending upon agronomic conditions prevalent in that year. However, he always keeps aside a portion of about 0.5 ha of the field for growing *valol (Hyacinth bean)*, the famous vegetable of Patel household and Jitabhai's favourite.

Village:Vetla,
Taluka:Vadali,
District: Sabarkantha, Gujarat

Scout: SRISTI, Gujarat

Jitabhai marked a few of the healthier vines. Around 20% vines flowered early. Pods of these vines were left to mature and harvested seeds were preserved by proper sun drying for sowing in next season.

In the next season 50% of the vines showed early flowering. Healthy vines from among the lot were again marked and collected. The same process of selection was gone through again, and the entire crop of 1990 after few years of selection turned out to be early flowering.

Over a period of four years of meticulous observation and selection, Jitabhai thus developed a valol variety that had early-flowering property, disease resistance, and good yield of large pods.

Farmers of 15 nearby villages have now started growing the new variety of *valol* developed by Jitabhai. He shares his experience with the farmers to enable them to harvest their own seeds. The process requires keen observation, skill and immense patience if one is not to be burdened by sub-optimal yields or unproductive crop from the seeds. All the selected vines are observed for growth parameters on a daily basis. The chosen creepers are twirled anticlockwise once they reach a height of about 1.3 m During periodic harvesting, pods from the anticlock-twirled creepers are retained, so as to turn into seed stock after drying.

Jitabhai sells dried 'valol' seeds at Rs 30 per Kg. The special characters of this variety are that it starts flowering after 40 days. The green beans are brighter, have good luster, yielding about 5000 kg per acre fetching a price of about Rs.10-15 per Kg.

National Innovation Foundation

Consolation Award
Plant Variety: Resham Patto – New Chilli Variety

Shri Alibhai Abhvani

Resham Patto – New Chilli Variety

In the wake of the severe cyclone that devastated parts of coastal Gujarat in 1980, outbreak of diseases ruined the groundnut crop in the Abhavani family farm. The family decided to invest in a crop that fetched them money. They spotted a promising chilli variety in the market and bought five kg of it to experiment with. Chillies are a lucrative cash crop. Not knowing details of cultivating chillies, Alidada and his sons fumbled for three years trying to grow it in a 0.7 hectare piece of land, without much success. They decided to consult farmers in Dwarka. They sowed the seeds brought from Dwarka but discovered them to be a mixture of several varieties of chillies. Soon, they also realized that they had sown the crop a little ahead of time. The nursery had been prepared in May and the seedlings were transplanted after the first rains. As a result, the plants bore fruits early but the fruit rot rate was high. In 1983, they decided to conduct a study to decide the best time for sowing. They divided the field into three plots. In the first plot, the seeds were sown early, a little later in the next plot and much later in the last one. The best results in terms of yield were when the nursery was prepared in July and the seedlings transplanted in August. At that time, they had sown chillies in 2.4 hectare land and reaped a profit of Rs 1.5 lakh. Today, Alidada and his sons

Eighty-year old Alidada is well known in his village for his vast experience in farming. He has gained great insights through trial and error in a lifelong process of learning. Father of eleven children, Alidada has become some sort of an agriculture consultant. Aided by three of his sons, Alidada cultivates a farm of 100 acres (40 ha) and maintains a systematic record of every crop he has ever planted on his land since 1976. This record includes details like date of sowing and harvesting, fertilizers used, management practices, yield, profit obtained and so on. It has become routine for Alidada and his sons to scrutinize the previous year's record while planning for the subsequent season. His knowledge and expertise can be attributed to his passion for maintaining records and documenting the results of the trials he undertakes. It is this passion that brought him success in developing a new planting method for groundnut (*Arachis hypogaea*) and in developing new variety of chillies.

Alidada has been the Head of Chikori Sangh in Jamnagar and for

Village: Sarmat
Tal. & Dist.: Jamnagar - 361 005, Gujarat
Phone No.: 89366-89487

Scout: SRISTI, Gujarat

produce Rs 25 lakh worth of chillies a year. The findings of their study also revealed January-February to be the right time to harvest the fruits. Once it happened that the Abhavani family was busy with other work and could not harvest the crop in January. While irrigating an adjacent plot of *bajra* (pearl millet), some water had seeped into the chilli field and the fruits had remained unharvested for a few more days. They then noticed that the plants started flowering again! The second crop of chillies was ready for harvest in March-April. Usually, this is the time when green chillies are in severe short supply in the market. Therefore, they could sell their produce realising much higher price than usual. By harvesting the same crop twice, Alidada and his sons increased their productivity and their profit. It took Abhavani family three years to select the new variety and even today the process of selection is on. The Abhavanis are continually on the look out for better and better quality fruits. They choose healthy plants with thick skin and black veins and sow the seeds of only healthy and hardy plants.

The Resham patto has a smooth, thick skin with a silk-like sheen. The fruit is five to seven inches (125 to 175 mm) long and about two inches (50 mm) wide. The skin is quite tough and does not crack upon drying. Its colour is deep red though it is not too pungent. The plant grows to a height of 2-1/2 to 3 feet (75 to 100 cm) and each plant has 6 to 10 branches. The plant bears 100 to 150 fruits and each fruit contains 120 to 140 seeds. The usual yield of red chilli fruits is 1250-1650 kg/ha and the maximum yield ever reached is 3000 kg/ha. The yield of green chillies is 3300-4200 kg/ha. Green chillies can fetch Rs 10 to Rs 15 per kg, while red chillies sell for Rs 120 per kg in the market.Flowering takes place 45 days after transplanting. Fruits start appearing in October and mature in January-February. It takes five months for the chillies to mature. Harvesting is completed within 20 to 25 days. In the first round, 20 per cent of the crop is harvested. Each of the two successive rounds yields 40 per cent of the total crop each time.

several years, he has been the Director of the District Co-operative Bank. Shri. A B Vajpayee, then a Member of Parliament, visited Alidada's farm in 1990 and was thoroughly impressed with his work. Alidada was honoured with Gujarat's Sardar Krishi Research Award. One of his sons, Bhadurbhai, was conferred with an award in 1999 by the Agriculture Department, Gandhinagar for improving the water level in the village wells through a novel rain-harvesting method. Alidada has registered an Ayurvedic cooperative whose members cultivate medicinal plants. They are on the look out for someone to market their produce.

National Innovation Foundation

Consolation Award
Livestock Management: Remedies for various livestock diseases: wounds, fever, lice control etc.

Smt. Selvarani

Remedies for various livestock diseases: wounds, fever, lice control etc.

1) Maggot infested wounds
Due to heavy weight of the yoke sometimes animals develop wounds on the shoulders. These wounds get infested with worms and cause a lot of pain to the animals. For treating this, leaves of 'seruppadithalai' (*Elytraria acaulis*) and turmeric (*Curcuma longa*) are to be ground and smeared over the affected region for three days. This treatment is equally effective for wounds in the feet caused due to foot and mouth disease. She has treated more than 200 cases over the last five years.

2) Assuring conception in dairy animals
About 500 gm leaves of adathoda *(Adhaotoda vasica)*, extract of one leaf of *Aloe vera*, two eggs of country chicken and 250 ml neem oil (*Azadirachta indica*) are to be ground and given orally one day before artificial insemination or natural mating.

3) Three days fever in animals
This disease is called locally as 'kunnu' (Ephimeral fever), which is characterized by erect hairs and shivering of leg in the affected animals. About 200 ml of gingelly oil is administered. In addition, 'kovai' leaves (*Coccinia indica*) 100 grams are to be crushed and used for smearing all over the body starting from the horn region.

Smt. Selvarani (32 years), a labourer has studied up to primary school. She is living along with her parents after her husband deserted her ten years back. She has been involved in treating animal and human diseases over the last eight years. She learned indigenous healing practices both from her mother and father. She also learned on her own, many herbal-healing practices by observing the other animal healers. She is also an active member of women Self Help Group promoted by the NGO - SEPHARD, Trichy. She has treated more than 200 cattle, sheep and goat. She also prescribes herbal treatment to distant villagers and has cured cases of serious diseases.

D/o. Janaki, Sitheri (New Street),
Thirupeyar, Post: Kurumbannur ,
Taluka: Perambalur ,
District: Perambalur ,
Tamil Nadu

Scout: SEVA, Tamil Nadu

4) Prolapse of vagina
Primordial leaf of banana (*Musa paradisiaca*) plant has to be placed underneath the rectum by holding the hands in such a way so that it slowly pushes the protruded portion inside the body. One has to put little pressure to push the vagina inside the body.

5) Lice control in poultry
Leaves of sangamkuppi (*Clerodendrum inerme*) are to be sprinkled over the brooding area of birds. The lice are attracted towards the leaves and then the trapped lice are destroyed along with leaves.

National Innovation Foundation

Consolation Award
Livestock Management: Herbal treatment for intestinal worms in livestock

Shri Fatehsinh Ramsinh Bariya

Herbal treatment for intestinal worms in livestock

In cattle and other domestic animals (including calves) intestinal deworming can be done by giving fresh root extract of date palm *Phoenix sylvestris* L. Take around 250 g roots of the *Phoenix* and grind it with water. Allow this mixture to settle by keeping undisturbed for 10 hours. Filtered solution is fed to the animal only once. The parasites will get removed along with the faeces.

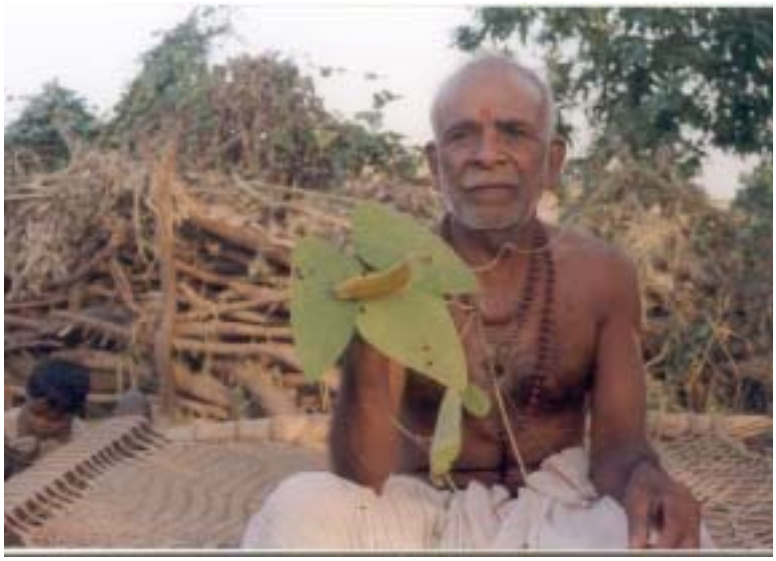
Among the other treatments for intestinal worms, (a) he gives 10 gm of crushed seeds of *Annona squamosa* with 200 ml water in the morning and evening, (b) after removing hairs from two green pods of 'kuvech' (*Mucuna pruriens*) carefully (as it causes itch), these are put in 200 ml of water or buttermilk. This mixture is fed with 50g of salt

Shri Fatehsinh lost his parents at very early age and also lost his village house and land because of the Hadaf dam project. Forced to abandon the army service while in the training because of the ill health of his wife, subsequently lost his wife too. Got barren land as a compensation for the fertile land he possessed, and worked hard for almost five years to convert it into cultivable land. He spent lots of money for digging up a well. Got married again. Worked for a few years with electricity board and laid high-tension cables to feed his eight kids (two from first wife and six from the second wife). When not able to do justice to his family and agriculture, he left the job and started putting all his efforts in agriculture. He spent a huge amount for curing cancer of his wife, but unfortunately lost her too. Despite all the calamities, one thing had not changed for him and that is his spirit of voluntary service. To him the blessing he receives from the suffering animals has no parallel. His philosophy of life is "*Daya dharm ka mool hai, pap mool abhiman, tulsi daya na chodiye, jab tak gut me rahe pran*". This is a famous quote of Saint Tulsidas. This means the foundation of humanity is sympathy,

Village: Vaijama Matariya,
Taluka: Morva Hadafa,
District: Dahod, Gujarat

Scout: SRISTI, Gujarat

to the animals for fast relief, (c) two unripe pods of 'Kuda' (*Holarrhena antidysentrica)* are crushed with water. The extract is diluted with 200 ml and fed to the calf. Generally, a single dose of this medicine is supposed to suffice, and (d) oral administration of buttermilk with salt is also supposed to help in milder cases. He has rich knowledge of remedies for several other animal problems.



ego is the root cause of cruelty and hence don't leave the empathy or kindness till there is life. Today, he is well known as 'Bhagat' for his herbal veterinary cures. He never charged people who came to him to get their animals treated, a single penny. On the contrary he has traveled kilometers together either to treat the animal or obtain the herbal remedies. "Do all the people in these villages have a praise for him?" "Yes, except the black magicians or mantriks," he says candidly. He is 65 year old and just third standard pass. He commands high respect for his herbal remedies. Most of this knowledge is based on traditional wisdom that he has acquired from his father. He shares his knowledge with everybody. Some of the veterinary practices, currently known to the villagers, are part of their traditional wisdom, but he is the one who practices them. So no wonder people fondly call him 'Bhagat'. He has cure for many veterinary diseases. To name a few, he treats 'tav' or fever, 'patla-jada' or loose motion, 'afra' or bloat, blisters or wounds and infection of horns. On an average, he has been treating almost fifteen animals per month for the last 35 years. He might have treated around 400-500 adult animals for intestinal worms, 20-30 calves for intestinal worms, 100 animals for bloat, around 100 animals for 'dhor kawavu', 60 animals for bone fracture and 60 animals for horn fracture, and just a single animal for skin treatment.

National Innovation Foundation

Consolation Award
Livestock Management: Herbal `thailam' (healing oil) for bovine mastitis and epistaxis

Shri Ayyathurai Konar

Herbal `thailam' (healing oil) for bovine mastitis and epistaxis

Herbal treatment for Mastitis (swelling and inflammation in udder): This is a disease noticed more often in cross breed animals yielding more milk. With knowledge acquired from his father, Ayyathurai Konar first tried 'kundrimani' (*Abrus precatorius*) and 'thaivelai' (*Cleome gynandra*) but without satisfactory results. In the traditional method of treatment of mastitis, 'peipeerku' (*Luffa acutangula var. amara*) leaf had been advocated. Therefore he used Peipeerku leaf for external application and found it very successful. For any poisonous bite, usually the root of 'thalaisuruli' (*Aristolochia indica*) is administered. Therefore, he got the idea of using this root for mastitis also. He combined both external application of 'peipeerku' and internal administration of 'thalaisuruli' and got effective results.

Developing herbal formula for diarrhoea in sheep/goat/ calves:
He noticed that the affected animals have been grazing a particular herb called 'thaivelai' (*Cleome gynandra*). By carefully noticing this, he tried this herb for diarrhoea and found it useful.

Instant remedy for nosebleed in cattle: Bleeding from the nostrils is a common ailment among draught animals. The abnormal condition known as epistaxis is often preceded by loud snoring. Bullocks as well as cows and buffaloes frequently suffer from heavy bleeding from the nose, particularly when over-exerted. Ayyathurai's father used to treat animals suffering from epistaxis with *soodu*. The treatment consisted of branding the nose with a burning stick taken from a fully matured branch of 'vidathalai' (*Dichrostachys cinerea*) On seeing the pain of suffering animal, started looking for a painless herbal remedy. This he found in 'kandangathiri' fruits (*Solanum surattense*). Over

Shri. Ayyathurai Konar (81years), learnt various healing practices from his grandfather, Shri Veerappakonar. He has been practicing herbal healing for the part 30 years. He usually never charges for any treatment; however, he accepts whatever people pay for his services. Many of his herbal formulae and methods have been incorporated in the training manual designed for imparting training programme for veterinary doctors attached with Tamil Nadu Cooperative Milk Union. Though he is treating both human and animal diseases, animal treatments alone are being considered here.

T. Krishnapuram (P.O) Saptur (Via),
Taluka:Peraiyur ,
District: Madurai,
Pin - 625 705 Tamil Nadu

Scout: SEVA, Tamil Nadu

the years, he has perfected the herbal nasal drops to treat epistaxis.

Preparation: He cuts 20 mature fruits of *Solanum surattense* and add it to 200 ml goat's urine. The content is transferred into a fresh mud pot. He closes the mouth of the pot using a piece of extra-coarse cloth and keeps this under compost pit for five days and let it ferment. The filtrate is kept in a bottle and ten ml drops of this medicine poured in both the nostrils of the animal. This is believed to stop the bleeding instantly.

He has successfully treated almost 1000 animals with the solution and has found that branding is no more necessary to cure cattle of nosebleed. Recently, an animal suffering from chronic epistaxis was brought to him. It had been abandoned by many veterinarians as uncurable. The nasal drops developed by Ayyathurai reportedly could give relief promptly.

National Innovation Foundation

Consolation Award
Agriculture Practice: Traditional knowledge practices

Shri Madhavrao Shankarrao Patil

Traditional knowledge practices

The expertise of Madhavrao Patil ranges from agricultural pest control, disease management, herbal veterinary remedies to environmental indicators, besides of course, the germplasm collection, storage and exchange. Some of the practices chronicled by him include prevention of ergot disease and control of blister beetle in bajra (pearl millet - *Pennisetum typhoides*), safeguarding cotton crop from pests by interspersing it with *Hibiscus canabinus*, intercropping of onion with carrot for better onion-seed production, enhancing milk production by using banana and peepal leaves, and use of onion and garlic to repel insects in poultry.

Control of root parasites of Sorghum: Patil advises broadcasting carrot seeds in the field after last ploughing and sowing sorghum. Depending upon weed infestation, the rate of carrot seeds is determined. The vigorous growth of carrot depresses various weeds besides helping in controlling the root parasites. It does not seem to have any adverse effect on the yield of sorghum.

Seed exchange: He has large collection of seeds of different varieties of fruits, grains, vegetables, trees, flowers, hedge plants etc. He has built almost one person gene bank in the region and people come to him for getting seeds of new crop varieties. He has not obtained any external assistance for carrying out his on farm research.

Madhavrao Patil (77 years), is an experimenting farmer. Earlier, he worked as tehsildar, in revenue office and after getting pension has devoted himself to farming fully over last two decades. He regularly published his experiments in various newsletters and local bulletins to help other farmers. Several farmers in the region find practices disseminated by him for control of several pests quite cost-effective. He also collects seeds of good local varieties of different crops from neighboring regions. He does it, not just to improve his own productivity but also to share these seeds with others. He observes, “whenever I visit any temple or pilgrimage place, I carry seeds from my collection and distribute them free among local people there. In turn I also receive seeds of local crop varieties”. He is amazingly active at his age and remembers most of the traditional practices and names of the varieties he has in his germplasm collection.

At Post: Pimpalgaon Hareshwar,
Talaka: Pachorae,
District: Jagaon-424202,
Maharashtra

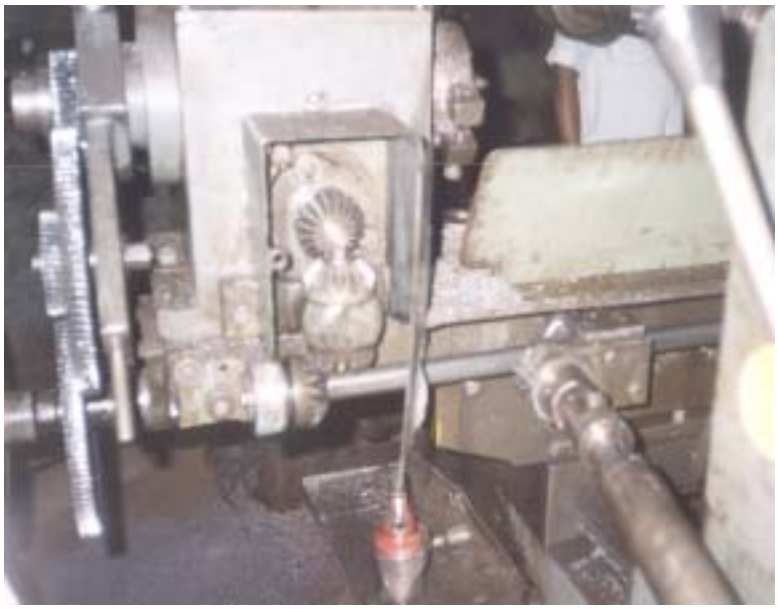
National Innovation Foundation

Consolation Award
Utilities and General Machineries: Improvements to the automatic gear cutting machine

Shri Balwant Singh

Improvements to the automatic gear cutting machine

He has modifications in longitudinal feed mechanism in helix-milling/hobbing attachment of milling machine. Gear-hobbing machines are employed to cut the teeth in the periphery of gear blanks made of cast iron or steel when the size of the gears is not too big. A milling machine is invariably employed for cutting large-size gears, when the face width is more than about 1-1/2 inches (38 mm). Hobbing machines give high outputs but they are specialized machines not suited for any other job except gear cutting. Indigenously-made gear hobbing machines cost up to Rs 3 lakh. It is not always possible to block that type of money in specialized machines as job work may not be available to feed them regularly. The other alternative is to use a milling machine fitted with a hobbing attachment. While this ensures reasonably high output, the machine can also be used for normal milling operations when there is no gear-cutting work. The output in case of a conventional hobbing attachment is however, not comparable to the output from modified



Balwant Singh (67 years), is a typical Ludhiana technician who lives and breathes only engineering and machines. He lives on the upper floor of his workshop, as is the usual practice with machinists of the town. His workshop is recognized as a dependable gear shop for machining large-sized worms and involute gears from castings or forgings. His son, since the time he was a little boy, has been assisting him in the workshop. In fact, he takes care of the machines when his father goes out for a lassi-break. Balwant Singh has made a couple of innovations with regard to gear cutting operations. He has made improvements in the methods based on his long experience to improve productivity. He has also modified the machine tools used for gear manufacture in order to improve the precision level of the gears manufactured. His son too has contributed in continual improvement of quality and productivity that the workshop has come to be known for.

Jain High School,
Near Bharat Nagar Chowk,
District: Ludhiana, Punjab

Scout: SRISTI-GYAN Kendra,
Uttranchal

hobbing machines. The output is limited because no more than two or three gear blanks can be machined at a time. When longer stacks of gear blanks are made, only the first two or three blanks are cut correctly; the variation in the tooth space becomes unacceptable after this much length. The inaccuracy occurs because of excessive vibrations when the over hang is long.

Balwant Singh probed the reason for excessive vibrations, which limited the blank length in the machine. He found that the culprit was the connection-arrangement between the hobbing attachment and the main spindle of the machine. The universal-joint coupling that transmitted power to the longitudinal-feed-screw was attached directly to the hobbing apparatus also. This created non-uniform motion leading to jerks in the feed-screw and this resulted in inaccuracies in the cut gears. Balwant Singh pondered over the limitation of the design, which compelled frequent loading/unloading of component, which in turn caused loss of productivity. Through a process of trial and error, he replaced the universal-joint coupling with a bevel-gear mechanism. The new system consisted of three sets of bevel gears to transmit the spindle motion to the hobbing attachment. The bevel-gear system is inherently superior to the universal-joint coupling because the velocity of the output shaft remains uniform throughout. This avoids jerks that cause unacceptable vibrations.

After incorporating the modification in the drive of the longitudinal feed-screw, stacks of gear blanks up to a length of 500 mm can be cut smoothly in a standard milling machine with consistent accuracy. This means that the number of job changes in a day is drastically reduced, thereby increasing the output without compromising on quality.

Autofeed Mechanism for Worm-teeth Cutting:
In a worm-teeth cutting, the in-feed of the cutting tool after

every pass is usually not automatic. Heavy jobs of worm-thread cutting sometimes involve 800 passes of the tool to complete the job. The operator thus needs to operate the cross-slide 800 times between loading and unloading of the job. It is a tedious work. The handwheel has to be rotated several revolutions at a uniform, standard speed. If it is rotated too fast, the tool wear will be excessive and the surface finish of the component will be affected. If the handwheel is rotated too slow, it will take long a time to complete the job. Often, operators tend to avoid such worm-teeth cutting jobs and absenteeism becomes chronic.

Balwant Singh came out with an innovative solution to the problem. He selected a high-ratio worm-gear reducer from a junk shop and a used domestic fan motor. This he attached to feed the cross-slide. After trying out in a couple of jobs, he made some modifications in the ratio. Now, instead of having to turn the handwheel hundreds of times at uniform speed, the operator has only to press a switch to start and stop the motor. While removing the tedium of rotating the handwheel, the surface finish of the teeth is also improved because the motor's motion is very uniform. Balwant Singh made a further improvement by providing a set of limit switches to automatically start / stop the feed at every pass. The company that manufactures the machine was impressed by the innovativeness of the modification and bought the design from Balwant Singh. New machines manufactured by the company incorporate auto-feed mechanism conceived and developed by Balwant Singh.

The improvements made by Shri Singh improved the efficiency considerably and reduced the labour requirement. The fact that a major company licensed in, the design improvement by Balwant Singh shows the potential, the knowledge of workshop mechanics has for improving the productivity of the Indian Industry.

National Innovation Foundation

Consolation Award
Utilities and General Machineries: Bullocks life saving system, vanrai bicycle pump and other innovative devices

Shri Chandrakant V. Pathak

Bullocks life saving system, vanrai bicycle pump and other innovative devices

The innovation by Shri Pathak about 'bullocks life saving system' is simple, wherein sturdy accessories have been designed for the bullock carts to update their safety to currently needed levels. Since most carts have to share the roads with fast-moving vehicles and need to travel during nights, headlights, taillights and brakes are considered essential to avert accidents. While the power for the lights can be easily obtained using a bicycle dynamo mounted on one of the wheels, a brake drum enveloped by a flat belt is introduced in the axle. Generally, bullock cart carries 1.5 to 2.0 tonnes of sugar cane or other load. On a downward slope, the entire load falls on the shoulders of bullock. To stop the cart one has to pull the rope often causing nose bleeding. He has developed a 'Flat Belt Brake System' fitted to the rubber tyre so as to help in regulating the speed and stopping the cart without causing injury to bullock. His second innovation is the Vanarai bicycle pump. This water pump is mounted on the carrier over the rear wheel of a bicycle. It is used for lifting water for various purposes

C V Pathak (60 years), social worker. Basically, he is a mechanical engineer and had worked on many technical issues like irrigation projects,and export-related works. He decided in 1982 to devote himself fully to social work and joined Sakal Relief Fund. This gave him the opportunity to visit many disadvantaged regions around the country. He saw people suffering from poverty because of non-availability of proper technology. Once, he came across two bullock-cart accidents. One had occurred due to inability to stop the moving bullock cart on a slope. The other was because a truck driver could not see the cart soon enough on a highway in the night. He found such accidents were quite common and had left many people dead in the past. He decided to do something about this, using his engineering knowledge. After many failures, he succeeded in finding appropriate solutions to these problems. He also found that using bullocks for agricultural and other operations was proving to be expensive. He started working on innovative products, which were energy-efficient and appropriate for the rural and urban poor. Some of his innovations include bicycle-mounted water pump, bicycle-

Modern Technical Centre,
144 Narayan Path, Kasat Chowk,
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like development of dry land, as a fire extinguisher, for construction work, use in gymnasium and for irrigation. The bicycle is taken to the water source, parked and peddled on its stand to operate the pump. His other innovations such as bicycle-mounted spray pump, stump-drip-irrigation system, vegetable grinder, sprinkler, flourmill, etc., are well received by the common people.

Modern bicycle dryer is another very useful innovation. The dryer consists of two buckets fitted on the rear wheel of bicycle with the help of v belt, that passes over the pulley. The outer bucket with a tap remains stationary while, the inner perforated bucket rotates as the wheel rotates. While in motion the inner bucket with wet clothes looses water through the perforated areas to the outer bucket. In the process, clothes get dried quickly without the use of any electricity. It is a low cost and simple to use technology.

mounted spray pump, stump-drip-irrigation system, flourmill etc.

Modern Technical Centre was established in 1964 with an aim to train students with technical education who have passed seventh standard but could not afford further education. The best way was to provide them with technical training so that, they could be employed in the industries. It was a non governmental organization and the quality of training was so good that, many of the students got absorbed in companies such as Telco and Kirloskar.

The center also started imparting training to deaf and disabled students as turner and fitters. To facilitate this, Mr Pathak had himself undergone a short term training course.

With the change of time and technology, there was a reduced demand for technically trained staff and more demand for computer trained staff. Also Mr. Pathak was more occupied with Sakal Relief Fund. This almost led to closing down of the center for a short while in 1992.

Subsequently, Modern Technical Center changed its focus from providing training to coming out with innovative solutions to different problems and providing technology based solutions on alternative source of energy. Situated in the old city of Pune, Modern Technical Center today is open for innovators

to do their experiments. Mr. Pathak has offered his centre to innovators to stay there, develop their concepts into products and try to disseminate them. In collaboration with NIF and GIAN-West, it is likely to be the incubation center for some technologies not only from Maharashtra but from other regions of the country also. Having come up from a very poor family background, Shri Pathak has created an unique platform for creating solutions for poor. Both his sons are engineers, well placed and happily married.

Today, he dreams of providing replacements to electrical operated bore well pumps and making small hydro-rams so that the water problem for the poor families of tribal hilly regions are solved. NIF has supported some of his work technically and financially for the new developments.

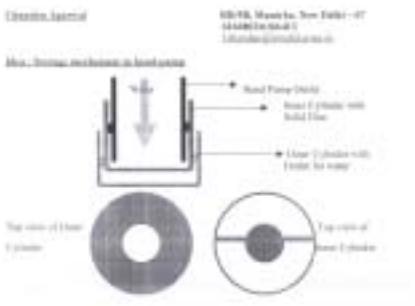
National Innovation Foundation

Student Award
Idea: Modified hand pump

Shri Chandan Agarwal

Modified hand pump

Large number of people in the country still use handpumps to meet their drinking water requirements. But anyone who has tried to use hand pumps single handedly to drink water directly from the taps knows how difficult it is to pump and store water in the spout of the pump at the same time. While in some of the modified pumps, the handle has been fitted on the same side as the delivery pipe, the problem still remains because the output is much more than can be consumed using hands. The result, therefore, is that lot of water is wasted. Chandan suggested a simple improvement to attach a valve and a tap on the delivery pipe so that one can pump and store the water in the body and the outlet pipe. And after pumping enough water, one can go to the other side, unscrew the tap and drink water with as much flow as one can conveniently drink with the hands. With increasing water scarcity, saving every drop matters apart from increasing the convenience of using the tap. This idea evolved in a first year class at IIMA where every student of ISPE course has to come out with a new idea of a product or service or improvement in the same in the class. All the students participate in evaluating the ideas and judge the best idea for award. If every student of the country is constrained in the likewise manner, how many problems of everyday life can be solved improving efficiency, reducing drudgery, adding convenience and of course conserving resources.



A BE, M.Tech and a PGDM student from IIM, Ahmedabad, Chandan Agarwal had always thought that it was difficult for someone to drink water from a hand pump when he has to pump and drink water simultaneously. But he had not thought about overcoming this problem till a ISPE class of PGDM course forced him to think. It was made compulsory for everybody to come up with at least one new idea of a product or service. He thought of an idea, which could make the life of millions of people using hand pump easier.

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National Innovation Foundation

Student Award
Idea: Wood saving matchsticks

Shri Ashutosh Jagdish Sharma

Wood saving matchsticks

Most of us having used match sticks for igniting fire for one or the other purpose have realized that more than three-fourth of the match stick goes waste after we extinguish the fire. However, this waste, colossal as it is triggered a thought in the mind of a first-year post-graduate student of IIM-A. As a part of a course (ISPE), every student is asked to come out with a new idea for product or service or think of an improvement in existing product and services. Mr. Ashutosh thought about the fact that hardly one-fourth of the matchstick near its head was consumed. He proposed an idea of a match box which will have the sticks of one-third size, popping out of the match box when pressed and held by a match stick holder for the ease of lighting.

It is in creditable that the same very idea was further modified by three students (Sankalp Upadhyay, Gaurav Gupta, Kunal Singh) next year who suggested several modifications such as having a slightly longer stick with inflammable head on both the sides of the stick, or having a bar-be-cue kind of a stick. With inflammable powder attached at three or four points on stick depending upon the length. It shows how simple ideas can be improvised through individual or collective creativity saving cost, effort and contributing to environmental conservation.

Ashutosh Sharma is a second year student of PGDM course at Indian Institute of Management, Ahmedabad. During one of the first year course (ISPE), everybody was asked to think of idea for new product or services or improvement in existing product or services or utopia. This is when the idea of a modified matchstick struck the mind of Ashutosh. He received appreciation from his classmates for this idea.

B-13, Krishikunj, Bajaj Nagar,
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National Innovation Foundation

Consolation Award
Community Knowledge: Traditional practice followed in valikandapuram for paddy seed treatment

Smt. Saraswathi

Traditional practice followed in valikandapuram for paddy seed treatment

Paddy seeds (30 kg) are soaked in water in a vessel or drum for 18 hours, and then transferred into a gunny bag, that has been bottom layered with one kg each of 'vadhanarayana' (*Delonix elata*) and 'kuppaimeni' (*Acalypha indica*). Above this layer cow dung cakes are to be placed and then filled with paddy seeds (soaked already in water). This has to be filled to three-fourth of the sack four and cow dung cakes are placed over the seeds. Finally once again leaves of 'vadhanarayana' and 'kuppaimeni' are to be placed over the cow dung cake. Then the sack has to be tied with rope and stones are placed above the gunny bag to keep it processed, for 24 hours. Then the sprouted seeds are taken out and sown for raising in paddy nursery. In this method the seedlings grow very fast and became resistant to disease like 'sengarai' (red spot disease). The seedlings after planting will also have more number of grains. Up to 300 seeds have been recorded per plant compared to 145 seeds in untreated white ponni variety.

This is a widespread community knowledge practiced by many farmers in Perambalur Taluka of Perambalur District, Tamil Nadu. Smt. Saraswathi, leader of a local Self help group in Senjeri Village has been chosen by the village community to represent it at the award function. Smt. Saraswathi (39 years), studied up to eighth standard. She belongs to the Dalit community. Her husband Subramanian is a repatriate from Sri Lanka. She also works as an agricultural labourer on others fields when there is not enough work at her farm. The villagers in these areas are conserving 'vadhanarayana' (*Delonix elata*) trees and wild moringa trees(*Moringa sp*.) on the field bunds as hedge crop and also in common lands. This year due to low rainfall, she raised paddy one third of an acre by giving the seed treatment as described. She has a son working in a local NGO. She owns two acres (0.8 ha) land (1 acre wet land and 1 acre dry land). She has been practicing this paddy seed treatment for the last 10 years. She has been instrumental in promoting organic farming through her self-help group with the help of local NGO-'CROP'. She practices organic farming and other practices such as green manuring with Vadhanarayana leaves and leaves of 'peimurungai' (wild variety of *Moringa sp*.). She prepares other herbal recipes also for protecting crops.

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District: Perambalur, Tamil Nadu
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Scout: SEVA, Tamil nadu

Scouts Award

First PRITVI (People Rewarding Initiatives in Technology, Values and Institutions
No. 416, 14 B Cross, 10 B Main, New Town, Yekahanka,
B Sector Bangalore-560064 Karnataka

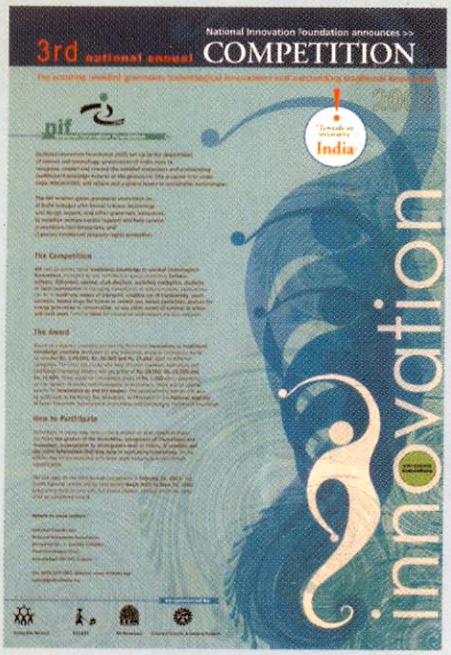
Second SEVA (Sustainable-Agriculture and Environmental Voluntary action)
43 - T.P.M Nagar, Virattipathu, Madurai 625 010,
Tamil Nadu

Second CCD (The Convenant Centre for Development)
18-C/1 Kennet Cross Road, Ellis Nagar, Madurai 625 010
Tamil Nadu

Third PDS (Peermade Development Society)
P.B. No. 11, Peermade,
Idukki., PIN: 685531
Kerala

Third Sristi Gian Kendra
Village and Post office Nagla Dairy fram
Pant Nagar, Uttranchal

Innovators/Traditional Knowledge Experts



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