

10th
National
Grassroots Innovation and
Outstanding Traditional Knowledge
Awards 2019



राष्ट्रीय नवप्रवर्तन प्रतिष्ठान – भारत
विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार का स्वायत्तशासी संस्थान
National Innovation Foundation - India
Autonomous Body of the Department of Science and Technology, Govt. of India

Making India Innovative...



FOREWORD



Prof Ashutosh Sharma
Secretary
Department of Science and Technology
Government of India

I am pleased to write the Foreword for the 10th Award Book of National Innovation Foundation-India (NIF) profiling some very creative grassroots innovators and student innovators of the country. These innovators and innovations have been identified after a long process of review, both internal and external, undertaken by NIF. I am happy to note that many of the innovators come from the North Eastern states, Jammu and Kashmir and other aspirational and developing regions of the country. This underscores the fact that creativity abounds everywhere in equal measures. What is needed is effective scouting, rewarding, empowering and providing right linkages, information and opportunities. Over the last many years, NIF has put in place all the necessary pieces in an innovation- incubation chain. The result is that so many innovators are being recognized from across the country; a large number of patents are being filed, technologies are being validated and the efforts for commercial and social diffusion are being mounted.

It is a privilege that the Honorable President of India, Shri Ram Nath Kovind will grace the Award function and give away the National Awards to the innovators. He will also declare open the Festival of Innovation and Entrepreneurship (FINE) 2019, which is for the first time being organized outside the Rashtrapati Bhavan, Delhi. Most of the grassroots innovators are like solitary reapers, they work on their own initially, most often without any external support. Getting an award at the hands of the First Citizen of the country is a lifetime of memory, motivation and inspiration for the innovators. Not only does it inspire them

to push further with renewed energy, but also generates self-confidence in their approach and accomplishments leading to even stronger innovations.

I compliment the NIF for undertaking many activities aimed at enriching the innovation ecosystem of the country by focusing on the grass-roots. I hope that this zeal and the execution of activities in a mission mode will continue unabated because a lot of work still needs to be done. In a huge country like ours, with all her extraordinary achievements, it still seems like touching the tip of the iceberg still. Our potential is immense. Many districts, many regions and many compelling themes may still have remained less explored, where intervention of NIF may not have reached adequately. Sustained and even wider efforts are now called for, especially from innovations to startups to scaleup.

I congratulate all the awardees and hope they will continue to identify relevant problems, ponder on the unmet needs and develop solutions to deliver to the people. The DST and NIF will continue to support all their efforts wholeheartedly.

With my best wishes to all

Ashutosh Sharma



PREFACE



Dr PS Goel
Chairperson
National Innovation Foundation – India

I am amazed to know that so many new innovators from the informal sector could be identified by NIF year after year from cities, villages and other interior areas of the country. This amply demonstrates that there is so much of innovation going on in our hinterland, which needs to be identified, valorized and then diffused widely for the benefit of the society. Hence, it is not only important for the NIF to scout innovations and recognize the innovators but also help diffuse/disseminate them widely so as to create an impact be it social, commercial, environmental, sector or region wise. While the scale may vary from technology to technology, efforts have to be invigorated to get closer to achieving that scale. NIF has already planned for this and that the necessary action is being taken.

I take this opportunity to thank our Hon'ble President, Shri Ram Nath Kovind Ji for his continued support to the inclusive innovation movement. The fact that he suggested to organize the Festival of Innovation and Entrepreneurship (FINE) outside Delhi, and his decision to travel to Gujarat to recognize the innovators in NIF's 10th Awards, underlines his deep sense of engagement with the cause. This message from our Hon'ble President goes far and wide that innovation at all levels, in all the strata of the society, is inevitable for the inclusive growth and development of our country. And to achieve this, a large number of stake holders need to work closely with each other. Without convergence and congruence, achieving collective goals may be difficult. Hence, coming together and joining hands becomes very important.

It is appreciable that with the generous support of the Department of Science and Technology, Government of India, the NIF has been able to contribute immensely to the innovation ecosystem, mainly in valorizing innovations at the grassroots, of school students and bringing various stakeholders together. The approach of NIF has been to engage with multiple partners in their domain of work, make them a partner in this mission and with their support, take grassroots innovations forward. I hope NIF will be able to partner with many more institutions and industry members across the country, in its efforts to promote grassroots innovations and strengthening the innovation ecosystem in the process.

I congratulate all the awardees featured in this 10th National Award Book of NIF and the team NIF for making this happen. The presence of a large informal sector in the country gives the NIF a good catchment area to source innovations from and support the identified ones. I hope NIF will continue to work with dedication for the innovators of our country, help them and support them. In return, the innovators will reciprocate by developing new innovations to address new challenges or solve persistent problems faced by our people.

21st century belongs to innovations and a country that does not innovate is likely to perish. Let India transform itself in to an innovative society.

PS Goel



DIRECTOR'S MESSAGE



Dr Vipin Kumar
Director and Chief Innovation Officer

It is indeed a very happy and proud moment to host the 10th National Biennial Award function in the NIF campus at Grambharti, Amrapur Gandhinagar, where the Hon'ble President of India, Shri Ram Nath Kovind will be giving away the National Awards. I wish to sincerely thank our Hon'ble President and his office for providing this opportunity to us.

For the Tenth National Biennial Competition (April 1, 2015 to June 31, 2017) NIF received about 12500 ideas, innovations and traditional knowledge practices from 428 districts of 34 States and Union Territories. A total of 59 awards will be given to 64 innovators in the 10th National Biennial Award function on March 15, 2019, which includes a Lifetime Achievement Award as well.

I wish to brief the readers about the process of awards. All the submissions received during a competition period are subjected to detailed technical and patent prior art search to ascertain the novelty, social applicability and/or cost effectiveness. Market research is undertaken and user feedback taken if the innovation has been commercialized. Thereafter a short-list of innovations is made, which is presented before Research Advisory Committee(s) comprising the experts from top Technological and R&D institutions, Engineering, Agricultural and Veterinary Colleges and Industry from all parts of India to recommend potential awardees.

I take this opportunity to thank all the expert members of our Research Advisory Committees, scientists, engineers and designers for validation of innovators claims and value addition in innovative technologies. I sincerely

thank Industry partners, IP firms, Patent Attorneys and all others who have helped us in the incubation of grassroots innovations.

I convey my deep regards to Dr PS Goel and other Governing Board members for their engagement with our cause and their guidance from time to time. Prof Ashutosh Sharma, Secretary, Department of Science and Technology and the officials of the Department deserve our sincere appreciation for supporting and facilitating all our work at all times.

I congratulate all the award winners of the 10th National Competition and thank all those as well who submitted their entries in the competition but could not win an award. NIF will try to ensure required and adequate incubation support in all deserving cases. Our aim over the next few years is to expand in all the regions, reach every district of our country with an attempt to provide our services at the door steps of our innovators and useful technologies to the people of our country. I solicit cooperation all institutions and people from all walks of the life for the same.

With my best wishes

Vipin Kumar



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Lifetime Achievement Award

Kudrat Seeds: Improved Plant Varieties

Prakash Singh Raghuvanshi
Varanasi, Uttar Pradesh

Prakash Singh Raghuvanshi (60) is a small landholding farmer owning three and a half acres of agricultural land on which he cultivates wheat, paddy and pigeon pea. His village had no improved varieties and all farmers were dependent on costly hybrid seeds. In 1995, he started his efforts for the development of plant varieties for paddy, wheat, pigeon pea and mustard. Initially, he failed many times but he did not stop trying. Later Raghuvanshi borrowed money from banks & friends to carry out his experiments and started 'Beej Daan Mahadaan' campaign for distribution of indigenous seeds free of cost to the needful farmers. He struggled a lot but tasted success after he developed an improved paddy variety Kudrat-5.

Prakash Singh has developed a number of improved high yielding wheat, paddy, mustard and pigeon pea varieties, which are tolerant to major pests and diseases, and have seeds with good aroma, flavour and taste. These varieties have been developed using mass selection method based on specific character/features/traits of the plants. He is also working for the conservation of over 100 varieties of paddy, wheat, mustard, pigeon pea, green gram, bottle gourd, etc. He has been NIF's National Awardee (2007) and was also given the Plant Genome Saviour Recognition Certificate (2010-11) by PPV&FRA. He has received many other awards and accolades as well. NIF also supported technically and financially for business promotion activities for his improved varieties. The Aarti Seeds and Research Agritech Pvt. Ltd was engaged for production and marketing of three Kudrat varieties in Maharashtra, Chhattisgarh, Madhya Pradesh and Karnataka state.

Seeds of his varieties has disseminated to more than fifteen states and reported for better performance in farmers' field. Kudrat-5 paddy, Kudrat-1 paddy, Kudrat-9, 17 wheat, Kudrat-3 pigeon pea and Kudrat Geeta mustard are some popular varieties with encouraging results in Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Maharashtra, Gujarat, Rajasthan, Haryana, Punjab, Uttarakhand, Bihar, West Bengal, Assam, Jharkhand, etc. Till now more than one lakh farmers all over the country have been benefited by the varieties improved by him.





National Award – First

Tractor Operated Paddy Transplanter

Shyambir Singh and Ved Prakash
Palwal, Haryana
Scout: Sameer Kumar



Originally hailing from Uttar Pradesh, Shyambir Singh (45) and Ved Prakash (48) were farmers with knowledge of fabrication and machineries. Ved Prakash tried his hands at farming, jewellery making, before settling for socks manufacturing. Shyambir pursued education/ training till ITI first year only.

Both friends had always been keen to mechanize the laborious tasks involved in farming to reduce drudgery. They noticed that the transplantation of paddy was becoming expensive day by day due to increased labour wages and unavailability of labour during peak season. To address this, they designed and developed an engine operated paddy transplanter (2011) and later modified it to be operated by tractor PTO power.

The paddy transplanter is operated by a tractor of 40 hp or more and is mounted on a three-point linkage. It has up to 9 transplanting units for transplanting paddy with a provision of changing row to row spacing, with adjustable width and depth of plantation. It has a simple mechanism for picking, indexing and transplanting seedlings using wash-root method of transplanting. The transplanting arm rotates in semi-circular path, on reaching its upper position, the guide roller removes 1-2 seedlings from the tray (depending on the size of seedlings); knock out mechanism pushes seedlings in the soil at a depth of 5 to 8 cm. During field trials the hill to hill spacing, missing hills, transplanting efficiency, field capacity and fuel consumption were observed to be 19-20 cm, 5-9%, 93%, 0.42 ha/h and 2.5 l/h respectively. The paddy transplanter costs Rs 150,000 with an operational cost of Rs 300/ha.





**National Award – First
Plant Variety**

Sandip Pyaz: Improved Onion Variety

Sandip Vishram Ghole
Pune, Maharashtra

Sandip Vishram Ghole (37), a young innovative agripreneur, has developed a purple blotch disease tolerant, light red colored onion variety with superior shelf life. He is a graduate and involved in onion cultivation using modern techniques and machinery.

This variety has been developed by continuous improvement of onion cultivar of Fursungi local variety of Nashik over the last ten years. Based on the criteria of healthy, non-splitting plants with bigger inflorescence and disease tolerance, he adopted the selection method for improving the variety year after year, and finally, the characters got stabilized in 2016.

With distinguishing characters like early maturation, large diameter of leaves, absence of cranking in foliage, ovate, non-splitting, uniform sized big bulbs and strongly adhering light red colored dry skin, the Sandip pyaj variety is also high yielding

with the average yield ranging between 42 – 45 ton per hectare. During the validation at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, the Sandip pyaz was found to be superior over check varieties for its traits viz. average bulb weight (g), number of rings per bulb, ring size, minimum degree of splitting, skin retention and keeping quality. It also recorded significantly higher bulb yield and lower incidence of purple blotch disease as compared all check varieties.

NIF –India has conducted on-farm trials at farmers' field of Rajasthan and Maharashtra. The variety performed very well and received encouraging feedback from the growers. Over 750 kilogram of seeds of the variety was provided to farmers of Maharashtra, Gujarat, Karnataka and Andhra Pradesh during the last three years. The application for registration has been submitted at the PPV&FR Authority, New Delhi.





National Award – First

Intelligent Goggles for Blind

Anang Tadar
Papum Pare, Arunachal Pradesh

Anang (23), now in college, was a school student when he developed the goggles for the blind (G4B as he calls them). These are like normal goggles but fitted with sensors to alert the visually challenged user about the obstacles ahead.

People who are visually challenged face a lot of difficulties in walking due to obstacles present on road like electric poles, parked vehicles etc. Once Anang helped a blind lady to find directions. This incident prompted him to study and research about the problems faced by visually impaired. He found that blind man sticks/ smart walking sticks to help visually impaired people to navigate were available, which could detect obstacles at the ground but nothing was available, which could detect obstacles at waist level and above. Anang got inspired by

navigation mechanism used by bats and incorporated the same in a goggle. Bats do not use their eyes for visual navigation, they emit specific frequency ultra-sound from their mouths or nostrils and detect obstacles by sensing the echo bounced back from the obstacles.

Anang developed smart goggles, which could detect obstacles present ahead of the visually challenged people and give an alert in the form of vibration. His goggles comprise ultrasonic transmitters, receivers and microprocessor. The vibration alert in the goggles is on the side (left, right or centre) of the obstruction; the nearer the user comes to the obstruction, the stronger the vibration gets. These goggles are complementing to the blind man sticks and are not designed to replace them.





**National Award – First
Veterinary**

Herbal medication for coccidiosis

Periyasami Ramasami
Salem, Tamil Nadu
Scout: Selva Raju

Periyasami (64) is a farmer sustaining his livelihood undertaking agricultural activities in his two acres of ancestral land. He acquired the knowledge of herbal medication from his elders and through years of practice.

Clinically, the condition of bloody diarrhoea in poultry is caused by a protozoan, *Eimeria* sp., and is called as Coccidiosis. The medication developed by the healer has three herbal ingredients in the ratio of 40:20:40 per cent. It has to be administered to affected birds with bloody diarrhoea for at

least three days. The test medication was evaluated for a period of 6 weeks where it reduced the mortality to an extent of 12.96 per cent than the infected, untreated birds, which showed higher mortality of 37.03 per cent. This test medication was found to reduce Oocyst per gram and on the 14th day post infection, the treated birds were found with 7500.00 ± 1997.50 OPG than positive control [14800.00 ± 754.98]. The medicine was found to reduce mean lesion score and protected birds infected with Coccidiosis.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



National Award – Second

Modified Combine for Maize Harvesting

Gurtej Singh
Moga, Punjab
Scout: Rahul Kumar

Gurtej (38) owns a workshop where he carries out the manufacturing of combine harvester, hole digger, maize cutter, high quality screw conveyor vermi segments and straw reaper, and also undertakes repairing of farm machineries.

He has been manufacturing reel type combine harvesters since 2000. However, he found them to be inefficient for maize harvesting due to the crop height. This led to farmers buying new header cutting type combine harvester. Gurtej then tasked himself to develop a reel type cutting unit for maize harvesting in 2013, which could

be attached to any combine harvester. He successfully developed a modified cutting unit for combine harvester, which has a rotating reel (triangular shape) with three tine bars for covering the maize crop effectively. The effective reach has increased because of the triangular shape and large diameter protecting the crops from getting damaged. It covers an area of 4.5 to 5 acre/h with a speed of operation of 5 to 6 km/h at an operational width of 3425mm. The developed cutting unit can be attached to any combine harvester. Costing Rs. 2,10,000/- around 70 units have been sold.





National Award – Second

Tractor Powered Sprayer

**Gurmeet Singh Bhupal
Hanumangarh, Rajasthan**

Gurmeet (45) is a fanner and a fabricator. He dropped out of school after class 3rd to help his family in farming. His interest in machine fabrication led him to mechanize various processes for crop cultivation in his farm.

The general practice in cotton farms is that the labours have to hold the spray boom of the tractor mounted sprayers for spraying pesticides. This makes spraying slow and tiring for the labourers. Gurmeet conceptualized a drawing of sprayer using a four bar mechanism so that more area could be covered and successfully developed a prototype in 2016.

He developed a tractor mounted PTO powered machine to spray over crops of small height (mainly cotton). The sprayer has two semi-revolving guns, which continuously spray liquid with an automatic semi-circular movement using four bar mechanism and two independent hydraulic controllable arms. Its working width is 23m, spraying height is 2.1m, coverage area is 5 ha/h and fuel consumption is 2 lit/h at a working speed of 2-3 km/h. The manufacturing of the present model costs about Rs. 60,000/-.





National Award – Second

Cot with attached toilet pot having a remote operated cleaning system

S. Saravanamuthu
Nagercoil, Tamil Nadu
Scout: SEVA

Saravanamuthu (40), who owns an engineering workshop, lives with his wife and two children. Son of a car mechanic, he started tinkering with car parts early in his life and later started repairing and modifying cars. He now helps students in his area in machining and fabrication work related to their projects.

Sometime back his wife had to be operated upon due to which she got bedridden for a considerable amount of time. During this time, she always needed assistance for using the toilet, which was at times stressful and embarrassing for her. This made

Saravanamuthu develop a bed with an attached toilet pot, which could be used by his wife to relieve herself, without being dependent on anyone.

The cot is fitted with a 12 V battery to operate two gear motors, for moving the attached toilet pot vertically and sideward. A remote operated flushing system for the pot has also been incorporated, which makes it easy for the user to flush after use. Saravanamuthu spent about Rs 35,000/- to build this cot with the toilet system.





**National Award – Second
Plant Variety**

Sanjeev Selection: Improved Cauliflower Variety

Sanjeev Kumar
Vaishali, Bihar

Sanjeev Kumar (36) is a young farmer recognized for his valuable efforts in protection and conservation of the traditional cultivars of cauliflower, cabbage and brinjal. He has developed a high yielding and early maturing cultivar of cauliflower named Sanjeev selection famous for its high vigour seeds and compact white curds.

During 2009-2013, he worked for the improvement of the variety by selecting healthy, early-maturing plants with bigger and more compact curds. Sanjeev selection variety is well known for early maturity (60-70 days); white, bigger (up to 940g) & compact curds and high yield (up to 175q/ha). Facilitated by NIF, the variety has been validated by Bihar Agricultural University, Sabour, Bihar. The variety was found to be superior in terms of vegetative yield, curd weight and Vitamin-C content and also produced significantly higher curd

yield (186.2tons/ha) over checks at all the three locations tested. Seed material of Sanjeev selection cauliflower was tested at the Division of Seed Science and Technology, ICAR-IARI during 2018 where it was found that the germination, purity and moisture content were 88.3%, 98.6% and 8.4% respectively.

On-farm trials were conducted at farmers' field by NIF-India in six states to check the adaptability and performance. Encouraging results and feedback was received. Early maturity and quality of curd was confirmed in Bihar, Uttar Pradesh, Madhya Pradesh, Gujarat and Chhattisgarh. The variety has spread in Bihar and Jharkhand states. The innovator has sold 80kg seeds of the variety during last four years. The application for registration under PPV&FR Act, 2001 has been submitted with PPVFR Authority, New Delhi.





**National Award – Second
Veterinary**

Herbal medication for anestrus

Vilat Yadav
Sitamarhi, Bihar
Scout: Kamod Kumar

Vilat Yadav (80) could study only up to 7th standard and thereafter has been practising agriculture for his living. He learned about the herbal medications keenly observing his elders and has been practicing for the last 25 years.

Anestrus is a period of dormancy between two periods of sexual activity in mammals with cyclic breeding. The healer claims to treat animals, which do not enter the reproductive cycle by administering about 25 grams of powder of an herb mixed in water twice daily for a period of up to 10 days. During validation, of the total 12

treated lactational anestrus cows, 9 (75.00%) cows exhibited oestrus in average 12.67 ± 4.26 days. Following artificial insemination in 9 oestrus exhibiting cows, pregnancy was confirmed in 5 (55.55 %) cows with the help of ultrasonography. Of the treated buffaloes (n=12), 11 (91.67%) buffaloes exhibited oestrus in average 12.67 ± 4.26 days. Among artificially inseminated buffaloes in 9 (81.81%) buffaloes the pregnancy was confirmed. This confirms the efficacy of the herbal formulation for anestrus.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



National Award – Third

Combi Tillage Implement

Maharaj Singh Lodhi
Raisen, Madhya Pradesh

Maharaj Singh Lodhi (32) had to leave studies after completing 10th standard due to poor economic condition of the family and join farming. However, he continued tinkering with farm machinery and over time was able to experiment and develop auger plough, modified submersible pump, and MB plough with the help of a local fabricator.

Maharaj Singh noticed that a conventional tractor mounted cultivator could not get proper depth on hard soil while carrying out tilling operation in his farm. To address this problem, in his first attempt itself, he developed an auger plough where five rotary augers were placed in place of cultivator tynes. They were powered by tractor PTO, however experiencing frequent

wear and tear, he further developed a modified MB plough and Combi-tillage implement.

The tractor mounted combined tillage (combi tillage) implement does primary tillage operations as well as secondary tillage operation together. It consists of a soil cutting tool (modified plough or cultivator tynes) and soil clods breaker cum levelling unit (tractor PTO powered auger shaft). The modification includes replacement of bar point share of MB plough by tractor PTO powered auger. It consumes 3 liters of diesel to cover up to 1.25 acres of land in 1 hour at a field efficiency of 79%. It requires draft force of around 560 kgf to attain depth of 18 to 21 cm and width of 2 m. The implement costs Rs 50,000.





National Award – Third

Automatic Weft Winding Machine

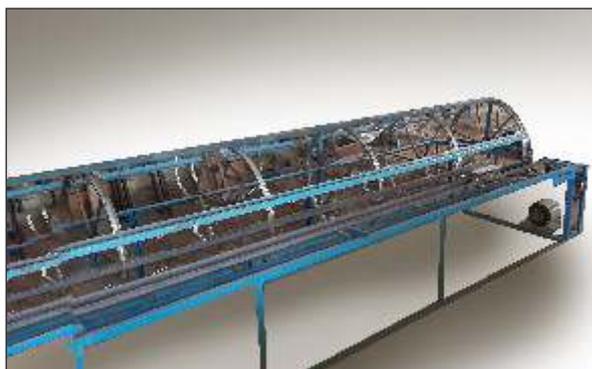
Prafulla Kumar Meher
Bargarh, Odisha

Prafulla Meher (56) is a weaver and textile machine manufacturer. He left his studies due to a financial crisis and joined his family business of weaving Sambalpuri Sarees. He visited numerous NGOs for gathering knowledge about weaving and started his own workshop named Artisan's workshop in the year 2008.

Weaving a 6 feet saree requires 8 kg of cotton and three processes viz. spinning, winding and threading are involved. Spinning is done for the purpose of dyeing and making designs in sarees, and winding is done to make a suitable package for both woven and knitted fabric production. He used to engage labourers for winding of the cotton thread. This process required two tree trunks for winding operation. However, gradually the number of labours decreased due to the involvement of tedious work in manual winding, lesser wages and better opportunities. Prafulla then started working at designing a solution for mechanization of this processes and nearly after 6 months he was able to develop his first prototype, which is a self-propelled machine

that facilitates winding of cotton thread for weaving of sarees.

The drum receives power directly from a 0.25hp electric motor and this can be operated manually as well. Weft winding work is carried out over the entire length of the drum. Prafulla has developed Purra bed (uniform thread distribution system), which automatically changes its direction of movement. This Purra bed has two cycle hubs for easy movement over the frame track. There is a small vertically placed thin rod attached with the chain loop and Purra bed is placed over this rod. So when it makes a U-turn after completing half cycle, the Purra bed automatically changes its direction of motion. The second Purra bed travels on other end of this drum as both Purra beds are connected by means of a square pipe. In this way, both the thread distribution systems work automatically and help in improving productivity. The machine has the capacity of winding 10 bundles of yarn over the drum within an hour. The machine costs Rs. 25000/- and over 110 units have been sold till date.





National Award – Third

Automatic Weft Winding Machine

Ram Prasad Meher
Bargarh, Odisha

Ram Prasad (50) is a school drop-out and since childhood has had a keen interest in arts and crafts, which made him join his family business of weaving. He owns a small workshop where he develops machines for textiles and saree weaving, mainly *Sambalpuri* saree.

Prasad's father used to make bundles of thread for dyeing and for making different designs for which he used two tree trunks. One had to walk around the trunks making an elliptical shape for winding the thread bundle. This led to less output with more time consumption. Prasad started designing a machine that could do winding and spinning work at faster rate and after working hard for 2 months, he came up with a prototype, which was able to wind cotton automatically.

The machine has a drum over which weft winding work is done, getting power from a 0.25 hp electric motor. The innovator has made a special component, which rotates periodically due to the impulse provided by the flat bars with the help of its cutting edges, responsible for the feeding of threads in both forward and reverse movement.

Purra bed (uniform thread distribution system) is attached to the chain and moves along the length of the drum. The forward and reverse action of Purra is controlled by a lever. A foot pedal actuated brake system is provided to stop the rotation of the drum.

The machine can wind 5 bundles of yarn within an hour, which otherwise takes 2 days if done manually. The machine costs Rs. 22,000/- and 90 units have been sold till date.





National Award – Third

Automated Arecanut Climbing and Harvesting Machine

Suresh PV
Malappuram, Kerala
Scout: Dr. Sunil, KVK

Suresh (41) works as a driver and a rubber tapping worker in rubber plantations in his locality. A school drop-out but an enthusiastic innovator, he developed a hydroelectric power plant of 2 kW capacity for his village in 2004 and a ropeway system for transportation of goods as well.

Arecanut tree has to be climbed three times every year for the purpose of harvesting. Only skilled labours can do this, as the task is very risky. Suresh came up with the idea of a machine that could be helpful for climbing the arecanut tree. First he came up with a machine that worked on electricity and could carry a man with it. However the power supply was an issue, so he designed a petrol engine based automated arecanut climbing and harvesting machine.

The machine is powered by a 42cc petrol engine operated using a remote/mobile app. It consists of dumbbell shaped rubber-grip rollers, which are clamped on tree and their rolling motion along the tree trunk provides upward motion. The machine is self-adjusting for varying diameter (100 to 203 mm) of the tree and can climb over dents or bumps in the surface of the tree. The device can remotely be put in forward, reverse, neutral and cutting mode. The rate of climb can be controlled with an accelerator and the device has been designed such that on full throttle, it can climb the tree (approx. 50-60 feet) in one min, perform cutting operation in 1 min and climb down the tree in another minute. It weighs approx. 28 kg and can work for about 3 hours in 1 litre of petrol. If at all the machine stops functioning while climbing up or down the tree, a rope connected to it will enables the user to bring it down without climbing the tree.





**National Award – Third
Plant Variety**

JK 1: Improved Variety of Indian Bean (*Dolichos lablab*)

Jitabhai Kodarbhai Patel
Sabarkantha, Gujarat
Scout: SRISTI

Jitabhai Kodarbhai Patel (64) is a farmer owning six acres of land where he grows Indian bean, castor, cotton, soybean and wheat as major crops and lucerne as fodder crop.

Jitabhai has developed early maturing and high yielding improved variety of *Dolichos lablab* (synonym: *Lablab purpureus*) commonly known as Hyacinth bean and Val (in Gujarati) from a local variety through selection method. In 1987 he found some good quality bunched pods of Hyacinth bean mixed in the fodder which he was collecting from neighbouring village. He separated those pods and kept for sowing in the next year. He sowed few seeds in his field the following year and noticed that some of the plants were bearing more number of bunched pods which matured earlier than others. He selected those desirable plants and harvested the seeds separately for next year. He continued the selection process for desired characters continuously for eight years and in 1995, the variety was stabilized. Thereafter the seeds of the variety were distributed to the farmers of his neighbouring areas for trials and it became very popular due to its high yield and delectable taste.

The distinct characteristics of JK-1 variety are early maturing variety requiring 60 to 65 days for first picking, longer fruiting period ranging from August to April, lengthy, pale green lustrous bunched pods, over 700 pods

per plant, high green pod yield (675 q/ha) and high seed yield (64 q/ha). JK-1 is the most preferable bean variety for making Undhiyu (Gujarati mixed vegetable dish)

During the validation of the variety by Sardarkrushinagar Dantiwada Agricultural University Dantiwada, Gujarat at two locations during 2015 to 2017, the variety JK-1 was found to be 119.7% superior in terms of green pods yield over checks. The variety is being widely cultivated by the farmers of Sabarkantha, Aravalli, Panchmahal, Dahod and Banaskantha districts of Gujarat. NIF has also conducted on-farm trials at farmers' field in Maharashtra (Pune & Palghar) and Rajasthan (Jaipur and Sikar) with overwhelming response from the growers for its higher market acceptability and taste. The application for registration of the variety has already been filed at PPV&FRA, New Delhi.





**National Award – Third
Veterinary**

Herbal medication for bloat

Desai Laxmanbhai Devkaranbhai
Aravalli, Gujarat
Scout: CRSD

Lakshmanbhai (53) is an illiterate farmer also engaged in livestock activities. He has been treating various livestock ailments for the past 30 years, which he has learnt from his father.

Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. For treating bloat about 125 ml of liquid preparation made from two

herbal ingredients has to be fed to bloat affected animals once a day. During the validation, the medication showed significant impact by reducing abdominal girth, enhanced rumen motility from 30 minutes onwards and sustained such therapeutic function up to 2.5 hours among the treated goats, thereby indicating its efficacy.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



State Award – Manipur

Tha Animakhai Chabi -Traditional Cauliflower Variety

Keisham Thoibi Devi
Bishnupur, Manipur

Keisham Thoibi Devi (51) is a progressive farmer growing traditional crop varieties using organic farming methods. She cultivates rice, cabbage & cauliflower as major crops and has adopted integrated farming system at her field.

Twenty years ago Keisham Thoibi Devi got some seeds of this cauliflower variety from her in-laws. She was attracted to the characteristics of the variety when sown in her field. She tagged some desirable plants which had matured early, had creamy white coloured curd and were free from insect-pests and diseases for preparing seeds for the next year cultivation. The selection of seeds from the best curds was repeated for several years and the variety was stabilized in 1998. She has been adopting same selection process to maintain the purity of desirable traits.

The variety is most suitable for early sowing in first week of July and produces narrow elliptical, creamy-white coloured curds. The average weight of curd is 750g, having medium compactness and are partially covered by inner leaves. It has delectable taste, is tolerant to insects and pests and fetches good market price due earliness. Since 2005, the variety has been distributed to neighboring farmers and relatives for cultivation. Most of the farmers at Langpok

and Nambol area of Manipur are growing this variety due to good earning during early season.

Facilitated by NIF-India, the validation at Central Agricultural University, Imphal confirmed its early maturing trait and reported that the variety fetched superior market price due to the early availability. The farmers of Langpok, Nambo, Thiyam and other adjacent villages have been growing this variety by procuring seeds from the innovator. Early maturity, delicious taste and high market price of the variety due to early availability in the market are highly appreciated traits of the variety by the farmers of the region. The application has already been filed for registration under PPV&FR Act, 2001 at PPV&FR Authority, New Delhi.





State Award – Maharashtra

Sarita Seedless and Nanasaheb Purple Seedless: Improved Varieties of Black Grapes

Dattatraya Nanasaheb Kale
Solapur, Maharashtra

Dattatraya Nanasaheb Kale (55) is a progressive grapes grower. Studied up to class-XII, he has been involved in grapes farming following the footsteps of his late father Nana Saheb Kale who had developed Sharad seedless grapes variety in 1980s. Dattatraya owns 25 acres of vineyards and grows various varieties developed by his family. He has started a nursery to sell the grafts of his seedless grape varieties and is also involved in producing and selling black raisins prepared from Sarita and Nanasaheb purple seedless varieties.

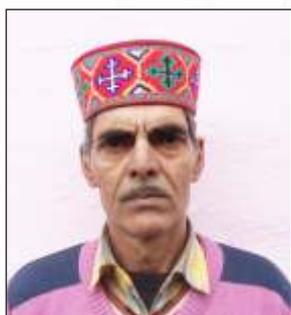
He has developed two new varieties of black grapes- Sarita and Nanasaheb Purple Seedless from the clone of Sharad seedless grape variety with high sugar content (18-20 brix), large sized berries and distinct taste. In 1984 he noticed one naturally mutated clone of Sharad seedless variety with bigger sized berries and attractive colour in his vineyard. He grafted the selected clone over rootstock of dog ridge grapes variety and monitored for distinctness of characters for three years followed by multiplication of this vine by grafting and continued the process till 2003. He named this variety after his mother Sarita Kale.

A few years later, he again observed a clone among the Sarita seedless variety with oval berry and 25mm size. He repeated the grafting process again and developed another variety- Nanasaheb Purple Seedless after his father in 2008. This variety has unique litchi flavour, more pulp content with high sugar content (>24 brix) and thin purple peel with white coloured pulp preferred for making export quality raisins, while Sarita seedless bears

elongated berries with higher bunch weight and yield and fetches good market price.

During the onsite evaluation carried out by experts from KVK, Solapur, Maharashtra, it was reported that both the varieties i.e. Sarita Seedless and Nanasaheb Purple Seedless have been widely adopted by the growers for profitable cultivation due to their good berry length, taste, attractive purple coloured & litchi flavoured big sized berries. Nanasaheb Purple Seedless variety produces export quality berries and is preferred for making raisins. The variety Nanasaheb Purple Seedless has been disseminated in four states viz. Maharashtra, Andhra Pradesh, Madhya Pradesh & Karnataka covering more than 21000 hectares' area and covers 90% in grapes cultivation in Maharashtra whereas Sarita Seedless is widely cultivated in Solapur and Nashik areas of Maharashtra covering over 17000 hectares. The process of applications for registration of both the varieties at PPV & FR Authority has been initiated by NIF-India.





State Award – Himachal Pradesh

Herbal preparation for the control of insect pests in crops

Roshan Lal
Kullu, Himachal Pradesh
Scout: Joginder Singh

Insect pests damage various crops and vegetables either by directly feeding or destroying post-harvest produce causing severe losses to the farmers. Roshan Lal (54), a progressive farmer, has developed a preparation using locally available plants for the control of different insect pests in cereals like wheat, barley and vegetables. He studied up to primary and has been involved in farming for many decades.

In order to overcome losses caused by various insect pests in crops, Roshan Lal developed a decoction prepared from bark & leaves, and leaves & fruits of two locally available plants (names withheld due to IP reasons). The decoction, at low doses, was found to be very effective in management of sucking and borer insects' in wheat and vegetables like okra, cauliflower, Brinjal, wheat and barley in the various experiments he undertook at his farms during the last decade. The preparation once prepared can be used for 5-6 months without any loss of efficacy.

Facilitated by NIF- India, the validation was conducted at Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi against insect pests of Okra. The formulation was found to be very effective against both borer and sucking pests of Okra at all the three doses tested during two sprays spread across the season. As compared to control, there was significant decrease in populations of all the pests of okra namely- leaf hoppers (*Amrasca biguttula*) (67-75%), whiteflies (*Bemisia tabaci*) (64- 71%), mites (*Tetranychus urticae*) (45%) and fruit borer (*Earias vitella*) (47%) during the study. The formulation also reported an increase of production as compared to control by 53.9%, 59.12% and 66.54% at farmer's dose, half dose and double the farmer's dose respectively. The formulation was also found to be safe to non-target and beneficial insects like honeybees, ladybird beetles and spiders apart from being safe to the crop without causing any phyto-toxicity at all the doses tested.



State Award – Odisha

Herbal preparation for protecting vegetables and rice against insect pests

Jyotsna Mayee Patra

Keonjhar, Odisha

Scout: Innovate Odisha Initiative

Jyotsna Mayee Patra (18) is a young innovator, studying Political Science Honours course for her graduation. In her home garden, she noted that the rose hedges were severely infested by insects and were not bearing flowers. She observed a climber (name withheld due to IP reasons) bearing fruits was growing close to the vicinity of the roots zone of the rose plants. The fruits of the climber decayed and decomposed in the root zone and the insects infesting the rose disappeared soon. The growth of the rose plants improved and they started bearing flowers. A curious young student of class 8th at the time, she searched similar fruits from the village pastures and placed in the root zone of other insect infested plants in her garden and in rice fields and noted the control of all types of insects including soil insects. She has been using the practice in her fields (rice) and garden (vegetables) for the last four years.

The preparation is very effective in low volumes and can be used for the control either in the form of a solution/juice or powder or can directly be buried equidistant in the soil, spread across the rice fields for maximum control. Care while handling,

spraying of preparation and use of protective gear is required due to its poisonous nature.

The validation facilitated by NIF-India at Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi against insect pests of Okra reported the efficacy against borer and sucking insect pests. The preparation was most effective against leafhoppers in both the sprays at all the doses tested providing control in the range of 50 – 56%. The preparation at farmer's dose was very effective in control of fruit borer infestation providing 50.6% reduction in infestation as compared to control and a 52.6% reduction in population of whiteflies. In case of mites, the preparation effectively reduced 54.6% and 52.7% mite populations as compared to control at half the farmer's dose and farmer's dose respectively. An overall 62.58% - 59.8% increase in production as compared to control was reported at the three doses tested and none of them caused any harm to the crop or to the beneficial insects like spiders and coccinellids during the whole course of trials.



State Award – Odisha

Tamarind De-Seeder

Dayaram Vishram Chouhan
Jeypore, Odisha

Dayaram (66) is a machine fabricator by profession, who joined his father's business of making electric boards and railway planks in the year 1974 and re-named it as Hindustan Iron and Wood Industry. In the year 1979 due to change in government policies he started making low cost agricultural equipment, which were easy to manufacture. Dayaram has developed a multi-seed decorticator and cashew nut peeling device also. A local non-profit organization approached him for developing a machine to separate tamarind seeds from tamarind fruit.

The tamarind seed-separating machine consists of a seed separation unit with separate outlets for the seeds and deseeded

tamarind. In the separation unit, tamarind is subjected to rubbing force by two rollers, mounted on frame, to break open the fruit and to push the seeds out. It can be operated manually as well as by electric motor.

The tamarind de-seeder costs Rs. 28000 and weighs about 50 kg. The manual version and power operated version have productivity of 5-6 kg/h and 10 kg/h respectively. The deseeding efficiency is reported to be 71.49% (testing report of SLFMTTC, Bhubaneswar). Dayaram has sold over 200 units till date out of which 25 units have been procured by Swaminathan Foundation, Jeypore and 80 units by TRIFED Bhubaneswar.





State Award – Rajasthan
Veterinary

Herbal medication for bloat

Kacharu Katara, Nathubhai, Rathubhai, Ramaji Bhimaji
Dungarpur, Rajasthan, Gujarat
Scout: Bharat Parmar

Kacharu Katara (76) is traditional livestock healer and a farmer who undertakes farming in his ancestral 4 acres farm. He has been treating livestock for several years but never seeks any financial assistance for his service.

Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. To treat bloat, he advices about 50g of dried leaf powder mixed in 200ml water to be administered to

the affected livestock. This preparation has to be administered orally once a day to the affected ruminants. During validation, this herbal medication was found to resolve the clinical condition of bloat, which is reduction in abdominal girth in 0.5 hours and enhancing rumen motility in 1.5 hours post treatment. This indicates that medicament was effective in treatment of bloat among clinically affected goat at the recommended dose.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



State Award – Uttarakhand
Veterinary

Herbal medication for bloat

Vijay Ram
Nainital, Uttarakhand

Vijay Ram (79) has studied up to 5th standard and has been earning his livelihood by agricultural activities. He has been practicing this medication, learnt from his family elders, in treating livestock affected with bloat since his childhood.

Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. To cure bloat, about 25g of dried powder of a particular herb has to be given twice a day for two days. He claims

this medication can relieve affected animals within 2-3 hours. During the validation, the indigenous medication showed significant impact in the reduction of abdominal girth in 30 minutes duration and sustained the impact up to 2.5 hours of observation. Further, the medication enhanced rumen motility from 1.5 hours and maintained up to 2.5 hours during the course of observation period, which proves its efficacy.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



State Award – Nagaland

Small Animal Restraining Cum Operation Table

Imna Meren
Dimapur, Nagaland

Imna Meren (51) initially practiced farming and carpentry in Mokokchung. However, in search of better opportunities, he had to move to Dimapur in 2012 with his wife. They started pig farming to sustain themselves. He had a keen interest in developing his ideas to workable solutions, which stemmed from his own observations. He spent a lot of his time and income on his innovations, going through numerous iterations. Other than the restraining cum operation table, he has also developed a pig dummy for artificial insemination, a tapioca slicing machine, and practices a different method of tapioca plantation.

He observed that the local veterinary centre did not have any proper operation table/tools and the animal had to be restrained by multiple people causing stress to the sick animal. Also, the local veterinary centre was situated very far and the roads were very bad. Often due to paucity of time,

distance, bad roads the ill animal would suffer a lot. He then started working on a small restraining cum operation table, which can be easily used in rural areas.

He developed an operation table for small animals from locally available Saagwan (teak) wood, to carry out simple medical routines such as vaccination, castration and administering medicines particularly for dogs, goats and pigs. It consists of detachable IV drip stand, compartment for storing surgical instruments, straps to secure the limbs and body, curved bed for comfort of the animal and provision for draining out stool and urine. It is hydraulically controlled and also provides an option for tilting the operation platform. It weighs 25 kg and costs Rs 18000. The table has been received positively in the local community with encouraging feedback from National Research Centre on Pig, ICAR.





State Award – Tamil Nadu

Jacquard Lifting Machine

P Ravi
Tiruvannamalai, Tamil Nadu
Scout: SEVA

Ravi (56) was interested in electronic gadgets from a very young age and started tinkering with old TV sets and audio players, familiarizing himself with different aspects of these gadgets. In 1999, he developed a novel way to manufacture quality audio cassettes at a cost that was cheaper than the ones available in the market. However, as time passed the technology evolved, making audio cassettes obsolete. Thereafter he started to work on a mechanized model to resolve one of the issues faced by the weaver community.

Weavers face problems while working with Jacquard handlooms due to heavy weight of Jacquard box (housing the whole mechanism), which has to be lifted by the weaver manually using his leg and a wooden lever. The weight of the mechanism coupled with the amount of repetitions, subject the weaver to physical strain and fatigue. This led

to decline in quality at the end of the day as well as lower productivity. To reduce the drudgery, health related ailments and increase in production speeds, Ravi designed a simple yet durable mechanism in 2009 that could be used to lift the Jacquard box with a simple press of a pedal.

Ravi's motorized Jacquard lifting mechanism is an attachment, which can be used in any Jacquard handloom for lifting the Jacquard box. The main function of Jacquard lifting box is to convert electric power into rotating motion by a single phase motor, which is later converted to linear motion. Several variants, compatible with different designs of Jacquard handlooms, costing between Rs. 15000 - 16000 are available and around 9000 units have been sold since 2009.





State Award – Tamil Nadu

Multi Stripe Weaving Machine

P. A. Sekar
Thiruvallur, Tamil Nadu
Scout: SEVA

Sekar (54) is a traditional weaver having over three decades of experience in weaving. He dropped out of school early to assist his father in weaving and allied work.

Sekar was a traditional handloom weaver who shifted to power loom weaving to improve productivity. Kanni poduthal (combining the ends) is one of the manually done, labour intensive task in weaving, which consumes a lot of time. In order to eliminate the drudgery involved in this task, he developed a machine to mechanize the process.

Sizing is done manually before weaving the threads in the handlooms at every 19 metre length. Sekar designed a machine to perform sizing at every 200 metres increasing the productivity 12 times by preparing 100 bunches per day. The machine is used for preparing short length warp of about 20 meters length, with proper lease, to enable for hand sizing before stretching on the loom for weaving. The conventional machine used to run on a 1 hp power motor while this machine runs on a ½ hp motor. Encouraging feedback has been received from Indian Institute of Handloom Technologies, Salem and over 100 families have adopted this machine in six villages. It costs Rs. 60,000/-.





State Award – Assam

Reciprocating Tea Dryer and others

Durlov Gogoi
Dibrugarh, Assam

Durlov Gogoi (51) is a serial innovator, who also loves composing and writing Assamese patriotic songs. Durlov has developed many tea processing machines, which include mini tea steamer, round tea dryer, reciprocating tea dryer, semi-automatic tea dryer, turmeric slicing machine, tea breaker, etc.

He owns a small tea garden, whose produce, was being sold to large tea factories nearby. This resulted in losses for him as a gunny bag full of fresh green tea leaves fetched him Rs. 3-8/bag only. Therefore he thought of buying a tea dryer, to process his own tea and sell dried tea in the market. He purchased a dryer but was not satisfied with its performance, hence he decided to

develop his own tea dryer. After years of trial and error, he developed his first tea dryer i.e. the reciprocating tea dryer.

The reciprocating tea dryer is also called as a push-pull tea dryer/to-fro tea dryer. Slider crank mechanism is used for the reciprocating motion of the drying trays. The drying capacity of the dryer with 14 plates is about 20-30 kg (wet weight) resulting in about 6 kg (dry weight) dried tea leaves in 40 min. The drying temperature can be maintained up to 100 C. The cost of machine for LPG unit with heater/kiln is Rs 2.5 lakh/ unit and for wood and other biomass with heater/kiln is Rs 3 lakh. Durlov has received positive feedback and has sold five units till now.





State Award – Assam

Sheetal Bichona – the Cooling Bed, Belt System Dryer (BSD) for Green Tea and others

Suren Barua
Tinsukia, Assam

Suren Barua (51) is a serial innovator and a fabricator. He owns a fabrication house named Tea Engineering Works where, he has developed many innovative machineries like BSD dryer, tea rolling table, tea steamer, Sheetal Bichona, domestic room heater and many more. Suren has been involved in developing tea processing machineries at an affordable cost for small tea growers/producers.

Sheetal Bichona- The Cooling Bed

During summers, in hot conditions, one feels uncomfortable due to continuous perspiration. Air conditioners are costly and not everyone can afford them. Suren has developed a bed with an in-built air cooler so that one does not feel uncomfortable while lying down on the bed. This cooler can also be used by the sick and elderly, who may have to lie down on the bed for long periods of time.

The cooling bed is an innovative steel box type bed, consisting of an electric motor, air compressor fans, a voltage regulator and an air duct. The cooled air passes through the perforated rubber mat through air duct and cools the top surface of the bed. The temperature of the bed can be regulated by varying the voltage of voltage regulator as per need of the user. It costs Rs 20,000/- .

Belt System Dryer (BSD) for Green Tea.

The existing tea dryers in operation face lot of problems like the drying trays getting stuck, higher maintenance and production cost, higher vibration and noise generation etc. At least 2-3 trained workers are required to operate these dryers. Suren Barua has developed a tea dryer to address these problems.

Suren's drier can be used to dry green tea leaves and other edibles like turmeric, paddy, ginger etc. It comprises a heat chamber, a drying chamber, a power source and a transmission system. Items to be dried are put on the belt driven drying trays. The machine can achieve drying temperature of up to 200°C. The three variants available are turbo type, L type and straight type suiting space availability of the users. Their capacity ranges between 150 kg – 3000 kg/8h. It costs Rs 4.85 - 12 lakhs and 35 units have been sold till now. The uniqueness of this dryer is that the belt driven drying trays (SS mesh) have been aligned properly for smooth and continuous operation during drying resulting in proper drying of leaves ensuring their good quality.





State Award – Maharashtra

Tillage Equipment with Mechanical Sensor

Ghanshyam Jadhav
Nashik, Maharashtra

Ghanshyam (34) left studies after completing 12th to support his family. He lives in a joint family and fabricates farm implements like plough, harrow, cultivators etc. in his fabrication workshop.

He had observed the organic farming practices of his neighbours and felt the need of having advanced technologies for intercultural tillage operation. This motivated him to work on developing a low cost and low maintenance multifunctional tillage equipment with mechanical sensor. He developed a Tractor PTO operated multipurpose equipment having

attachments like plough, disc harrow, weeder, grass cutter and furrow opener. While in operation, whenever the mechanical sensing rod strikes any plant/tree, the whole working unit moves away from it, through the spring attachment, and helps protect tree roots from getting cut. It also results in leaving very small area around the trees uncultivated.

The implement can be attached to any tractor of 22hp and above, and can cover an area of 1 acre in an hour. The cost of this tillage implement is Rs 1.25 lakh.





State Award – Andhra Pradesh

Pole Climber

Nannem Tirupathi Rao
Prakasham, Andhra Pradesh
Scout: Palle Srujana

Tirupathi Rao (27) is an electrician by profession. He left studies after completing intermediate due to poor economic background and started working for laying out electrical lines as a sub-contractor. He has been engaged in this work for the past 12 years and has worked in many states including Andhra Pradesh, Telangana, Maharashtra, Uttar Pradesh, Karnataka and Tamil Nadu.

Rao found it difficult to climb electric poles made of cement. Therefore in 2016, he began designing a device to aid in climbing up the electric poles of all types. He successfully developed a prototype after many trials and modifications. He used the

developed pole climber himself initially for climbing the electric pole, to instill confidence in others.

The pole climber is made of a 16 mm steel rod, shaped into a square and bent suitably. Two such pieces are used in tandem by the climber. He has fixed leather sandals on this bent frame. The climber simply shoves his feet into the sandals and climbs the electric pole using this innovation as one climbs a staircase. It is easy to learn and provides comfort in climbing which otherwise is a difficult operation. It is safe, as each climber is tested for 150 kg weight. One can sit on it and work with both hands.





State Award – Gujarat

Modified Wood Based Culturally Accepted Crematorium

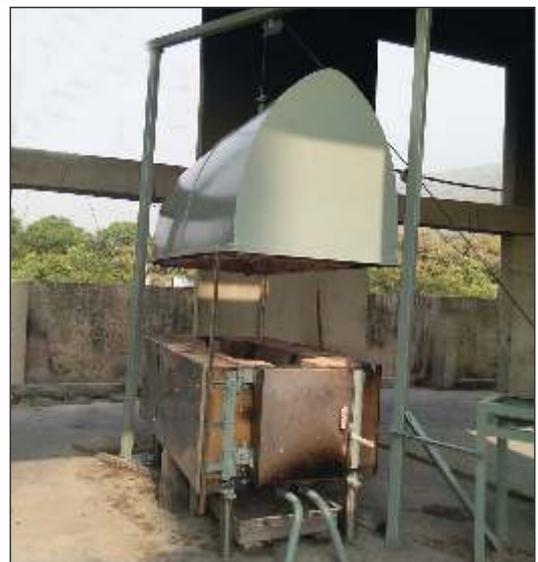
Arjunbhai M. Paghdar
Junagadh, Gujarat
Scout: CRSD

Arjun Bhai (56) is engaged in construction and brick making business. He has dedicated his life for solving the problems of common people and conservation of nature. He was awarded at NIF's 8th National Grassroots Innovation Awards for his brick/block making machine. He has also made a wood splitting machine, cow dung log and pot making machine and a mobile chabutra (bird feeding platform).

As per Hindu rituals funeral is by cremation generally where about 400 kg of wood is used. In India, millions of tons of wood is burnt every year in cremating dead bodies. Arjunbhai has designed a biomass gasification based cremation process, wherein a closed mummy shape is made of

refractory bricks to ensure minimum heat loss. He has placed doors at front and rear end of structure to perform Hindu rituals. The inner side of the top cover is filled with cera-wool, which can tolerate high temperature. Blowers and nozzles are provided which release air to accelerate the cremation process. Charcoal filters and caustic soda filters have been provided for air filtration and a chimney for air exhaust.

The average time taken to burn a dead body (about 80kg weight) is 70-90 minutes while consuming 70 to 80 kg of wood as compared to 3-4 hours in conventional method consuming around 400 kg of wood. The cost of modified crematorium is about Rs 2 lakh.





State Award – Uttar Pradesh

Improved Baisakhi (Crutch)

Durga Devi
Bareilly, Uttar Pradesh

Durga Devi (22) is physically challenged house wife, who is motivated to improve her life by overcoming her limitations. She used to slip and fall often on wet floor, while doing daily household tasks. She realised that normal crutches performed well at roads or rough surfaces, but while using them on smooth floor or low friction surfaces, they were prone to slipping causing the user to also slip and fall. Further she found that crutches also had a tendency of slipping away from the underarm. After observing these problems, she decided to modify the commonly available baisakhi/crutches.

She added three features to the crutches i.e. a shoulder belt which keeps the crutches in contact with body, a shock absorber, which absorbs vibrations or shocks while using the crutches and a clutch lever operated vacuum cup placed in the base/leg of the crutches. This arrangement prevents the crutches from slipping on slopes as well as on wet and smooth floor. After tying the shoulder belt it can be used as a normal crutch. While using the crutch on a wet/smooth floor, the vacuum cups stick to the floor up on pressing. When the user has to move again, the clutch lever can be pulled, which releases air into cup, making movement possible.





Consolation Award

Sona-40: Improved Onion Variety

Babasaheb Nanabhau Pisore
Beed, Maharashtra

Babasaheb (64) is well known progressive and experienced farmer in the field of onion cultivation and seed production. He has developed Sona-40 variety of onion through mass selection from N-2-4-1 variety based on the criteria of healthy plants, bigger and uniform flower size. Initiated in the year 2000, the selection process continued till 2005, when the desired characters were stabilized. He named the new variety-Sona-40.

This early maturing variety is known for its bulbs with single predominant axes made from the thick ring. The red coloured medium sized bulbs are free from splitting and have good shelf life. The variety has been validated at two locations under Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (Dr. BSKKV), Dapoli, Maharashtra. During the study, Sona-40 was found to be superior in terms of average bulb

weight, no. of rings per bulb, ring size, keeping quality and lower incidence of blotch disease as compared to checks. The variety produced significantly higher bulb yield (33 - 34 tons/ha) at both the locations over checks.

Babasaheb has received Krishi Bhooshan award from Maharashtra State for progressive farming and his contribution to onion cultivation. NIF-India has supported for on-farm trials and dissemination of the variety in twelve states and encouraging results and feedback was received from growers of Rajasthan and Maharashtra. Over 13,600 kg seeds of the variety has been distributed to the farmers of Gujarat, Andhra Pradesh and Karnataka since 2016. The process of registration of the variety under PPV & FR Act, 2001 has already been initiated by NIF-India.





Consolation Award

Souwriyamakkal: Improved Nutmeg Variety

Roy Mathew
Idukki, Kerala
Scout: PDS

Roy Mathew (57) a history graduate and a progressive farmer from Idukki has developed a nutmeg variety Souwriyamakkal identified for its good quality mace. He has been involved in farming for the last forty years and cultivates nutmeg and cocoa as main cash crops in his 10 acres of land. He has a keen interest in experimenting at his field for improvement in yield and quality produce of different spice crops.

During 1995-97, the market price of rubber had fallen drastically so he shifted to nutmeg cultivation. Then he had planted a hundred seeds of different unknown varieties. In 2000, he observed that all new plants were male and therefore in order to maintain vigour, he collected nutmeg buds of different local unknown varieties from the Angamaly forest area. In 2003, he noticed the peculiarity of one plant with fruits in bunches, a higher number of fruits per tree and intense aroma in mace. Later he

propagated it through budding & grafting and replaced the old plantation. In budding, he got good results and homogeneity of the desired characters. Now he owns 175 fifteen – seventeen years old trees of the variety at his farm. The trees bear fruits in bunches of three per stalk with higher yield (in a 17-years old plant, dry nut 35kg, dry mace 10kg). The high-quality mace contains superior essential oil per cent (24-25%) and medicinal properties.

NIF-India facilitated the biochemical and quality analysis of the variety at the Indian Institute of Spices Research, Kozhikode, Kerala. The variety was found to be superior in terms of higher mace oil content (24.3%), non-volatile extract (33.1%), Beta-pinene (12.69%) and myristicin (25.95%) as compared to the check varieties. The variety is being cultivated in 2.5 acres in Idukki district where over 350 grafted plants have been transplanted.





Consolation Award

Helen Morok- Improved Variety of Chilli

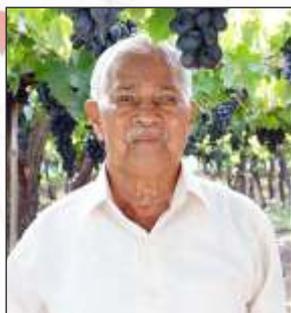
Leimapokpam Helendro Singh
Imphal West, Manipur

Leimapokpam Helendro Singh (52) is a progressive farmer and is involved in vegetable farming. He has been growing vegetables like chilli, cabbage, cauliflower, cucumber, pea and rice crops in his field.

During 1990-91, his parents used to grow indigenous varieties of chilli - Meitei Morok and Tha Animakhaic Chabi in their fields. Meitei Morok was very popular for its taste and big fruit size but was low yielding and longer duration variety while Tha Animakhaic Chabi was preferred by farmers for its short duration and high yield but smaller fruits. He was cultivating Tha Animakhaic Chabi and Achar morok varieties in his field in 1995 and during harvesting he saw some plants of Tha Animakhaic Chabi bearing big sized fruits. He selected those fruits and collected seeds for sowing. He continued the method of selection for 10 years and in 2005, the variety was stabilized for its desirable traits of big sized and number of fruits. The varietal characters became very popular in the region and many scientists and farmers started visiting his farm. The variety became very popular among the farmers at Kamong area and since 2005, the variety is being cultivated by the farmers of Bishnupur, Imphal East and Imphal West districts of Manipur.

The variety is a medium duration variety, suitable for timely sowing (October to November) under Manipur conditions. The fruits of the variety are bigger in size, have attractive red colour with mild pungency and good taste. It is also tolerant to leaf curl disease. Facilitated by NIF – India, the field testing of the variety was carried out at Central Agricultural University, Imphal, Manipur. It was found to be an outperformer in terms of fruit size and yield, which was significantly higher than the check varieties. This variety has been diffused among farmers of Bishnupur, Imphal East and Imphal West districts of Manipur who have reported broader chilli fruits having higher yield, which fetches them better market prices.





Consolation Award

Nath Jumbo Seedless: Improved Black Grapes Variety

Vithal Nivruti Thorat
Pune, Maharashtra

Vithal Nivrutti Thorat (76), who had studied up to class-XI only, has been involved in grape cultivation since last five decades. He has developed a grape variety “Nath Jumbo Seedless” having large bunches, good sugar content in berries and better shelf life.

Shri Vithal Nivrutti Thorat has developed this variety from Sharad Seedless variety through mass selection followed by grafting at his orchard. He identified three distinct grapes vines which had big sized berries, more number of berries and larger length of bunch in his plantation of Sharad Seedless variety in 1997. The selected bunches of grapes produced from selected vines fetched two-fold higher market price than the parent variety. He tagged the unique vines and multiplied them through grafting over root stocks of dog ridge grapes variety and observed the continuity for next 5 years for character stabilization. In year 2007, he planted only this new variety in one-acre of land and named the new variety as “Nath Jumbo Seedless”. Thereafter, he multiplied the graftings for developing an orchard of 4 acres in 2011. Subsequently, saplings of the variety were distributed to fellow farmers of surrounding areas for cultivation.

The variety takes 125-130 days to mature, produces extra-long and bold berries (40 x 24 mm) with superior sugar content and

higher bunch weight and yield, has shelf life of over three months and is preferred for export and fetches good market price due to elongated berry length and taste. Facilitated by NIF- India, the on-site evaluation done by the experts of Krishi Vigyan Kendra, Narayangaon, Pune confirmed the distinct characters of the variety and reported that the variety fetches 25 to 40% more price in market and is being successfully exported to European and Asian countries due to its better shelf life. The variety has been distributed to the grapes growers of Pune, Nashik, Sangli, Solapur, Baramati, Junnar areas covering over 1000 acres in Maharashtra state. The application for registration of the variety at PPV & FRA, New Delhi has been filed by NIF - India.





Consolation Award

Herbal preparation for insect pests and fungus infesting cabbage, cauliflower and vegetables

Kishan Singh
Kullu, Himachal Pradesh

Kishan Singh (38), a graduate, is engaged in agriculture for his livelihood. Based on the knowledge gained from his family elders, he makes use of two local plants along with cow urine for the control of insects and fungus in cabbage, cauliflower and other vegetables.

The insect control practice developed by him involves the use of powdered roots and leaves of plants (names withheld due to IP reasons). The preparation, effective at low volumes, can be stored in cool dry place for 5-6 months without losing its efficacy. Detailed prior art search did not reveal any insecticidal properties of both the plants used in the preparation.

NIF- India facilitated the validation trials of the herbal preparation at Department of Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi against insect pests of Okra, reporting that the formulation

was most effective in providing excellent control against both borer and sucking insects of okra. The most prominent result was observed in controlling mite infestation, where 67.2% and 69.6% population reduction as compared to control was recorded during first and second sprays respectively at farmer's dose. It was also very effective against shoot borer infestation providing 59.63% reduction over control at farmer's dose and also reduced fruit borer infestation by 58.1 % and 64.55% during first and second spray respectively. The preparation also reduced whitefly population by 42.1% and 47.1% during first and second sprays while 47.86% reduction in leafhopper population was recorded during second spray as compared to control. The preparation provided 78.4% increase in yield over control at farmer's dose and did not cause any adverse effects on crop, beneficial and non-target organisms.



Consolation Award

Herbal preparation for the protection of fruits and vegetables against insects and termites

Divya Sharma
Kullu, Himachal Pradesh
Scout: Kiran Kumar

Divya Sharma (40) is a housewife and herbal healer, engaged in farming. She mainly grows fruits like apple, pear, plum and vegetables in her farms. She uses the fruits of a local tree (name withheld due to IP reasons) for the protection of fruits (apple, pear, plum, pomegranate etc.) and vegetables against insects and termites.

She uses the filtrate of fermented solution prepared from the fruit powder of a tree locally grown in her area. The preparation is being used by her for about a decade in her farms and orchards. The preparation can be stored in cool dry place for 5-6 months without losing its efficacy. The detailed prior art search did not reveal any insecticidal properties of the fruits of the tree used in the preparation.

NIF-India facilitated the validation trials of the preparation at Department of

Entomology and Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi against insect pests of Okra. The formulation was very potent in the management of whitefly (*Bemisia tabaci*), providing 59.4% and 65.2% population reduction as compared to control during the first and second spray respectively at farmer's dose. The leafhoppers (*Amarasca bigutula bigutula*) were also controlled to the tune of 63.7% during first spray as compared to control at farmer's dose during first spray. The formulation at farmer's dose also reduced the fruit borer - *Earias vitella* infestation by 46.7% as compared to control during second spray. Overall 45.1% increase in production as compared to control was reported. None of the doses tested caused any harm to beneficial insects like spiders and coccinellids or caused toxicity to the crop.



Consolation Award

Herbal medication for bloat

Laxmiben Pratapji Thakarda
Banaskantha, Gujarat

Laxmiben (50) gained knowledge of treating livestock with help of several herbal medications learned from her grandmother. She practiced this knowledge with the support of her husband and is a known 'Pashu vaid' (veterinary healer) of her village.

Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. Laxmiben administers about 200g fresh leaves of an herb once per

day orally for 2 to 3 days to cure the clinical condition of bloat. This herbal medication resulted in significant reduction of abdominal girth from 30 minutes of observation and maintained the impact for a period of 2.5 hours during validation.

Further, it enhanced abdominal motility by one hour duration and sustained the impact till 2.5 hours indicating its efficacy. The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



Consolation Award

Herbal medication for mastitis

Shamalbhai Kanabhai Gamar
Sabarkantha, Gujarat
Scout: Bharat Parmar

Shamalbhai (71) claims to treat animals affected with clinical signs like haemorrhage in milk, painful udder, clinically referred to as Mastitis. This medication he learnt from his father and has been practicing successfully in his village for a long duration.

His medicine helps to cure the animals without any adverse effect by the 4th day onwards and has to be continued for 10 days. Clinically affected animals with bacterial mastitis were administered this medication

once daily for 10 days via intramammary route. The medicine was found to reduce inflammatory reaction as it stabilised clinical parameters viz., pH and somatic cell count among affected animals. The intramammary infusion was found to curtail bacterial growth in udder and enhanced Albumin:Globulin ratio. This resulted in protection of clinically affected animals with mastitis.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



Consolation Award

Tractor Mounted Multi-Crop Harvester

Jhabarmal Khokhar
Sikar, Rajasthan
Scout: Swabhiman

Jhabarmal (34) left studies after completing 8th standard and now owns a small workshop in Sikar, where he experiments and tries to innovate while developing farm machines.

Four years ago, while on a visit to Nagaur district of Rajasthan, Jhabarmal observed the farmers cutting green gram crop with cutter mounted on one side of tractor. He found that the cutter did not work effectively. After noting this problem, he decided to develop a machine, which could harvest low height crops like green grams, cumin, soya bean, gram, etc. He developed the first prototype in 2015 and further improved the design in 2017. He developed it so that it could be mounted on a tractor and can also function while the tractor is operated in reverse direction.

The tractor mounted multi crop harvester is useful to cut crops like green gram, isabgol, cumin, soya bean, black gram, chickpea, etc. It is mounted at the rear side of tractor for easy control and adjustments using the hydraulic system of a tractor. While in operation, tractor can be operated in reverse direction, this enables harvesting of crops sown in any pattern. It has a working width of 1.75 m, left over cutting height of 2.5-4.0 cm, field capacity of 0.25-0.43 acre/h (for different crops) and fuel consumption of about 2.5 lit/acre (at an average speed of 0.5-1 km/h). The machine costs about Rs. 65,000/- and 25 units have been sold till now.





Consolation Award

Mobile Groundnut Thresher

Nileshbhai Dobariya & Pankajbhai Lunagariya
Rajkot, Gujarat
Scout: GIAN West

Nileshbhai (35) is a practicing farmer also involved in trading of plastic items along with farming. Pankajbhai (35) is a fabricator by profession. Nileshbhai is an enthusiastic individual with a strong sense of service to mankind. He has developed an automatic battery operated floor cleaning device which is in use at the Swaminarayan temple in his village.

Nileshbhai observed that farmers faced scarcity of labor at the time of groundnut harvesting. The use of conventional threshers, requires adequate labor to collect the harvested/dug groundnut stalk. Delay in collection of harvested stalk, which is allowed for drying after digging, results in loss of groundnut. To overcome this problem, Nilesh along with his friend Pankaj started working on a solution, which could move around the field and pick up the heaps of harvested and dried groundnut

stalks on its own. They developed their first prototype in 2015 and then set out to improve it.

They developed a modified tractor mounted PTO powered mobile automatic thresher, which consists of an endless chain for collecting pods and stalk, a threshing unit, a separation unit for groundnut pods and stalks and a separate chamber for storage of groundnut pods and stalk. It consumes 2 lit of diesel to cover 1 to 1.5 acres of land in 1 hour with a capacity to store 600kg of groundnut and 800kg of stalk. It has been successfully used for threshing groundnut with an efficiency of 90%. Its cost of operation is only Rs 280 to 300 per hectare. It can also be used for harvesting soya bean and pigeon pea. The cost of the mobile groundnut thresher is Rs 500,000 only.





Consolation Award

Sunflower Seed Extractor

Lakhanlal Patel
Raigarh, Chhattisgarh

Lakhanlal (41) joined farming along with his father and brother immediately after completing his class 10th examination. He now owns 10 acre of land wherein he cultivates sunflower, coriander and groundnut crops.

The farmers in his village faced difficulty in extracting the seeds of sunflower due to the shortage of manpower. They grew sunflower at a large scale but were unable to get good return while selling sunflower without extracting seeds. Lakhanlal enquired about machines available for the

purpose but found them to be costly and out of reach of farmers like him. Therefore he started developing low cost machine for separating seeds from sunflowers at a minimal cost. He successfully developed and tested a prototype in his field.

The sunflower seed extractor is powered by a 1 hp motor and has a series of rubber belts as beating unit, which strikes the sunflower, resulting in its deseeding. Its capacity is 40 kg/h with deseeding efficiency > 95% and percentage damage < 1%. It costs Rs. 21,000/-.





Consolation Award

Reeling Machine for Muga and Mulberry

Saruj Chetia
Sivasagar, Assam

Saruj Chetia (30) is an innovator and a farmer who owns a poultry feed supplying shop and a computer shop. He completed his 12th and further pursued a one year ITI course in Information Technology. In his free time, he works on developing solutions for local problems. He has developed reeling machine for Muga and Mulberry and also undertaken a project on production of bio-fertilizer using poultry wastes.

Saruj practiced Muga cultivation and production using traditional method, which was very time taking and required more man power. Since he could not afford the reeling machine available in market, he

conceptualized a new low-cost design of reeling machine. He developed a prototype using the parts of a sewing machine, though it proved to be inefficient. He continued working on it and was able to develop an improved version of reeling machine, which could be used for reeling both Digh (Warp yarn) and Bani (filling yarn) simultaneously.

The machine can be operated by electricity (1hp motor) or manually as well. It can reel 300-500 cocoons for filling yarns (less twisting, thicker yarn) and 250-300 cocoons for warp yarns (more twisting, thinner yarn) in 8 hours.





Consolation Award

Chandan (Sandalwood) Paste Making Machine

Subhash Vasant Rao Jagtap
Jalgaon, Maharashtra

Subhash Jagtap (70), is NIF awardee of 3rd National Competition in the year 2005 for his innovation “Tricycle mounted Sprayer”. Over last four decades, Subhash has developed many machines like forging, drilling and plywood cutting machines and has been engaged in fabrication.

He observed the painstaking and laborious task of manually grinding sandalwood paste in temples and realized that they have a continuous and repetitive requirement of pure sandalwood paste, for religious rituals on a regular basis. Therefore he started to work on developing a machine for the same and after various trials and feedback succeeded.

The Sandalwood Paste making machine is an electrically operated motorised rotary grinder. The Sandalwood logs of small size, are placed on the circular shaped grinding stone. The motor rotates the grinding stone over the sandalwood log, a small quantity of water gets added with the result that a smooth Sandalwood paste gets formed. The capacity of the machine is 5 kg per hour and costs Rs 35000 only.





Consolation Award

Slider Swing

Sapan Kumar Mandal
Nadia, West Bengal

Sapan Mandal (52) is a well-known electrician in his locality. He had to discontinue studies after completing 10th examination due to financial problems in his family. However, his interest in modifying and improving machines led him to develop various machines over a period of time.

Mandal's swing can slide on a rail guide, with the help of two bearings, giving smooth operation and starts to swing with a mild push. It swings like a pendulum over the rail guides and can accommodate two adults at a time. During the birth of his daughter 15 years ago, he made this swing for her. It is

designed in such a manner that the swing can be modified according to the age of child. When his daughter was an infant, the swing was used as a bed for the baby. When she was a toddler the slides of the swing were protected by rods, for protecting her from falling down while in the swing. When she was able to sit on her own, the rods were removed and back-rest was added to make it comfortable for sitting.

The bulky structure of steel frame and chains has been eliminated making it light at 40 kg and at a cost of Rs 4000 only.





Consolation Award

Cow Dung Collecting Machine

Mohan Mukтажi Lamb
Beed, Maharashtra

Mohan (45) has studied up to 10th standard but is science and technology enthusiast with an interest in machines. He observes the problems faced by farmers and tries to solve them. Earlier, he developed an improved knapsack sprayer, for which he was awarded by NIF in its 7th National Biennial Award Function (2013).

Once during a visit to a dairy farm he observed the hesitation of labourers in picking and collecting cow dung by hand. While interacting with the dairy farmer, he came to know that there was always shortage of manpower due to the nature of

work involved. This motivated Mohan to work on developing a machine to pick and collect cow dung without any physical contact.

Mohan developed his first prototype in 2015, which got further modified based on the feedback till the final model developed in 2018. The cow dung collecting machine has a 0.5hp dc-g geared motor, battery, picking and conveying trays, collector, caster wheels, etc. It can work with AC geared motor also. It has a working width of 45 cm and a capacity of 8 kg/min. It costs Rs. 12,000 (with battery).





Consolation Award

Portable Room Heater (Bukhari)

Towseef Ali Malik
Kishtiwari, Jammu & Kashmir

Towseef (25), though a graduate is a daily wage earner, but with keen interest in exploring different solutions to everyday problems.

He observed and modified the traditional Bukhari, which is commonly used in every household of Kashmir to fight the chilly winters to increase its efficiency. It typically consists of a sheet metal cylindrical hollow space where wood is burnt to heat the room. The smoke generated in the chamber flows out through a sheet metal cylindrical duct well connected to the bukhari. Towseef used

logs made from gypsum and baked clay (powder of bricks) to retain heat for longer period.

The modified bukhari requires less than 1 kg/h of wood/coal, which is 3-4 kg/h in the traditional one. After complete combustion of fuel, it can retain heat for about 3-4 hours, while in conventional alternatives heat remains for half an hour only. The technology has been validated by NIT Srinagar and the design is being improved upon to increase the efficiency further.





Consolation Award

Electronic Load Controller

Lanu L Jamir
Dimapur, Nagaland

Lanu L Jamir (49) is an enterprising individual who has been known to find solutions of problems faced by local people in their day to day life. He has a background in electronics and runs an Engineering Innovation Centre in Dimapur, wherein he does his research and encourages others to experiment and make prototypes.

'Hydroger' a water mill or a pico-hydro-power system provides an electrical power output of 3-5kW. However, the electricity produced by them requires controlling/stabilizing to run the domestic household appliances. Imported controllers for this purpose are very costly and out of reach for local people.

Lanu Jamir designed and developed an electronic load controller that controls the power supply and works as a stabilizer cum controller for voltage, speed and frequency control of output power from the generator. By keeping the voltage and rpm constant, it can vary the frequency and acts like a synchronizer having a power factor of 0.9. Two types of load controllers, have been developed by Lanu, for 5kW and for 100kW respectively. Encouraging feedback from officials of a state Power Distribution Company has been received.





Consolation Award

Lac Processing Machine

Sourav Dey
Singhbhum, Jharkhand

Sourav comes from a humble background and aspires to become an electrical engineer. When he submitted his idea about the lac processing machine he was a school student, but now he has completed diploma in Electrical Engineering. He is very enthusiastic about machines.

Lac cultivation involves five major operations which are pruning, inoculation, used up broodlac (phunki) removal, harvesting and lac scraping. Mostly, lac cultivation operations are carried out manually. In one method, farmers sit on the ground in a group and scrape lac with the traditional tools like a small scraping knife (dauli) and sickle. In another method, farmers remove lac encrustation by beating lac sticks with bamboo stick. One person

scrapes 5-10 kg of lac in a day. As scraping is done on the ground, unwanted foreign materials like sand, soil, and wooden twigs find their way into scraped lac, reducing the price. Also the manual lac scraping is a very slow and tedious process.

Sourav was inspired by sugarcane juice extracting machine and designed a simple manually operated roller type lac scraper on the similar principle. The machine scrapes lac under the action of shear and compressive forces and has an attached rotator. Sourav's machine can remove lac from the branches without breaking them. As a result, the amount of impurities is lesser in the extracted lac and it takes lesser effort to clean it.





Consolation Award

Namda Rolling Machine

Zufa Iqbal
Srinagar, Jammu and Kashmir

Zufa Iqba (20) was known as junior scientist during her school days, for her inclination towards science and developing of new innovative projects for solving day-to-day problems faced by the people. She writes poetry and is an excellent debater. Though she was a school student when she submitted her idea, right now she is pursuing medical course in Iran.

Kashmiri Namda (woollen carpet) is just like a mattress, which is made up of wool. After imprinting with Kashmiri artwork, it is spread on the floor to adorn homes in winters. Namda making is a rare and unique craft wherein splendid floor pieces are made from wool by practice of felting the wool instead of weaving it. Wool is spread evenly in a thick layer on a grass mat or jute mat and sprinkled generously with soap water. Wool used here might be white or dyed. The mat is then rolled tightly and tied up with a rope

and compressed by way of rolling to and fro on the floor with the help of hands and feet. This process goes on for about an hour. This allows fusing together of the fibre technically known as 'fibre to fibre' fusion. The rope is then untied and the mat unrolled, to discover the well-shaped Namda. This manual process take hours to complete one Namda sheet.

Zufa developed a machine, which works on the principle of rotation and relative motion after material is wrapped around the main roller. The roller applies pressure on material which binds the fibres together. A motor is attached to the rollers with a set of gears, which generates ample amount of pressure. It consist of an adjustable roller, to roll Namda of different thickness. Machine takes almost seven to eight minutes to make a simple Namda.





Appreciation Award

Edavarembil Gold- Improved Nutmeg Variety

E. V. Thomas
Idukki, Kerala
Scout: PDS

Thomas (58) has an experience of over four decades in the cultivation of clove, black pepper and nutmeg using traditional methods learnt from his forefathers. He completed his education up to 8th standard but has been keenly interested in nursery establishment for propagating, regenerating and disseminating traditional cultivars of spice crops. He has developed a nutmeg variety Edavarembil Gold famous for good quality nuts.

After losing his nutmeg orchard to some unknown disease in late 1980s, he collected seeds and grafting materials of traditional nutmeg varieties from wild and propagated the plants by seeds and grafting using wild nutmeg rootstalks. In 1999, he developed fresh nutmeg plants and among the newly developed plants, he noticed four-five plants, which had lateral growth pattern of the branches. Owing to the peculiar growth pattern, which facilitated easy harvesting of fruits, he started clonal propagation from one of the lateral branching plant through grafting and continued for two generations. By 2004 he found that desired character was stabilized and named the variety as Edavarembil Gold. Presently, he has 50 fruit bearing trees of the variety, 20 of which are 15 years old. The variety produces more fruits per plant (200kg/annum in 10-years

old plant) with good shelf life (5 days) of raw fruits. It is also suitable for the cultivation in shady areas like in cardamom estates. The variety produces high quality bold nuts and dark red mace; nut contains higher essential oil content (13-15%).

Facilitated by NIF-India, the biochemical profiling and quality analysis of the variety were carried out at Indian Institute of Spices Research, Kozhikode. The report showed that the variety has superior quality nuts with highest oil (13.3%), total phenol (20.7 mg GAE/g) and Alpha-limonene (9.84 %) content as compared to all the checks. The variety is being cultivated in about two acres of land in Idukki district.





Appreciation Award

Kubri Mamhani Selection and Kamal- Green Rice Varieties

Rohit Sahu
Durg, Chhattisgarh

Rohit Sahu (46) is a farmer famous for identification and cultivation of green rice and organic farming in Chhattisgarh. He has keen interest in promoting organic farming and traditional crop varieties. He cultivates many traditional rice varieties using organic farming methods. He has developed the green rice varieties Kubri Mamhani selection and Kamal through mass selection from traditional varieties of rice Kubri Mamhani and Ramtil respectively.

During 2012, he observed that some dark blackish grains of Kubri Mamhani and Ramtil varieties produced green coloured kernel. Both the varieties were developed by selection of best seeds with desired traits of green kernels, high yield and aroma from the earlier known traditional varieties after continuous effort over 4-5 years. The characters of both the varieties were

stabilized in 2016 and he started mass multiplication of seeds 2017 onwards. The green colour of kernel, a very sensitive trait, is dependent on cultivation method, environmental condition and on hulling & milling practices.

The validation was facilitated by NIF- India at Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur where it was reported that the farmer's varieties performed better in terms of yield at both the test locations. On-farm trials at organic farmers' field in Uttar Kannada, Karnataka and Imphal East, Manipur conducted to evaluate the performance and green colouration of kernels of the varieties, showed positive results. Both the varieties are being cultivated in over 50 acre of land in Durg district.





Appreciation Award

Mosambi and Seb Mango: Conserved Indigenous Varieties of Mango

Syed Ghani Khan
Mandya, Karnataka

Not interested in agriculture initially, Syed Ghani Khan (38) had plans to study commerce and work in Mysore, but due to family problems he could not continue his studies and had to get involved in farming. At present, he is very popular and a well-known farmer for protection and conservation of paddy and mango varieties in South India. He is conserving more than 900 paddy varieties and 116 mango trees including exotic varieties such as having taste like sweet lime & cumin flavour and fruits in shape of fish at his biodiversity rich farms known as 'Badaa Baagh'. He also owns a repository where he has conserved more than 1200 indigenous & improved crop varieties.

The Mosambi mango variety conserved by him has sweet lime flavoured, slightly acidic firm pulp, yellowish green coloured peel at maturity with delicious taste in addition to its excellent keeping quality. The Seb mango variety resembles apple in terms of color and shape, with unique taste and good keeping quality.

NIF- India facilitated the on-site evaluation of the variety by the scientists of ICAR-Indian Institute of Horticulture Research, Bangalore. The result revealed that the average fruit weight of Seb mango is 120 g, with greenish yellow peel colour and orange pulp colour having moderate TSS (13 °B). It is unique variety having good flavour. For Mosambi Mango it was found that the fruit

shape is oblong, average weight is about 159.79 g. It is very delicious to taste, medium in pulp percentage (58.63 %) and moderate TSS (13.4 °B). The peel colour is yellowish green and with pale yellow pulp. Fruits are having sweet lime like flavor with slightly acidic firm pulp and excellent keeping quality.

For his outstanding work, he has been conferred with various awards including the 'Plant Genome Saviour Farmer Recognition' award by the PPV & FR Authority in 2012. "Krishi Jeeva Viavidya" honoured in 2010 and "Krishi Pandit" award in 2008 were awarded by the Government of Karnataka. Many farmers have collected scion from the trees for grafting and the Department of Horticulture, Govt. of Karnataka prepared 250 grafts of the varieties and distributed to the farmers of the Karnataka during 2014-15.





Appreciation Award

Herbal medication for bloat

Gameti Vishrambhai Somabhai
Aravalli, Gujarat
Scout: Bharat Parmar

Vishrambhai (73) undertakes agricultural labor activities for earning his livelihood. He also treats sick animals using herbs available in his vicinity and also travels inside forest to collect useful plants.

Bloat is a clinical condition wherein animals suffer from enlarged abdomen, pain, lack of motility of abdominal organs and respiratory distress. About 15g of this particular plant used by him has to be fed

once for 2 days for goats for treating bloat. Treatment of naturally bloated goats with this medicament therapeutically cured bloat, which is evident by reduction in abdominal girth and enhancing rumen motility of bloated goats in 1 hour duration of post treatment. This indicates that medicament is effective in treatment of bloat among clinically affected goat.

The name(s) of the plant(s) used in the herbal medication have been withheld due to IP reasons.



Appreciation Award

Double Axle Rotavator

Gurpreet Maan
Muktsar, Punjab

Gurpreet (39) studied till 12th standard and was a state level Kabaddi player. Since childhood he was interested in mechanical objects and therefore set up his own workshop for manufacturing rotavator and repairing of agricultural machineries. His family owns 10 beegha of land where they practice farming.

While farming using a regular (single shaft) rotavator, Gurpreet observed that conventional single shaft rotavator needs to be operated in 2-3 passes for efficient pulverization of soil in field. This made him work on developing a double axle rotavator and in 2012 he was able to complete it.

Gurpreet's rotavator uses double rotating shafts for pulverizing the soil in a single

pass. It is tractor (min 40hp) PTO powered rotavator, wherein both axles rotate in the same direction, at the same speed resulting in better pulverization of soil in single pass. It is available in size from 7 ft to 12 ft and different shapes of blades like L, J and C type can be attached to the rotor to pulverize the soil. It has been tested by NRFMTTI (Northern Region Farm Machinery Training and Testing Institute) and found to perform as per following specifications. Working width: 203 -205 mm, Speed of operation (kmph): 3.63-3.91, Field capacity: 0.629-0.734 ha/h; Field efficiency: 82.9-94.1%, Depth of cut: 6.0-6.3 mm, Fuel consumption: 5.90-6.29 lph. Over 100 units of this rotavator have been sold with good feedback.





Appreciation Award

Fruits and Vegetable Capper

Shaji Varghese
Ernakulum, Kerala

Shaji Varghese (54) practices farming and cultivates tapioca, banana, and rubber. He started farming to help his father after completing class 10th. He was an average student in school but had keen interest in science and used to participate in scientific exhibitions. He tried his hand in running a hardware shop, but shut it down due to losses. In order to sustain his family, he now owns and operates a poultry farm.

Four years ago (2015), Shaji observed the guava fruits in his garden were being eaten by bats and birds before ripening. This made him think of capping the fruits to protect them. Manual capping was possible only on small trees. This led him to think and develop a fruit capper for tall trees.

This fruit capper is a small tool, which can be used for capping or bagging fruits and vegetables to protect from birds, squirrels and insects. Any kind of cover-plastic, paper, cloth etc. could be used for this purpose. It is useful for fruits and vegetables like guava, cocoas, mangos, grapes, sapota (chikku), passion fruit, bitter gourd, snake gourd, etc. A plastic or paper cover is fixed on the holder with rubber band, the holder is placed around the fruit /vegetable and knob at the bottom is pulled. The pin releases a rubber band along with the cover. The length of the tool can be increased using additional pipe or pole. This tool is made of different sizes of PVC pipes and a lever, pin- knob etc. It costs only Rs. 350/-.





Appreciation Award

Modified Two Wheeler Vehicle for Specially Abled

Jignesh S. Shah
Ahmedabad, Gujarat
Scout: GIAN West

Jignesh (41) is physically challenged from lower limbs and works as a video editor. While browsing the internet, he once found a video of a vehicle, which enabled a physically challenged person to mount it with their wheelchairs. He was inspired to work on designing and fabricating similar mobility solutions for handicapped people under his company tag 'Freedom wheels enterprises'. He designs 10 different variants of wheelchairs for people who cannot even sit.

Jignesh designed and developed a customised two wheeler wherein one can mount the vehicle with wheelchair. He developed two variants, one with engine power based and the other electric power based. Before fabricating this two wheeler, he travelled in a 'retrofitted gear car' driven by himself. However, it was difficult to get

off the vehicle and on to the wheelchair and then back on the vehicle. Hence, he decided to work on the project and now mounts the two wheeler using his battery operated wheelchair, which can also be done by a similar person using his manual/ battery operated wheelchair.

The engine and pillion body of the Honda scooter (Activa) has been shifted towards the right, while in its place a lorry is attached to the vehicle's front part. In this lorry, a person with his wheelchair can be accommodated. The wheelchair is locked in its place using belts and/ or a wheel- docking system. The ramp provides additional safety support as it is linearly actuated and locked in its place behind the wheelchair. The modified vehicle can be driven up to speed of 60 kmph. The cost for modifications is Rs 45000/- .





Appreciation Award

Manual hand lever-based Tapioca plant uprooter /digger

S Vanchinathan
Erode, Tamilnadu

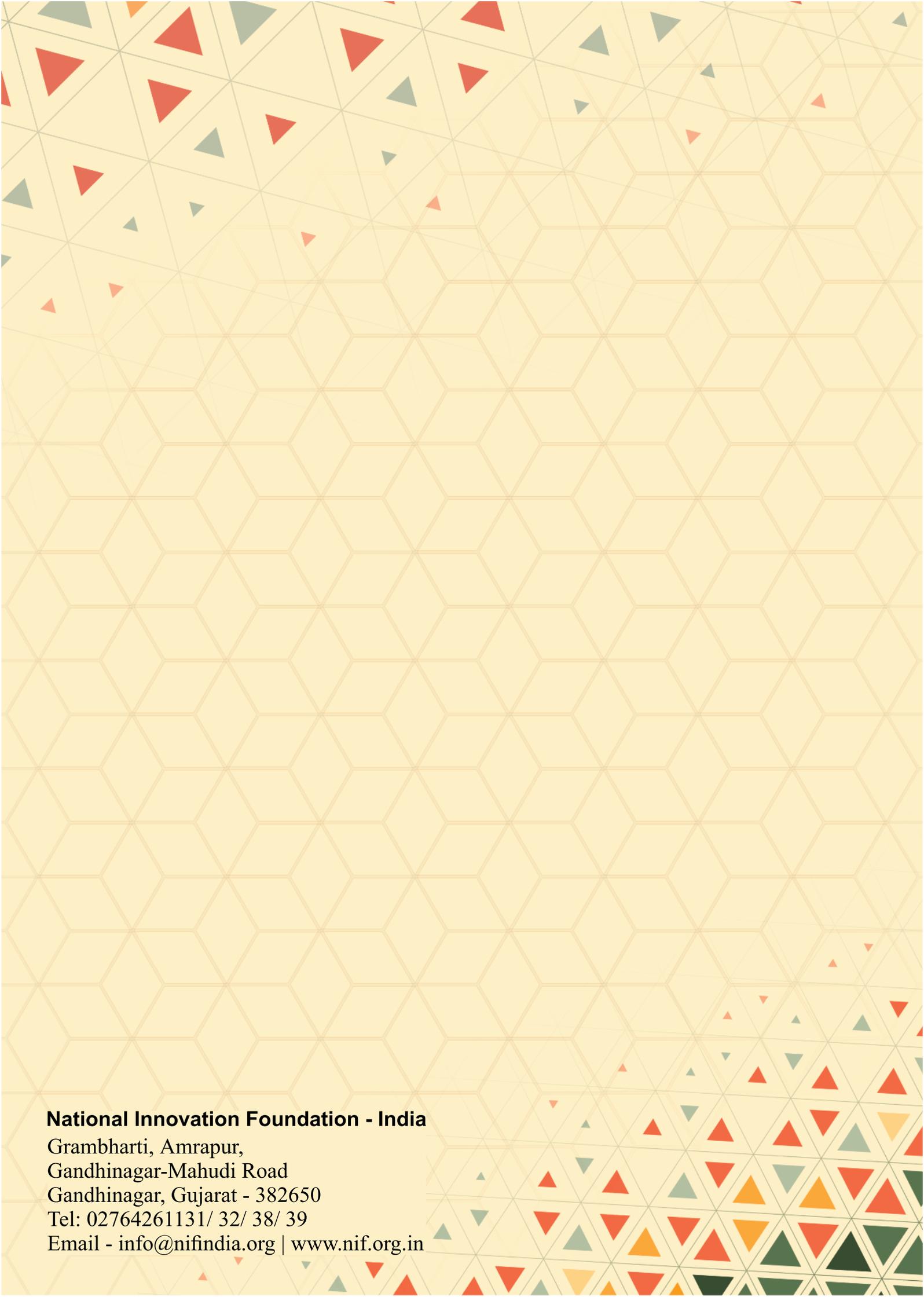
S Vanchinathan (14), a class 9 student, loves making small mechanical gadgets to address local needs. He wants to become a doctor and then join civil services to serve the people. The roots of tapioca plants are usually very deep. Plucking out tapioca requires a lot of effort and a small area of 1000 square meters requires two people per day to undertake the task. Realising the difficulties behind the operation, Vanchinathan designed a Manual hand lever-based Tapioca plant uprooter /digger.

It makes use of two levers, which move about a lever shaft (similar to shaft for

driven wheels). One lever has a jaw to clamp around the tree and the second lever helps in digging of the soil. The two levers are pushed together. The simultaneous application of pulling and pushing force helps in easy uprooting of the plant.

Using this device harvesting of tapioca from over an area of 1000 square meters can be done by a single person in a single day which otherwise requires two persons. The tool has also reduced drudgery involved in the task.





National Innovation Foundation - India

Grambharti, Amrapur,
Gandhinagar-Mahudi Road
Gandhinagar, Gujarat - 382650
Tel: 02764261131/ 32/ 38/ 39
Email - info@nifindia.org | www.nif.org.in