

11th

*National Biennial Grassroots
Innovations and
Outstanding Traditional
Knowledge
Awards
2023*



*11th National Biennial Grassroots
Innovations and
Outstanding Traditional
Knowledge Awards*

डॉ. जितेन्द्र सिंह

राज्य मंत्री (स्वतंत्र प्रभार),
विज्ञान एवं प्रौद्योगिकी मंत्रालय,
राज्य मंत्री (स्वतंत्र प्रभार) पृथ्वी विज्ञान मंत्रालय,
राज्य मंत्री प्रधान मंत्री कार्यालय,
राज्य मंत्री कार्मिक, लोक शिकायत एवं पेंशन मंत्रालय,
राज्य मंत्री परमाणु उर्जा विभाग तथा अंतरिक्ष विभाग
भारत सरकार



सत्यमेव जयते

DR. JITENDRA SINGH

Minister of State (Independent Charge),
of the Ministry of Science and Technology,
Minister of State (Independent Charge)
of the Ministry of Earth Sciences,
Minister of State in the Prime Minister's Office,
Minister of State in the Ministry of Personnel,
Public Grievances and Pensions,
Minister of State in the Department of Atomic Energy and
Department of Space,
Government of India



MESSAGE

The 11th Biennial National Grassroots Innovation and Outstanding Traditional Knowledge awards at Rashtrapati Bhavan is a small glimpse of Grassroots innovators whose commendable work leads to a widespread social impact. They can be spotted throughout the country with a unique characteristic that they want themselves, others and in a way entire country to be more efficient, effective and innovative in the approach. While a formal education would have been missing from their profiles, they have a unique ability to deploy their wisdom and S&T approach to solve problems. While they always remain favourite of people in their locality, the National Innovation Foundation (NIF) – India aims to get their work a much needed national level attention so that such talents attract respect for their innovative work from the entire country.

Driven by a strong leadership, every single day, India is upgrading its own historical standards in every dimension of Business and Science and Technology. Be it the Global Innovation Index or the Ease of Doing Business ranking and the likes, India is making its presence felt everywhere in positive ways. Such developments get validated when we meet the grassroots section of our population who are doing their bit to ensure that as a country our profile in the field of innovation grow higher. This book is a collection of such intriguing and inspiring stories which first introduces us to a problem, then someone rising to the occasion and arriving at ideas that can lead to a useful solution. Finally, we realize it is a different approach altogether to solve a perennial problem and it happens to be delivering more than existing solutions.

Contd...p/2

डॉ. जितेन्द्र सिंह

राज्य मंत्री (स्वतंत्र प्रभार),
विज्ञान एवं प्रौद्योगिकी मंत्रालय,
राज्य मंत्री (स्वतंत्र प्रभार) पृथ्वी विज्ञान मंत्रालय,
राज्य मंत्री प्रधान मंत्री कार्यालय,
राज्य मंत्री कार्मिक, लोक शिकायत एवं पेंशन मंत्रालय,
राज्य मंत्री परमाणु उर्जा विभाग तथा अंतरिक्ष विभाग
भारत सरकार



सत्यमेव जयते

DR. JITENDRA SINGH

Minister of State (Independent Charge),
of the Ministry of Science and Technology,
Minister of State (Independent Charge)
of the Ministry of Earth Sciences,
Minister of State in the Prime Minister's Office,
Minister of State in the Ministry of Personnel,
Public Grievances and Pensions,
Minister of State in the Department of Atomic Energy and
Department of Space,
Government of India

-2-

This year, the Presidency of G20 is being led by India. Hon'ble Prime Minister of India Shri Narendra Modi continues to emphasize the fact that India's G20 agenda will be inclusive, ambitious, action-oriented, and decisive. India is indeed very well positioned to do that simply because we value "inclusivity" in both letter and spirit, and we believe in driving it meaningfully and in a result oriented manner, a reflection of which is evident in the diversity of innovators and also innovations. For example, a paramount focus of innovators in Agritech, be it through Agri mechanization technologies or plant varieties or herbal formulations help us understand that "Sky is indeed the limit". While a wide range of technologies are available already, yet our grassroots innovators believe that being good isn't just enough and hence they target something great, extraordinary and in simple words innovative in their technologies. It is this "never say die" attitude of our innovators which motivates them to constantly improve and innovate during their respective journeys. Consequently, thanks to their innovations and "can do" spirit, countries like ours get an opportunity to ensure that tomorrow can be better than today for our people.

India's experiences can provide insights for possible global solutions and therefore it is important that knowledge creation at the grassroots get captured and successful approaches in one part of the country should get replicated in other parts. I am confident that through initiatives like FINE and award function, innovation quotient of the country will only improve further !

My best wishes to all the innovators !

(Dr. Jitendra Singh)

MBBS (Stanley, Chennai)

MD Medicine, Fellowship (AIIMS, NDL)

MNAMS Diabetes & Endocrinology

Anusandhan Bhawan, 2, Rafi Marg

New Delhi - 110001

Tel.: 011-23316766, 23714230

Fax: 011-23316745

South Block, New Delhi - 110011

Tel.: 011-23010191, Fax: 23017931

North Block, New Delhi - 110001

Tel.: 011-23092475, Fax: 011-23092716



डॉ. एस. चंद्रशेखर
Dr. S. Chandrasekhar



सचिव
भारत सरकार
विज्ञान एवं प्रौद्योगिकी मंत्रालय
विज्ञान एवं प्रौद्योगिकी विभाग
Secretary
Government Of India
Ministry of Science and Technology
Department of Science and Technology

06th April, 2023



Message

The paramount importance of the grassroots innovations for the country is underlined in the annual India Innovation Index, which encompasses it as one of the performance parameters for the States and UTs as a part of the evaluation. Over the past twenty-two years, the National Innovation Foundation (NIF) – India has been spearheading the grassroots innovation movement across the country, including the deepest pockets and the last mile locations. At the same time, it is also evoking interest of many other countries in the field of grassroots innovations and they look up to India for inspiration.

I am delighted that after the hiatus of three years due to the pandemic, the 11th National Grassroots Innovation and Outstanding Traditional Knowledge Award function is resuming and being organized at the Rashtrapati Bhavan, New Delhi. My heartfelt gratitude towards our Hon'ble President of India, Smt. Droupadi Murmu for kindly consenting to grace the award function and conferring the Awards to grassroots innovators of the country which is a big boost to technological innovations emerging in the informal sector of the society. I am sure as a key driver, NIF will continue to leverage this natural advantage to get traction for these innovations so that these could be promoted and propagated through relevant government agencies and under relevant schemes.

This award book profiles some very creative innovators identified and supported by the NIF from across the country and includes women, young students, farmers and others coming from remote and backward regions, tribal communities. It's encouraging to note that NIF is able to reach the interiors of the country and unearth the talent which abounds there. As one of the institutions of the Department of Science and Technology, NIF has a very important role to play, not only in identifying grassroots innovations but also in nurturing them into enterprises devising and delivering innovative solutions for the society. I hope that NIF will be able to undertake this with great aplomb.

My heartiest congratulations to all the award winners who would be receiving awards this year and also to others who may not have won the award, however, remain persistent with their respective efforts and are our hope for the future. The more innovators the country has, the more solutions get generated, and the more opportunities get created. The Department of Science and Technology, Government of India, through its various schemes and institutions, remains committed to undertake cutting edge research, investing in new and emerging technologies, and supporting innovative ideas of people of all age groups. This is destined to make India Innovative and raise the profile of the country in a special year when we are re-iterating our commitment to the belief of "One Earth, One Family, One Future".

(S. Chandrasekhar)

Technology Bhavan, New Mehrauli Road, New Delhi - 110016

Tel: 0091 11 26511439 / 26510068 | Fax: 00 91 11 26863847 | e-mail: dstsec@nic.in | website: www.dst.gov.in

Foreword

India is perhaps the only country in the world where the process of supporting grassroots innovation is institutionalized to an extent that the Office of the President of India, the highest constitutional office of the country hosts a festival of innovation and entrepreneurship (FINE) for them annually and an award function to recognize, reward and respect them biennially. This is in addition to a round the year engagement of grassroots innovators for various support and incubation activities by the National Innovation Foundation (NIF).

As is the case with many initiatives impacted by the pandemic, the temporary pause of three years owing to COVID-19 to the aforementioned programs i.e. FINE and Award function has momentarily deprived grassroots innovators this opportunity. However, the grassroots innovators and NIF have been active throughout this period. Grassroots innovators are now excited at a mere thought of exhibiting their innovations at the Rashtrapati Bhavan, and it goes a long way towards creating more opportunities for them. I am confident that they have utilized the time to amaze everyone with their tremendous creativity manifested in form of their innovative technologies which will be part of the innovation exhibition, a major attraction of the festival, year on year.

The awardees represent twenty-two States and Union territories across the length and breadth of the country. This reflects the pervasive culture of creativity across the country and also the ability of NIF to reach out and tap this creativity. It gives us an important message that India is an innovative country and there is no one particular region which is ahead or behind than the rest in arriving at indigenous solutions to local problems, and our men, women and children believe in the power of "attempting". There is so much that the rest of the country and rest of the world can learn from the unwavering commitment of our grassroots innovators.

I wish to congratulate all the awardees profiled in this Eleventh National Award Book of NIF for their accomplishments and hope they continue on their journey of innovation, in the service of the society. It's their first step towards changing the world with their innovations and entire country takes pride in their meritorious work !

With best wishes

P S Goel

CONTENTS

S. No	Innovator	Innovation	State	Award Category	Page No.
1	Dipak Sardar	Sola Wood Sheet Making Machine	West Bengal	National First	13
2	Kishan Lal Suthar	Tractor Operated Groundnut Decorticator cum Grader	Rajasthan	National First	14
3	Ram Vilas Maurya	G-Vilas Pasand - Improved Guava Variety	Uttar Pradesh	National First	15
4	Aniyamma Baby	Innovative Multiple Rooting Propagation Method for Cashew	Kerala	National First	16-17
5	Ravi Ganpat Chopade	Six Axis Rotating Head Golden Embossing Machine	Maharashtra	National Second	18
6	Sadasibo Majhi	Manual Paddy Transplanter	Odisha	National Second	19
7	Indrajit Singh Khass	Tree Root Puller	Maharashtra	National Second	20
8	Sachin Kamlakar Karekar	SK-4: Improved High Yielding Turmeric Variety	Maharashtra	National Second	21
9	Shishpal Singh	Herbal Medication to Hasten the Process of Expulsion of Placenta and Involution of Uterus	Uttar Pradesh	National Second	22
10	Biju Narayanan	Portable Coconut Breaking and Water Collecting Device	Kerala	National Third	23
11	Mukesh Kumar Singh and Rajmani Singh	Sonali - 45 : Improved Variety of Cauliflower	Bihar	National Third	24
12	Vishnu Kumar Sharma	Herbal Medication for Treatment of Mastitis in Cows	Rajasthan	National Third	25
13	Karappan Venkatraman	Innovative Handloom	Tamil Nadu	State Award	26
14	Shine Joseph	Clove Bud Separator	Kerala	State Award	27
15	Jalendra Kumar	Iron Bar Cutting and Bending Machine	Bihar	State Award	28
16	Mohd. Shafi Ahanger	Walnut Peeling Machine	Jammu & Kashmir	State Award	29
17	Imkongsunep	Pineapple Peeling Machine and Shredding cum Peeling Machine	Nagaland	State Award	30
18	Chhuanmawia	Laddu Making Machine & Large Scale Spindle Machine	Mizoram	State Award	31
19	Yanglem Brajamani Singh	Tractor Operated Taro Harvester with Washing Unit	Manipur	State Award	32
20	Suchil Teron	Soil Clod Crusher and Wetland Leveller	Assam	State Award	33
21	Mohammad Aminuddin	Tarpaulin Shed with In-built Water Drain	West Bengal	State Award	34
22	Rajesh Sahoo	Polanga Decorticator	Odisha	State Award	35
23	Sunil Ajurnarav Shinde	Silkworm Breeding Net Folding Machine	Maharashtra	State Award	36
24	Himatbhai Virjibhai Lakkad	AA: Improved Drought Tolerant Dual Purpose Sorghum Variety	Gujarat	State Award	37

25	Aji Thomas	Pelletisation for Paddy Cultivation	Kerala	Consolation	38
26	Ajaya Kumar Prusty	Paddy Straw Cutter for Mushroom Bed Preparation	Odisha	Consolation	39
27	Binoy Sebastian	Pepper Thresher	Kerala	Consolation	40
28	Rajanikant Raghavjibhai Dhedhi	Two In One Cultivator And Blade Harrow	Gujarat	Consolation	41
29	Dinesh Chaudhary	Channel Making Machine	Chhattisgarh	Consolation	42
30	Mohana Kumar G S	Automatic Cup Hanger Making Machine for Rubber Plantation	Kerala	Consolation	43
31	Selichum Sangtam	Cardamom Pod Plucking and Pruning Tools	Nagaland	Consolation	44
32	Budheswar Pamey	Coconut Harvesting Tool and Eri Cocoon Opener	Assam	Consolation	45
33	Harkumar Goswami	Self-Operated Juice Vending Machine	Assam	Consolation	46
34	Gobin Sinha	A Device for Climbing Areca-nut Tree	Tripura	Consolation	47
35	Chinnakannu Muthusami	Arecanut Leaf Moulding Machine	Tamil Nadu	Consolation	48
36	Punamchand Patidar	Kansi No.1: Improved High Yielding Onion variety	Rajasthan	Consolation	49
37	Mousumi Biswas	M-Jamini: Fine Grain Aromatic Paddy Variety	West Bengal	Consolation	50
38	Anand Kumar Patel (Community Representative)	Palli: Dual Purpose Chilli Variety for Chutney & Sauce	Gujarat	Consolation	51
39	Akhmabhai Vagadia	Herbal Medication for Treatment of Anestrus in Cows and Buffaloes	Gujarat	Consolation	52
40	Baltej Singh Matharu	Flower Shower Machine	Punjab	Appreciation	53
41	Nisar Ahmad Itoo	Standing Bar for Carpenters	Jammu and Kashmir	Appreciation	54
42	Bajrang Lal	BLK-Balaji: Improved High Yielding Wheat Variety	Rajasthan	Appreciation	55
43	Hom Prasad Chuwan	Herbal Prepration for Controlling Leaf Curl Disease	Sikkim	Appreciation	56
44	Asim Sikander Mir	Spill Proof Kangri	Jammu and Kashmir	Student First	57
45	Sayen Akhtar Sheikh	LPG Cylinder Cap Opener	Andaman and Nicobar Islands	Student Second	58
46	Sumit Murari	Bamboo Basket Weaving Machine	Jharkhand	Student Third	59
47	Tsering Omphel	Sea Buckthorn Harvester	Ladakh	Consolation	60
48	Hema Pradhan	Shock Absorbing Stretcher	Sikkim	Consolation	61
49	Arushi Tandan	Bed with integrated wheel chair	West Bengal	Consolation	62
50	Mauwang Wangham	Life Jacket with an Oxygen Mask	Arunachal Pradesh	Appreciation	63



National Award – First

Sola Wood Sheet Making Machine

Dipak Sardar

South 24 Parganas, West Bengal

Scout: Direct

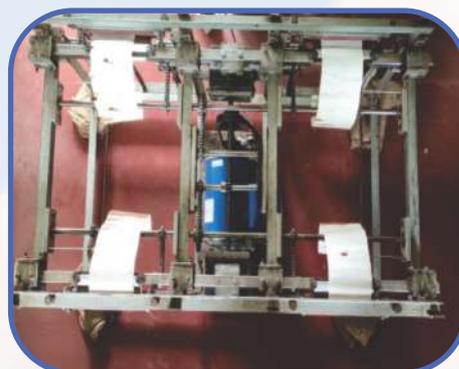
Dipak Sardar (27) has had a keen interest in the development of innovative items since his childhood. His father operates a lathe workshop and repair centre. Dipak uses locally available materials to develop various projects in his father's workshop.

Sometime in 2016, during one of the discussions with his friends, he learned that the artisans involved in the sola handicraft* industry were facing difficulties in manually peeling sola wood using a knife/blade. It would take a long time to produce a sola sheet, and during the process, they would also hurt their fingers. Encouraged by his uncle, who knew of his creative exploits, Dipak considered making a machine for solving these problems.

The sola wood sheet-making machine is a motorized machine that can slice four sola pith at a time to make sola wood sheets, which can then be used for making

handicrafts items. Four pieces of 12 cm long sola wood are inserted into the machine at a time. A roller rotates the sola wood through a slider-crank mechanism; simultaneously, a blade moves in to slide the sola wood. The machine produces a nicely finished, even surfaced, high-quality sheet of uniform thickness for the sola craft industry and eliminates the risk of physical injury to the worker. Manually one skilled labour can slice seventeen sola piths in an hour, whereas the machine slices over four hundred sola piths in an hour. No other sola wood peeling machine is not available in the market.

*Sola wood comes from a plant Shola (*Aeschynomene aspera*). It is usually turned into paper-like sheets by slicing the wood by hand. Various artefacts like flowers are then made from that paper.





National Award- First

Tractor Operated Groundnut Decorticator cum Grader

Kishan Lal Suthar

Bikaner, Rajasthan

Scout: FIMTTC, SKRAU, Bikaner

A school dropout, Kishan Lal Suthar (40) is a farm machinery manufacturer having a small workshop where he works on innovative farm machinery. His interest in machines dates back to his childhood when he tinkered with any and every toy or a gadget he could lay his hands on. Growing up among agriculturists, his interest in agro-machinery grew and he started fabricating machines and tools for farmers.

About ten years ago, upon request of neighbouring farmers, he started working on a machine to separate groundnut seeds from the pods and segregate them based on their size. After several attempts over the next five years, he succeeded in developing the

required machine.

The innovation is a tractor PTO-powered implement that decorticates groundnut to separate seeds. It also has a provision for a grading unit where groundnut seeds are graded based on their size and specific gravity. The machine has the capacity to decorticate and grade 800 - 1000 kg groundnut pods per hour at a fuel consumption of 4-5l/h at a decortivating efficiency of 97.63–98.87% and cleaning efficiency of 89.14–91.49%. The performance evaluation of the machine was undertaken at FIMTTC, SKRAU, Bikaner. He has sold over 150 machines.





National - First
Plant Variety

G-Vilas Pasand – Improved Guava Variety

Ram Vilas Maurya
Lucknow, Uttar Pradesh
Scout: Direct

Ram Vilas Maurya (69), a well-known progressive farmer in his area, only studied up to class 10th. But that did not prevent him from learning and experimenting on his farms. He developed an improved Guava variety with high economic yield and good market value due to its off-season availability

In 1970, Ram Vilas selected a plant of a local variety having prolific bearing and large-sized fruits. He sowed ripened fruit seeds in the nursery and developed 15 new plants. In the year 1979, among those plants, he observed that one plant bore jumbo-sized fruits throughout the year. During 1980- 84, he conserved that plant and started multiplying it through grafting and air layering. In 1984, he found that the variety was stable for new characters.

The G-Vilas Pasand guava has coarsely textured skin with creamy white fleshy fruits and has high market value and acceptance. The uniqueness of the G-Vilas Pasandguava is that it is an off-season bearing variety with

good market potential, dwarf plants and is suitable for medium-density planting. The variety bears fruits round the year. The average yield for a five-year-old plant is 50-60 kg, with the average fruit size being 300-400g.

The onsite evaluation for claimed characters of the variety was done by ICAR-Central Institute of Subtropical Horticulture, Lucknow, Uttar Pradesh. The report mentions that the variety has a unique trait of fruiting throughout the year. It gives an economic yield of 60-80 kg/plant with big-size fruits (350g) during the off-season when other varieties are not in the fruiting stage, making it commercially important for farmers. Ram Vilas has been selling this variety in Uttar Pradesh, Rajasthan, Haryana, Maharashtra and to farmers in South India. The variety is registered with the PPV&FR Authority, New Delhi (REG/2017/1642, date of Grant January 1, 2021).





National Award – First

Innovative Multiple Rooting Propagation Method for Cashew

Smt. Aniyamma Baby

Kannur, Kerala

Scout: Peermade Development Society

Aniyamma Baby (55) is a progressive plantation farmer and homemaker. She has developed an innovative multiple-rooting system method for cashew nut propagation. This method aims to create multiple roots in a grownup cashew tree to improve unit area production, manage stem and root borers, extend plantation life, and restore productivity in the senile cashew gardens.

She observed that the old cashew plantations of poor farmers are always under constant threat of diseases, insect pests and uprooting of trees due to cyclones. Observing the rooting and development process of a new plant from the branch of the mother plant, she thought of developing new plants by giving weight to branches close to the ground and covering them with soil for rooting. She has been using this method in the old senile plantations for the last seven years.

Two approaches followed by her to initiate rooting in a grownup cashew tree are:

1. A sac filled with potting mixture (soil and cow dung) is tied on the lower branches of cashew growing parallel to the ground. After one year, rooting occurs at that point. These new roots are then guided through hollow areca nut stems filled with soil and cow dung to the ground. In little over a year, the roots shall develop and add to the root network of

cashew. It will help as additional channels for nutrient and water uptake to the plant and will be helpful to improve the yield.

2. She heaps stones around the nodes of trees with low-lying branches and covers them with soil and cow dung. Rooting occurs at these points, and these branches grow as new trees while remaining part of the main tree. She has successfully initiated the rooting of branches lying in rocky areas.

The uniqueness of the method is that it is cost-effective technology to increase and restore the productivity of cashew crops in a short time. It is an eco-friendly method for in-situ plant multiplication and managing severe stem and root borer attacks. Being a climate-resilient (cyclone and storm) technology to protect old cashew plantations, it gives higher yield due to fast plant growth and more flowering/fruitleting. It facilitates utilization of rocky areas for plant multiplication and sustainable use of cashew plantation areas.

The technology was validated by ICAR-Directorate of Cashew Research, Puttur and Kerala Agriculture University for its innovativeness. They opined that the technology is unique and can be helpful for the cashew farmers having old and senile cashew gardens to realize additional yield by improving nutrient and water uptake and by

providing an additional sink for flower and fruit production. The technology also helps provide anchorage against wind damage/cyclonic storms and helps to extend the plantation life also without replanting.

Kerala Agriculture University scientists observed that this new technology offers hope and a new method to restore cashew productivity in senile plantations and could be a potential for farmers and eco-friendly technique to restore cashew trees from a severe attack of cashew stem and root borer, which is a debilitating pest in cashew.

The technology is recommended as a cost-effective, innovative method of managing cashew root development to increase production and provide eco-friendly management technique for crop loss due to pest attacks and giving extra anchorage to prevent damage from cyclonic storms in the coastal regions. To date, about 600 farmers from five districts of Kerala have been trained by Aniyamma in this technique.





National Award– Second

Six-Axis Rotating Head Golden Embossing Machine

Ravindra Ganpat Chopade
Mumbai, Maharashtra
Scout: Direct

Coming from a humble background, Ravindra Chopade (48) has toiled hard since dropping out of school to reach a stage where he operates two printing shops and leads a team of a dozen. He has been providing photocopying, binding, printing and embossing services at his small shop near IIT Mumbai.

The process of embossing is quite slow using the conventional letter punch process. To automatize and accelerate the embossing process, he devised a mechanism to use existing printers and desktops to achieve the intended result. Further working on the idea, he developed three kinds of machines viz. Golden Embossing Machine using high-quality dot matrix printer, digital hot foil stamping embossing machine and digital hot foil printing machine. This innovation won him the Maharashtra State award in NIF's 7th National Grassroots Innovation Awards 2013.

The Six-axis rotating head golden embossing machine is a stamping machine with a head movable on six axes. The first axis, 'Z', at the top of the machine, is for punching, the second one is the rotary axis for indexing letters, the third one is for changing the angle and elevation of letters, the fourth one, 'X' axis and the fifth one 'Y' axis are for moving bed in the position of X-Y laterally and the sixth one is for foiling, i.e. golden roll winding. The machine facilitates golden embossed printing on a diary, paper, or file of any material - leather, canvas, plastic, or sheet. The whole system is software operated. Once the required text is entered into the software and the print command is given, the system starts printing. The device can emboss 350 characters in a minute.





National Award Second

Manual Paddy Transplanter

Sadasibo Majhi
Koraput, Odisha

Scout: Mukhyamantri Abhinav Krishi Yantrapati Samman
Yojana awards, organised by Govt. of Odisha & NIF

Sadasibo Majhi (43), class 9 pass, is a mechanic and a fabricator. He makes iron gates, window grills, agricultural machines and tools such as cage wheels for tractors, paddy threshing machines, paddy winnowing machines etc. Learning fabrication while working in various workshops, he now owns one.

Koraput is an economically backward district with a large tribal population. Most of them cannot purchase costly agricultural machines and tools from the market. Considering this, Sadasibo developed a low-cost manual paddy transplanter after several design and material iterations.

The device used for the wash-root method of transplanting is a manually operated (pulled type) paddy transplanter requiring two persons for its operation. The mechanism for picking (using rubber roller and fingertips) and transplanting is simple, with a provision of adjustment in width and depth of the plantation. At a time, six rows can be transplanted. The field capacity of this device is 0.6 acre per hour, with 6-inch spacing between two plants and 91 cm being the overall width of the planter. The power is obtained from the ground wheels through the chain and sprocket mechanism. The operational cost (including labour) is Rs. 400/- per ha compared to the alternatives available on contract for ₹4500/- per ha.





National Award – Second

Stump Remover /Tree Root Puller

Indrajit Singh Khas
Aurangabad, Maharashtra
Scout: Direct

Indrajit Singh Khas (47, fabricator) is keenly interested in developing new machines, particularly agriculture-related ones. Based on problems his farmer friends identified, he had developed a ginger/turmeric sowing machine earlier.

A few years back, one of his farmer friends had planted paper wood (subabul) trees, which left behind their stump after harvesting. He inquired about removing the stump from a JCB owner who estimated the cost to be Rs. 1,80,000/- for the 14-acre land, which was not affordable. His friend requested him to think of a practical cheaper solution.

The stump remover is a tractor-mounted implement for stump/tree root extraction. It is mounted on the rear side of a tractor (30 hp

and above) through a three-point linkage system. A hydraulic double-acting cylinder is connected to the tractor's hydraulic hose pipe to actuate the arm to hold the plant body. There are two arms to dig and hold the plant body, of which one is fixed, and the hydraulic cylinder actuates the other. Weighing about 150kg and consuming about 3.5 litres of diesel per hour, it can cover an acre of land in 10 hours. It can pull the stump from approximately 20.32 cm (8 inches) depth in the soil. The machine is mainly used for stump removal of paper wood tree roots like eucalyptus, subabul, etc. The machine's novelty is utilising the tractor's hydraulic power to undertake stump removal, done conventionally through JCBs, whose rental charges range from Rs. 12,000 -15,000 per acre.





National Award – Second

SK-4: Improved High Yielding Turmeric Variety

Sachin Kamlakar Karekar
Ratnagiri, Maharashtra
Scout: Direct

Sachin Kamlakar Karekar (43) is a progressive and skilled farmer cultivating turmeric, coconut, mango and areca nut. He has a keen interest in the development of high-yielding, disease-resistant varieties of turmeric.

He has developed an improved variety of turmeric through the clonal selection method based on desired traits. In 1998, he planted the local variety Kadja and observed a few plants were early maturing and had good vigour. He harvested the produce from these plants and further selected plants with the best disease free, big sized rhizomes, bright in colour, having higher yield and continued the best selection till 2007. By 2008, he was able to develop a superior clone with all the desired traits like early maturity, vigorous growth, disease-free plants with high yield and bright colour rhizomes. He multiplied the selection and named the variety SK-4.

The variety is characterized by high yield

potential (50t/ha fresh rhizome) with attractive bright reddish yellow coloured, big-sized rhizomes. It is a short duration (160-170 days) variety suitable for high rainfall regions with good tolerance to rhizome rot disease.

During Kharif 2020, the validation trial was carried out at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. The variety was found to be promising, with high rhizome yield (56t/ha). Among the 32 tested varieties, SK-4 was observed to be superior over 28 check varieties and at par with the best check variety Sona (64t/ha), in terms of yield/ha. It was reported to be tolerant to leaf spot disease and rhizome rot disease. He has given this variety to a few fellow farmers in his surrounding villages, and the feedback is good. In 2021 around one lakh saplings of SK-4 were sold in Maharashtra. NIF-India has submitted the application for registration under PPV&FR Act, 2001.





**National Award - Second
Veterinary**

**Herbal medication to hasten the process of expulsion of
placenta and involution of uterus in animals**

Shishpal Singh
Meerut, Uttar Pradesh
Scout: Direct

Sachin Kamlakar Karekar (43) is a progressive and skilled farmer cultivating turmeric, coconut, mango and areca nut. He has a keen interest in the development of high-yielding, disease-resistant varieties of turmeric.

He has developed an improved variety of turmeric through the clonal selection method based on desired traits. In 1998, he planted the local variety Kadja and observed a few plants were early maturing and had good vigour. He harvested the produce from these plants and further selected plants with the best disease free, big sized rhizomes, bright in colour, having higher yield and continued the best selection till 2007. By 2008, he was able to develop a superior clone with all the desired traits like early maturity, vigorous growth, disease-free plants with high yield and bright colour rhizomes. He multiplied the selection and named the variety SK-4.

The variety is characterized by high yield

potential (50t/ha fresh rhizome) with attractive bright reddish yellow coloured, big-sized rhizomes. It is a short duration (160-170 days) variety suitable for high rainfall regions with good tolerance to rhizome rot disease.

During Kharif 2020, the validation trial was carried out at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. The variety was found to be promising, with high rhizome yield (56t/ha). Among the 32 tested varieties, SK-4 was observed to be superior over 28 check varieties and at par with the best check variety Sona (64t/ha), in terms of yield/ha. It was reported to be tolerant to leaf spot disease and rhizome rot disease. He has given this variety to a few fellow farmers in his surrounding villages, and the feedback is good. In 2021 around one lakh saplings of SK-4 were sold in Maharashtra. NIF-India has submitted the application for registration under PPV&FR Act, 2001.





National Award - Third

Portable Coconut Breaking and Water Collecting Device

Biju Narayanan
Idukki, Kerala
Scout: PDS Kerala

Biju Narayanan (51) works as an electrician and a mechanic. He has been a curious tinkerer since his childhood. Noticing the various coconut-breaking methods used by people around him, he came up with his manual cum power-operated portable coconut-breaking machine.

Generally, dry coconuts are broken into two equal parts for further processing, like the making of copra wati, virgin coconut oil and coconut powder. Conventionally, manual tools/ implements are used to break coconuts, which is unsafe, drudgery-prone, tedious and time-consuming.

Biju's machine is a portable device where a

dry coconut is split into two pieces using the impact of a free-falling blade accentuated by the movement of a cam. After breaking open the coconut, the water passes through a filter and into a collector. This machine can be manually operated as well by an electric motor. Taking only a few seconds to break/ split a single coconut, the machine can break open about 250-300 coconuts per hour in manual version while 800-900 coconuts per hour in power operated version.





National Award – Third

Sonali-45: Improved Variety of Cauliflower.

Rajmani Singh and Mukesh Kumar Singh

Vaishali, Bihar

Scout: Direct



Rajmani Singh (45) and Mukesh Kumar (39) are well-recognized progressive farmers in their district, renowned for their efforts to conserve and propagate traditional cultivars of cauliflower and brinjal.

The Chakwara area in Vaishali is the hotspot for traditional varieties of cauliflower, and farmers have been cultivating traditional varieties for decades. The Singh brothers have been growing cauliflower since their childhood. They developed Sonali-45 from a traditional variety of cauliflower Kuvari through selection and seed propagation methods. In 1995, they selected plants with good quality curd with dwarf height, early maturity and higher curd weight and harvested them for seeds. During 1996 – 1999, they repeated the selection process and selectively harvested and multiplied the seeds. By 2000, the variety was stabilized for the desired traits-early maturity, high yield and good curd quality. After that, they multiplied around 30 kg seeds of Sonali-45 and distributed them to fellow farmers.

The variety Sonali-45 is an early variety requiring 70-75 days after transplantation for maturity. It produces attractive white-coloured compact curds weighing around 450-500g, and is high yielding (18-20t/ha). The variety is suitable for early sowing also, tolerant to insect pests and diseases and has a good market price.

The validation trials were conducted at Dr Rajendra Prasad Central Agricultural University, Bihar, in 2018. The variety recorded maximum curd yield (18.5 t/ha) and average curd weight (470.4g). Sonali-45 exhibited higher yield and was superior in average curd weight, curd polar diameter, earliness, gross plant weight, and leaf length compared to all checks.

On-farm trials of the variety were conducted in four states - Gujarat, Uttar Pradesh, Bihar and Maharashtra. The variety was found to be most suitable for cultivation in Uttar Pradesh and Bihar for early sowing and maturity. The highest yield of 30.0 t/ha was reported from East Champaran, Bihar. Singh brothers have turned into Agripreneurs, registered a seed company- “Ramayan Seeds”, and sold four-quintal seeds of the variety in Bihar, West Bengal, Jharkhand and Odisha, generating around Rs. 19 lakhs in revenue.





**National Award – Third
Veterinary**

Herbal medication for treatment of mastitis in cows

Vishnu Kumar Sharma
Jaipur, Rajasthan
Scout: Direct

Vishnu Kumar Sharma (50) is an innovator and a traditional knowledge practitioner from Rajasthan. He is a serial innovator who develops machinery-related innovations and practices herbal medicines for various human and animal-related ailments.

Mastitis is an inflammation of the udder tissue in mammary glands due to certain infections or physical trauma. It may cause pain, redness, and swelling of the udder. It may result in loss of milk or a change in texture and quality of milk as well. Vishnu Kumar has developed a herbal formulation for treating mastitis. When administered to the affected

animal, this formulation helps relieve the symptoms gradually.

The validation trials for the herbal practices were carried out at Nagpur Veterinary College, Maharashtra Animal and Fishery Sciences University (MAFSU), Nagpur. The dairy animals suffering from Sub Clinical Mastitis [SCM], diagnosed based on inflammation in the affected quarters, were topically treated with the test medication. It was found that Somatic Cell count(s) decreased from Day 1 of Post Treatment [PT] period. The improvement in udder health was noticed by 5th-day post treatment.



State award – Tamil Nadu

Innovative Handloom

Karappan Venkatraman
Coimbatore, Tamil Nadu
Scout: SEVA, Madurai

Born in a farmer's family, V. Karappan (71) lives near Tiruppur. Most people in his and the surrounding area work in weaving and textile-related businesses. Growing up among weavers and loom operators developed his interest in weaving. He also started improvising on the looms, developed a jacquard lifting machine with a gear system, and introduced a braking system for handloom machines.

Once, chikungunya disease was widespread in the region, affecting a large number of workers. They complained of joint pain, due to which they could not work on the looms and had to discontinue their jobs. Karappan decided to design a handloom where only one leg and one hand are needed for weaving. After developing it successfully, he modified it further into a loom that could be operated by a

single leg without requiring any support of hands.

The innovative handloom machine includes a static and dynamic body frame, an oscillating frame made of wood, pulleys, gears, and a band brake for stopping power transmission. The machine is operated using a single-foot pedal. The mechanical power is transmitted from the oscillating frame to the roller below, which moves the oscillating cross frames up and down to facilitate weaving. The application of the band braking system stops the handloom operation within seconds. Due to the torque stored in the flywheel, the effort to be applied by the weaver is drastically reduced. Silk, cotton sarees can be woven within 12 hours at 0.5m per hour. Also, bed sheets can be woven on this handloom.





State Award – Kerala

Clove Bud Separator

Shine Joseph
Kozhikode (Calicut), Kerala
Scout: PDS Kerala

Shine Joseph (40) completed his higher secondary and took up farming as a full-time profession. While his main interest lies in agriculture, he also tinkers with tools and equipment required in the field.

Conventionally, the clove buds are removed from the stalk manually after harvesting. This is done by holding a cluster in one hand and pressing it against the palm of the other. Proper precautions should be taken before separating the clove buds to avoid contamination. The stems and buds are separated and dried separately. The stems can also be processed for oil distillation. For the separation of clove buds, 40 labours are required to process approximately 600 kg of clove buds in a day, making it a labour and a time-consuming process. Looking at the problem, Shine developed this machine for self-use in 2018. Now farmers in his

neighbourhood also rent this machine for their use.

The machine separates stalks and clove buds from clusters by rubbing. The bud cluster is passed through a cylindrical drum inside which three spiral blades rotate, resulting in rubbing and separation of stalk and buds. A 1hp motor operates the machine. This machine can process 400 kg clusters per hour with an efficiency of 99%. By the conventional method, costing of bud separation comes to be Rs. 12/kg, while using this machine, it comes to less than Rs. 1/kg. The cloves obtained after processing through the device are dipped in a saltwater container to remove unwanted impurities sticking to the buds. After several trial and error attempts, Shine found that salt water at 7.2% can clean the clove buds efficiently.





State Award – Bihar

Iron Bar Cutting and Bending Machine

Jalendra Kumar
Nawada, Bihar
Scout: Direct

A school dropout, Jalendra Kumar (32) is a fabricator and has had a keen interest in improvising machines and gadgets since childhood. After learning basic fabrication from his father, he moved to Delhi to get some experience and save money for his workshop. After a few years, he returned and opened his workshop and started the fabrication of door gates, vehicle trolleys, and different small agriculture implements like threshers, winnowers etc.

Jalendra gets orders for different kinds of machinery from his clients. But his margins are low, so he faces many problems undertaking tasks without cutting into his profits. Labour has been one big issue for him. This makes him think continuously about developing machines that could help him at work. Generally, fabricators use cut-off saw/chop saw to cut iron bars. In this process, the abrasive cutting wheel needs to

be changed after heavy use. Loud noise is also another issue during the cutting operation. These issues made him think about developing an improved cutting cum bending machine.

This machine is electrically operated and has a 1hp motor for cutting and bending operations. The machine can cut an iron bar of 10 mm diameter in 5 sec. The iron bar is easily sheared when a sharp-edged cutting tool is applied at heavy pressure. The bending operation is similar to cutting, but adie helps bend the metal in the former. A fabric belt connecting the rolling shutter spring and hollow cylindrical bar helps the cutter and other movable elements return to their respective positions. The machine cuts/bends the work piece precisely and does not produce any significant noise during its operation.





State Award – Jammu & Kashmir

Walnut Peeling Machine

Mohd. Shafi Ahanger
Anantnag, Jammu & Kashmir
Scout: Direct

Born in a blacksmith's family, Shafi (42) had a childhood full of struggles, more so because he is physically challenged. Overcoming his financial hardships and physical limitations, Shafi self-learnt mobile repairing and opened a shop in his village. He has had a keen interest in developing something new, which has led him to make devices like an inverter power supply, a lantern that works on DC power, and a generator using a six-volt motor. In 2017, he won NIF's National award for his PCB repairing device for mobile phone.

Kashmir is blessed with walnuts of the best quality. Peeling (green) walnuts immediately after harvesting and drying is essential for walnut processing. Peeling green walnuts manually is a tedious, time-consuming and back-breaking process, and it adversely affects the skin of the hands of the person who peels the walnut. To make the process

efficient and without exertion, Shafi first developed a manual walnut peeling device and then modified it into a manual and a powered system.

In this machine, green walnuts are fed into the hopper at a level convenient to workers standing on the ground. They are received on a horizontal conveyor into four parallel rectangular channels mounted atop shredder plates. The shredder plates are supported by perpendicular compression springs so that walnuts of all sizes can be accommodated underneath the shredder plates, and sufficient compression force can be applied to the walnuts. As the walnuts travel along the conveyor belt length, they are subjected to impact and shredding forces, leading to the peeling of walnuts. The machine's throughput is 500-600 kg/h at a peeling efficiency of 98%.





State Award – Nagaland

Pineapple Peeling Machine and Shredding cum Peeling Machine

Imkongsunep

Mokokchung, Nagaland

Scout: Direct

A Pastor in a Church, Imkongsunep (47), has been a tinkerer since childhood. Always keen to look inside machines and devices, trying to understand their work, and trying to break them and remake them, have been her hobbies even today. He has built a small workshop in his home where he experiments during his free time.

Hailing from a remote hilly district in Nagaland, he relates to the hardships people go through daily and strives to do something that could help them. He tries to develop useful machines at a low cost, which could reduce people's struggle and benefit them. He is willing to declare his projects open source if people wish to use them to make their lives easier.

The entire North East is blessed with good-quality pineapples, but peeling them requires careful effort. Imkongsunep has developed a pineapple peeler that can peel a pineapple in a few seconds. It is a kind of small lathe machine on which a pineapple is mounted and rotated. A blade moving parallel to the rotating axis peels the pineapple. The machine can adjust to minor variations in the length and thickness of the pineapple to be peeled. He has also developed a shredder cum peeling machine for various fruits. He encourages innovators to keep pursuing their passion for doing something new as their results can bring about a lot of change in society and urges them to never give up on their dreams.





State Award – Mizoram

Laddu Making Machine and Large Scale Spindle Making Machine

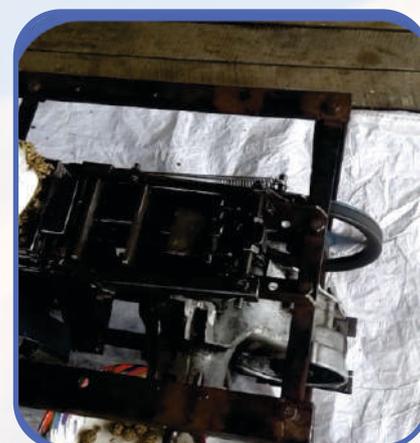
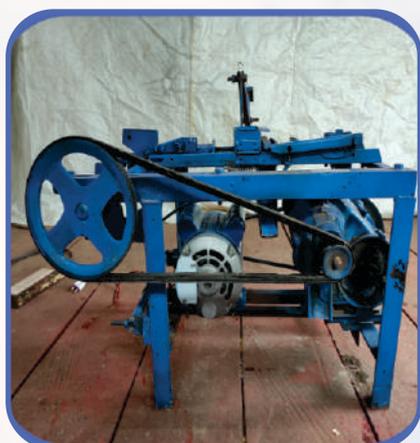
Chhuanmawia
Lunglei, Mizoram
Scout: Direct

Chhuanmawia (58) is a mechanic workshop owner and a serial innovator from Central Mizoram. He has been a prolific innovator since beginning his journey of experimentation many decades ago. Some of his works include a three-way telephone for talking with his neighbour friends (1988), an improvised weaving machine (1992), a fish scale remover (2010), a betel leaves washer (2015), wild plantain chipping machine for pig feed (2016), spindle machine (2016); rice processing machine (2016), and a weaving machine for small cloth (2017) design for scarf or turban.

The laddu-making machine was initially developed for making sesame bolus (laddu) prepared with hot sugar. While the sugar is hot, the mixture is rolled into a small ball with bare hands. While doing so, sometimes the

palm gets burnt. Chhuanmawia wanted to develop a mechanical device to replace the hand-rolling process. The raw material, i.e. sorghum/sesame/ wheat mixed with hot sugar, is placed and pressed into a hopper using a metallic spoon. In an hour, 50 kg of the mixture can be processed to make laddus of 18mm diameter. At four different speeds, the machine's production capacity ranges from 20 laddus per minute to 50 laddus per minute.

He has also developed a large-scale spindle machine. Usually, looming threads is done with hands, which is a slow process. Spindling lengthy threads is quite difficult and takes a lot of time. Chhuanmawia has developed a spindle machine that has 20 slots of bobbins to loom at once. The speed of the looming can be adjusted to 1x, 2x and 3x times.





State Award - Manipur

Tractor Operated Taro Harvester with Washer

Yanglem Brajamani Singh

Bishnupur, Manipur

Scout: Direct

Yanglem Brajamani Singh (36) is a passionate young farmer who has come up with a solution to the strenuous, time-consuming work of harvesting and washing taro (yam) manually by making a taro harvester cum washer. He is engaged in farming all year round, but during his free time, he likes to modify and innovate things.

The taro harvesting is usually done manually using a spade, taking a lot of time and requiring several labourers. It takes days for harvest, and the farmers end up spending a lot of money on the wages of the labourers.

The Taro harvester is a tractor-mounted implement driven by PTO. During the operation, the soil is dug up by a steel blade digger, and corms of taro are released backwards by the continuous movement of the conveyor. Using this implement, a farmer

can harvest 1 hectare in 10 hours engaging three manpower including tractor driver while it takes over a week to harvest the same area by employing five labourers. The washer is a cylindrically shaped body attached to the tractor after harvesting to wash the yam.

The machine has reduced drudgery significantly as compared to manual taro harvesting and washing operations as squatting and bending positions are required during manual harvesting. Brajamani has received a lot of enquiries from the neighbouring districts too, but he is not commercially manufacturing the harvester. He operates on a service model and charges hourly during the harvesting period. He plans to improve the machine further and sell it commercially. He also has plans to make a paddy harvester and thresher.





State Award – Assam

Soil Clod Crusher

Suchil Teron
Kamrup, Assam
Scout: Direct

Suchil Teron (38) had a challenging childhood where he shuffled between school and paddy fields. The demise of his father when he was 10 made him leave school and work full-time to support his family. While doing odd jobs over the next many years, he slowly got an understanding of various machines, how they work and how they can be repaired. Now, he continues his farming, his workshop and also has a stone quarry.

Passionate about farming, he does not like agricultural fields remaining unproductive and leases them for farming from their owners. While working on one such farm, he found the soil too hard for ploughing, and he came up with the idea of developing a soil clod crusher. This device is an individual unit fitted behind a cultivator. The cultivator stirs and pulverizes the soil before planting to aerate the soil and prepare a smooth, loose seedbed. After planting, the cultivator is used to kill the weeds. The clod crusher acts in two ways (i) breaks the soil clods and (ii) buries the uprooted weeds into the soil for mulching.

The length of the clod crusher is a foot more than that of the cultivator to provide a better coverage area. The machine covers 0.32 ha per hour, consuming 3.5 litres of diesel.

He has also developed several useful implements, like a wetland leveller, which can be used in wetland, on uneven land with slopes and clods. The tractor-mounted wetland leveller was developed for primary levelling operation, followed by soil compaction and final proper levelling. To improve the output of ploughing, he added one more plough to the conventional two-plough mechanism. In large-scale mustard cultivation, he faced difficulty pumping water directly onto the field as the mustard plants died from water flooding. Then seeing the water sprayer used in road construction, he developed a boom sprayer to spray water on a mustard oil field of 40 feet in length at a time. He believes that for a society to march ahead, the problems need to be solved and urges everyone to identify a problem and works towards its solution.





State Award – West Bengal

Tarpaulin Shed with In-built Water Drain

Mohd. Aminuddin
Kolkata, West Bengal
Scout: Direct

Mohammad Aminuddin (78) is a shopkeeper from Chandini Market dealing in bags, plastic sheet material, covers, and tarpaulin. Since childhood, he has had a keen interest in the fields of art, craft, and design, and this has been a driving force behind all his endeavours despite all hardships.

The monsoon season in West Bengal often brings heavy rainfall, which causes significant challenges to those living and working in narrow bylanes or low-lying areas. The tarpaulin shed used during rains has to be periodically emptied as water collects on it, making it heavy and unstable. Doing so sometimes spills the rainwater on customers, parked two-wheelers or inside shops. Many times due to thunderstorms, the shed supported by bamboo poles collapses. These problems made Amiruddin think about a

possible solution.

Since he was dealing with tarpaulin, he decided to make use of it. He made a bamboo frame, mounted tarpaulin over it and provisioned a tarpaulin drain in the centre of the shed to drain water as it collects during the rain. He opened the lower end of the tarpaulin drain into the roadside drain to let rainwater runoff. The system worked perfectly well!

His innovative idea caught the eye of other shopkeepers, and in no time, many of them implemented the same in their shops. The solution was practical and easy to implement. He has sold over 6000 units of the tarpaulin with a drain in his area and wishes to reach out to more shopkeepers in the future.





State Award – Odisha

Polanga Decorticator

Rajesh Sahoo
Puri, Odisha
Scout: Direct

Rajesh (31) hails from an agricultural region. However, the fields in the area are prone to denudation during periodic high tides, leaving them unfertile for short spells. This reduces reliance on agriculture, and people look for other avenues for livelihood. It was during such vocations that Rakesh learnt to work on machines and repair them.

Polanga (*Calophyllum inophyllum* L.) is a tropical evergreen tree, the seeds of which are a rich source of tamanu oil used for skin, hair, acne and other skin-related skin problems. Considering the properties of the oil, the demand is relatively high in the health and wellness industry. There is an increasing demand in the biofuel industry as well. Tamanu oil extraction is a tedious process involving various conventional methods such as manual plucking, repeated drying, decortication and breaking the seeds. Polanga collectors break the hard shell of the fruit manually (by hammering and rubbing against stone/wood) after drying them under the sun for several days.

Rajesh realized manual processing is not

financially viable due to low productivity, where one labourer could process only 25 kg of seed in 6 hours. While searching for a solution, the idea of a polanga decorticator machine struck his mind when he observed the rollers' motion in a sugarcane juicer. The decorticator is an electric motor (1 HP, single phase) operated machine designed specifically to remove the kernel from the hard shell of the polanga fruit by breaking them in between its rollers. The machine was tested at the State Level Farm Machinery Training & Testing Centre (SLFMTTC), Odisha, where it was found to be capable of processing 300 kg of polanga fruits per hour. The decortication efficiency was observed to be 98%. After the introduction of the machine, during the harvesting season, villagers earned Rs. 800/day to Rs. 1200/day as compared to Rs. 200/day previously. The innovator leases three machines to local farmers on a rental basis and earns Rs. 3000 to 4000 rupees per day during harvesting seasons. With the help of this machine, several female workers have also started making their livelihoods, defying social stigma.





State Award - Maharashtra

Silkworm Breeding Net Folding Machine

Sunil Ajurnarav Shinde
Jalna, Maharashtra
Scout: Direct

Sunil Shinde (47) is part of a big joint family engaged in farming and silkworm rearing. Facing labour shortages in agriculture, he has designed and developed several agriculture tools.

In sericulture, a specially designed V-shaped net is used to establish the silkworm colony. The silkworm net must be appropriately folded and tightly bound with ropes until the next cycle. Otherwise, its shape gets distorted, and the cocoon cannot be grown properly in the distorted nets, lowering productivity. Sunil has over 1000 such nets, requiring at least two skilled labourers who can manually fold and bind only 200 nets in a day.

Sunil has made a device using which silkworm nets can be efficiently folded and bound with ropes. The device is a square pipe structure consisting of three parts: the main frame, platform and pressing lever. The three-pipe

platform is placed on the ground, and a bunch of nets are placed over it. After the nets are properly placed, the platform is lifted upwards towards the main frame as it is hinged at it. Once the platform is vertical, it is locked in position, and the nets are pressed downward by a horizontal pipe moved through the pressing lever. Once the nets are fully pressed, the lever is locked in position. Due to the pressing and locking, ropes can be easily tied around the nets. After properly tying the net, the locks are released and nets removed.

The weight of the device is around 16 kg. Using this device, the time required to fold and bind the net has been drastically reduced to 300 nets per hour compared to 200 nets in a day done manually. The machine is handy for the farmers engaged in sericulture activity. It saves time in folding the net and preserving the net's quality for the next cycle.





State Award – Gujarat

AA: Improved Drought Tolerant Dual Purpose Sorghum Variety.

Himatbhai Virjibhai Lakkad
Bhavnagar, Gujarat
Scout: Direct

Himmatbhai Virjibhai Lakkad (57) is a progressive farmer growing local sorghum, groundnut, cotton, onion, and wheat crop varieties and working for varietal improvement.

In 1995, he identified one unique sorghum plant among the local sorghum variety having bigger bold grains, good lustre, good plant vigour, green leaf midrib and free from insect and disease incidence. During 1996 – 1999, the selected plant seeds were cultivated, and plants with evident phenotypical desirable traits were selected for propagation. By 2000, the variety was stabilized for its dual-purpose characteristics, and he named it “AA”. He has been distributing the seeds to the other farmers, and the variety is very popular in the region .

AA is a dual-purpose sorghum popular among farmers equally for grain and fodder. It is a high-yielding variety suitable for both Rabi and Kharif seasons. It takes 100-110 days for harvest maturity, is high yielding (grain yield:

25-35 q/ha, green fodder yield: 220-250 q/ha & dry fodder yield: 110-120 q/ha) and suitable for growing throughout the year. The fodder is sweet, and the variety is tolerant to insects, pests, diseases and is suitable for drought conditions also.

During 2018-2019, the validation trials were carried out at S. D. Agricultural University, Sardarkrushinagar, Gujarat. The variety Sorghum AA recorded a 45% higher grain yield and 9.84% high dry fodder yield over the checks. Compared to the checks, the variety was early maturing in Rabi & Kharif seasons at all the locations tested. The protein content in the flour ranged between 10.5 to 12% and was recommended for dual-purpose use with good performance.

In the field trials in Jammu and Maharashtra, the variety received good feedback for dual-purpose use from the farmers. The innovator has disseminated seeds in Gujarat. The application for registration under PPV&FR Act, 2001 has been submitted by NIF.





Consolation Awards

Pelletisation for Paddy Cultivation

Aji Thomas
Wayanad, Kerala
Scout: PDS, Kerala

Aji Thomas (50) educated upto senior secondary, is a farmer growing banana, vegetables, paddy and rubber. In hilly regions, it is challenging to cultivate paddy. Transportation from other areas takes time and increases costs. He also observed tribal people treating seeds of paddy with various herbs for obtaining rice with high phosphorous and fibre content. Aji developed a table-top rice pelletisation system using which paddy saplings can be grown in pellets, retaining their properties and increasing yield.

A nutritional cocktail is made by mixing and crushing the leaves of various plants in water and fermenting them. Later cow dung and panchagavya mixture are added to it. This increases soil bio-factors and, thereby, the crop quality. The required quantity of seed grains is added to this cocktail and mixed thoroughly to obtain a pellet mixture. The pellet mixture is in a semi-solid state. A multi-chambered (cubic) pallet is washed thoroughly and placed on a flat panel. The prepared mixture is filled in the pallet chambers. After the mixture sets in, the pellets are removed by gently tapping the pallet. The pellets are kept in a natural

environment or a controlled environment to allow them to germinate and further allowed to grow till the desired height and, after that, transplanted in the field.

The pallet tray can be used to make 1100 pellets at a time. Four labourers can produce 70 trays per day, i.e. 77000 pellets. Each cubic chamber contains 1 to 4 paddy seedlings in the mixture. The paddy grown through this process has vigorous growth compared to the traditional method. The average number of tillers per plant is 50-60, with 150% more straw yield and increased panicle length. The average yield per hectare is 5.5-6 MT in 15-20 days lesser duration and with per acre seed requirement of 2.5-5 kg only as against 32-50 kg required in the conventional process.

Aji started this method of pelletisation for paddy cultivation in 2016. He began selling pellets based on the good results; farmers later started adopting this technique. More than 150 paddy farmers are using this technology, and the average area covered under paddy grown through this technique is over 1000 acres.





Consolation Award

Paddy Straw Cutter for Mushroom Bed Preparation

Ajay Kumar Prusty
Dhenkanal, Odisha
Scout:

Ajay Kumar Prusty (54) is a progressive farmer with a keen interest in farming. He has an inclination towards the mechanisation of agriculture. Noticing the growing labour scarcity, he has always attempted to develop implements beneficial for the farmers.

Mushroom bed structure and shape have a vital impact on the output, as it can enhance the quality of mushrooms and quantity. Fresh, disease-free paddy straw is the ideal substrate. 10-15 kg paddy straw is required for preparing one bed. To prepare a bed, straw should be cut about 1m in length and 0.75 m in breadth, which is a challenging task and generally carried out with a manual straw cutter. This process of preparing a mushroom bed is quite a time taking and requires more than two workers for the same.

Ajay has designed and developed a straw cutter, which can be adjusted to cut paddy straw bundles as per the required size. The bed can easily be prepared using this machine, saving time and resources. Worker safety issues are carefully considered while designing the machine. The capacity of the machine is about 1000-1200 straw bundles per hour. The machine removes drudgery, reduces labour requirements and enhances productivity. He has sold about 1400 units of the machine in Odisha and Jharkhand. The technology is transferred to M/S Supreme Enterprises for manufacturing and supply in several parts of the country.





Consolation award

Pepper Thresher

Binoy Sebastian
Idukki, Kerala
Scout: PDS, Kerala

Binoy Sebastian (46) is an Economics graduate and a fabricator. Since childhood, he has had twin interests in machinery and agriculture. With time, he developed an interest in books related to machines. He learnt how to perform calculations related to structural strength/stress analysis (of any machine) by reading reference material online. In his workshop, he keeps improvising on agricultural tools and machinery as required.

Realising that manual threshing of pepper was time-consuming and tedious, Binoy developed a pepper thresher. This machine, made of GI sheet and MS pipes, works on rubbing action to thresh berries (pepper) from stalks/spicks. It has a rotating drum with spiral blades on the periphery and variable threshing clearance with an overload spring

which helps reduce the machine's load, protects it from clogging and reduces power consumption. It is powered by an electric 1hp AC motor having 1440 rpm. The threshing drum has six overhead spiral blades placed at equal distance of 6.8 cm with 26-35 degree with horizontal plane (the best result is observed at 29 degree). Its threshing capacity is 295.85 kg/h, with threshing efficiency of 84.5% (single pass) and power consumption of 0.43 kW. The un-threshed spikes are fed again to machine along with fresh input (or separately) resulting in efficiency close to 95%. The thresher has been validated by the KVK Idukki. For reducing the fatigue of loading operation, a supporting frame is provisioned at the top of the machine, where a gunny bag can be kept so that the labourer need not hold it continuously.





Consolation Awards

Two in One Cultivator and Blade Harrow

Rajnikant Raghavjibhai Dhedhi

Morbi, Gujarat

Scout: Direct

Rajnikant Dhedhi (40), educated upto 10th standard is, a farmer and owner of a small workshop where he develops some agricultural implements, including cultivators and other customized farm machinery.

For intercultural operations, separate blade harrows or intercultural tools are used. The harrowing operation is done after ploughing. Separate implements are attached to the tractor three-point for performing these operations. Rajnikant noticed that it takes much time for attaching and detaching these implements. To eliminate this problem, he has

provided a blade harrow (for harrowing operation) on top of an existing cultivator.

The innovation is a tractor-mounted three-bottom cultivator cum blade harrow. Both the cultivator tynes and blade harrow can be used alternately using a reversible mechanism. While one is used on the farm, the other is carried upside on the implement. At the end of each operation, the paired blade harrow/cultivator tynes are turned over so that the other can be used. The field capacity for ploughing and harrowing is 1.6 acres per hour and 2 acres per hour, respectively.





Consolation Award

Channel Making Machine

Dinesh Chaudhary
Durg, Chhattisgarh
Scout: Direct

Dinesh Chaudhary (42) has a small workshop where he experiments and innovates farm machines. The neighbouring farmers often come to him to discuss their farming problems. He tries to develop or modify farm machines/tools upon the farmers' request to help them.

Working on a farmer's request, Dinesh started developing a machine for making channels for banana farming. It is a tractor (20-25 hp) operated channel-making machine, which digs and conveys the soil on one side with the help of rotating blades powered by the tractor PTO. The two side ploughs dig and guide the soil towards rotating blades during operation. Rotating blades remove soil and convey it to

the left side of the machine. At the machine's rear end, two wheels are provided to support the machine in maintaining the required depth. The operating mechanism of soil conveying to cover the root portion of the plants is the novelty of the machine.

Though developed initially for banana crops, this machine is now also being used in papaya cultivation. The machine's working width is 62 cm at an average work rate of 0.66 acre/h (depending on the type of work) and average fuel consumption of 2 lit/hr.





Consolation award

Automatic Cup Hanger Making Machine for Rubber Plantation

Mohan Kumar, G.S
Kollam (Quilon), Kerala
Scout: Direct Entry

Mohan Kumar (55) is an innovative technician. His skill lies in designing and developing tailor-made components to make his machines. He has tinkered with watches, radios, televisions, and cameras and has even made and installed elevators at commercial and household levels.

A few years back, while talking with one of his friends, a wholesale dealer of rubber collection cup hangers, Mohan learned that the cup hangers for tapping rubber latex were manually made. As a result, no two cups were precisely the same, and some failed while the rubber was being tapped due to the latex flow. After an effort of a few months, he developed

a machine that could automatically make cup hangers. Powered by a one hp 15000 rpm motor, the machine can produce 1200 cup hangers in an hour.

The main advantage of the cup hanger made by the machine is that it has more stiffness and resists bending due to latex flow over the bowl. The cup hanger acts as a cantilever beam with a uniformly distributed load initially and a uniformly varying load when the bowl gets filled with latex. The cup hanger material is galvanized iron wire of 3mm diameter/11-gauge size. The machine can count the number of cup hangers it makes and has a clutch system to stop the machine manually.





Consolation Award

Cardamom Pod Plucking and Pruning Tools

Selichum Sangtam
Tuensang, Nagaland
Scout: BLF, Tuensang

Selichum Sangtam (41) is an automobile mechanic, farmer, blacksmith, and innovator. Due to financial problems in his family, he had to discontinue school and take up odd jobs. The experience made him learn so many things and helped sharpen his creativity.

Cardamom is one of the region's most popular cultivation and most profitable farming. As a farmer, one has to be careful while plucking and pruning the plant to increase production. All the farmers employ traditional ways of harvesting and pruning using simple tools like knives, chisels, sickles, etc. Selichum developed the tools to make the process more convenient, faster and safer.

He made a hand tool for plucking the capsules or harvesting the plant. The head of the tool is curved so that the harvester can pluck the capsule easily without hurting the other plant or capsules. He used ordinary sickle and sharp

knives for pruning and cleaning, but during the process, the plants would get injured unintentionally. To overcome this, he improvised the sickle by sharpening both sides of the blade to use the tool in multiple ways. He also sharpened the tool's curved edge to help clean the weeds or plants without hurting the plant or the capsule. The tool can be used in cleaning and harvesting other plants.

Any farmer can use the tool, which is easy to use, more productive and multipurpose. It can also be used to harvest rice and vegetables, collect plants, etc. Selichum has sold over a dozen sets of plucking and pruning tools and given a few tools to his friends and neighbours. He is open to people modifying his tools to suit their requirements but with his consent.





Consolation Award

Coconut Harvesting Tool and Eri Cocoon Opener

Budheswar Pamey
Dhemaji, Assam
Scout: Direct

Budheswar Pamey (50), a tribal farmer from Dhemaji, has been innovating several small agricultural tools useful for the farmers. He has participated in many exhibitions in Assam and won a few awards.

Harvesting coconut fruit from the tree is tedious once it attains sufficient height. Using rope or barefooted technique for coconut harvesting is risky, and the availability of skilled labourers for the task is drastically declining. The toil in manual coconut harvesting, the lack of climbing labourers and the operational and safety issues in availing manual climbers have necessitated the mechanization of coconut harvesting. To overcome this difficulty, Budheswar developed a small tool which helps to efficiently selective harvest the coconut without climbing the tree.

It is a small cylindrical tool with three outwardly bent finger-like projections on three with two knobs inside each finger. This

help to hold the target fruit properly. A bamboo stick is fixed to the tool to act as a handle (the stick size can be up to the desired length). The target fruit is held with the help of the fingers, and the tool rotated anticlockwise to pluck the fruit. The tool is unique and available at a low cost. The tool's harvesting capacity is around 70-80 units/h. It weighs 2kg without a handle and with the bamboo stick about 10-12kg. The innovation was verified by KVK Dhemaji, whose report mentions that this tool helps harvest the selected coconut from a bunch without requiring it to harvest the entire bunch. Also, using this tool, harvesting can be done without affecting the germinating bud.

Traditionally Eri cocoons are processed by boiling, followed by the removal of pupa, which affects the quality of yarn. Budheswar's cocoon opener makes a hole in the cocoon to take out the pupa. Removing the pupa without boiling does not deteriorate the yarn quality and colour and saves time.





Consolation Award

Self-operated Juice Vending Machine

Harkumar Goswami
Guwahati, Assam
Scout: Direct

Harkumar Goswami(62), a matriculate, is a businessman dealing in LED display devices. His late father was a tech savvy person and he got interested in gadgets seeing his father work on them. From journalism to screen printing, advertising, event management and now to being an innovator, Harkumar has had different experiences in life. He has had a disturbed youth due to untimely demise of his father, later his brother and subsequently the mental condition of his mother.

While working with PEPSICO, an idea of sugarcane vending machine came into his mind having potentiality of promoting local juice business. He believed that sugarcane juice can be a healthy replacement to cold drinks benefitting our local farmers. He realised that the juice market was not

organised and the way of selling juice was not too hygienic. He then thought of developing an automatic juice vending machine.

The setup is an automatic vending machine, which can be setup as a kiosk in public places. Along with cooling system, it has an integrated system of mechanical, electrical and electronics devices placed in a metallic cabinet. The mechanism of action is similar to a tea vending machine but Harkumar Goswami has integrated certain innovative features in his machine. Customers have four juice options to enjoy and Card/UPI/ Wallet payment options for fast checkout. Self-operated system, fast operation along with smart card insertion facility as well as e-payment wallet accessibility etc. in a single set up are the novel features in the machine.





Consolation award

A Device for Climbing Areca-nut Tree

Gobin Sinha
Unakoti, Tripura
Scout: Direct

Gobin Sinha (19) is an undergraduate student of arts. His father earns living by driving trucks and other vehicles. They also own a small farm where they grow paddy. He noticed that people generally use jute ropes to climb the areca nut tree, which is unsafe because ropes have a chance of slippage or cutting due to heavy load. This problem led Gobin to think of a better solution.

This is a manually operated tool to climb the areca nut tree comfortably. The device comprises two semi-circular MS bars with extended straight edges for screwing together. The bars have grippers on their inner

side. Two flapped footrests are welded to both MS bars on the outside. Both the semi-circular MS bars are put on either side of the areca nut tree and screwed together. Spring positioning is provided to adjust to the variable diameters of the areca nut trees. Once the device is fitted around the tree, the user can insert the feet in the two footrests and stand up. Taking grip by hands, lifting the tool upward, and locking it by pressing down, one can climb the tree, repeating the steps. While many tree climbing apparatuses are available, this well is a simple, effective instrument at a very low cost.





Consolation award

Areca-nut Leaf Moulding Machine

Chinnakannu Muthusami

Namakkal, Tamil Nadu

Scout: SEVA

Chinnakanu (58) owns a workshop and is involved in farming. He got introduced to machines by his father and wanted to be a mechanical engineer. Dropping out of school, he started repairing pump sets of bore wells and undertook maintenance work for two and four-wheelers.

Once while undertaking repair and maintenance of a leaf moulding machine, he realised the drawbacks of the machine. But he felt that the utility of the device was immense. He started working on developing his version of the machine. After incorporating hydraulic mechanism, the productivity improved, drudgery reduced, maintenance lowered and even females could operate it without strain. In 2001, he made the first prototype using six moulds (die) in line with the compressor and pump. From 2002 to 2004, he made four more prototypes changing the design with closed assembly. In 2012 he made the final prototype, which was compact with parallel arrangements of moulds (top and bottom).

The machine moulds leaves to make plates ranging from 4" to 12" in diameter and bowls. The assembly consists of a parallel arrangement of moulds (in pairs mounted one above the other) for reducing space, incorporating hydraulic assembly and heat regulator. The machine uses electric power and a hydraulic mechanism to mould the leaf. A 2 hp motor and pedal operate the machine to lower/lift the pressing mould and cutting bar. The heater removes moisture and thus helps maintain the quality of plates. The leaf is placed between the moulds and pressed by lifting the foot lever. The MS cutter embedded in the mould cuts the leaf equal to the size of the mould. The machine is robust and easy to operate even by unskilled labour or women. Different shapes of output can be easily obtained by changing moulds. The machine can make 1700 plates/day (8 hours). The operating cost of the machine is ₹50/h.





Consolation Award

Kansi No.1: Improved High-Yielding Onion Variety

Punamchand Patidar
Jhalawar, Rajasthan
Scout: Swabhiman

Punam Chand Patidar (54) is a progressive farmer, well recognized in his area for developing high yielding onion variety- Kansi No.1. He developed this variety through selection from a traditional variety of his region based on healthy disease-free plants having big size single bulbs. During 1980–1986, he used selection, followed by seed production for the best disease-free early maturing plants and sowing of composited seeds to get uniform characters and stabilized the variety for desirable characters. He started seed production and sold through farmers-to-farmer networks.

The variety is known for its high early yield (40-45 t/ha), copper red coloured firm bulbs with more rings (8-10), good shelf life and medium pungent good taste. It produces uniform size, single-centred bulbs with a thin neck and has good export potential with good quality. The variety is free from bolters and is tolerant to thrips.

The SKN College of Agriculture, Jobner and Rajasthan Agriculture Research Institute, Durgapura, Jaipur, conducted the validation trials during 2019-2021. The variety Kansi No.1 was found superior to checks for high yield (40 t/ha), good quality bulbs and longer shelf life. It was superior over check varieties in terms of bulb yield, average bulb weight (63 - 109g), with 6.38 - 8.94 mean number of rings, TSS % (13.34, 12.23), with uniform ring thickness, and bulb shelf life. The on-farm trials of the variety were conducted in Uttar Pradesh in collaboration with KVK, Sultanpur, during the Rabi 2020-21, where the farmer's variety recorded good yield compared to the local check variety (LR 41) and was preferred for its good shelf life. The application for registration under PPV&FR Act, 2001 has been submitted to the PPVFR Authority, New Delhi.





Consolation Award

M-Jamini: Fine Grain Aromatic Rice Variety

Mousumi Biswas
Murshidabad, West Bengal
Scout: Direct

(Ms.) Mousumi Biswas (48) is a progressive women farmer, exceptionally skilled in developing new, improved high-yielding varieties and organic agriculture. She has been felicitated with KrishakRatna, KrishakSamman, Maatisamman and Krishak ruby by the state for her contributions to organic agriculture and Agri-innovations.

She developed M-Jamini fine grain rice variety with high-yield, blast-tolerant, and good aroma by crossing Lolat (Local Cultivar-Female) and IR 36 (Male), followed by selection in 2009. She then crossed the selected parent plants manually to produce F1 seeds. During 2010 - 2016, further selection was continued to stabilize the desired characteristics viz. early maturity, fine grains with aroma, and blast tolerance. By the year 2017, she started multiplying the variety's pure line seeds and distributing them to other farmers. The variety is characterized

by high yield (45q/ha), blast disease tolerance, and fine medium-long (long slender) grains with good cooking quality. This aromatic variety is also suitable for cultivation in lowland areas.

Uttar Banga Krishi Viswavidyalaya, Cooch Behar, West Bengal, validated the variety at two locations. The variety M-Jamini was found to be tolerant to rice blast disease having aromatic, long slender grains with an average yield of 43q/ha at Cooch Behar and 34.4 q/ha at Darjeeling. The variety was found to be significantly superior to popular check varieties viz., Gobindobhog (11.94 q/ha), Lalat (31q/ha) and IR36 (17q/ha) in yield at both locations. The farmer has distributed about 40kg of seeds of her variety to the farmers of her surrounding villages and has received good feedback. NIF-India had submitted the application for registration under PPV&FRA, New Delhi.





Consolation Award

Palli: Dual Purpose Chilli Variety for Chutney & Sauce

Anand Kumar Patel (Community Representative)
Gandhinagar, Gujarat
Scout: Direct

Anand Maneklal Patel (50) is a progressive farmer and community representative for Pallichilli variety cultivating chilli, cotton, castor and wheat crops. He is an active member of the farming community of his village and believes in progress through shared effort.

The variety was traditionally cultivated in the Rupal village, Gandhinagar Gujarat. For the last five decades, the farmers of the village have been cultivating and conserving it. The collective efforts of the farmers' community played an important role in the varietal conservation, and improvement through the mass selection method. Every year, the phenotypically similar desirable healthy plants with uniform fruits were selected for seed production based on specific traits of fruit i.e. yield, fruit length, bright red coloured fruits, and disease-free plants. At present, the community of more than 100 farmers in the village cultivates and maintains the quality and genetic purity of the variety. The variety was unanimously named as "Palli" by the community in honour of the famous rituals of Palkhi locally known as Palli, performed for the Goddess Vardayinimata, the local deity of the village.

The variety is characterized by a high yield of green and dried chilli fruits (Green: up to 25t/ha, dried: 4t/ha) with attractive bright glossy red and uniform 17-18cm long fruits. The fruits are moderately pungent and

showed tolerance to major insect pests and diseases.

The variety was evaluated by S.K.N. Agriculture University, Rajasthan during Rabi 2020-21 under Jaipur (Rajasthan) conditions. The variety 'Palli' produced longer fruits with higher average fruit weight than all the reference varieties. The variety recorded a significantly superior yield of Green (22 t/ha), Red (16.7 t/ha) and dried red (3.7 t/ha) fruits over national (Pusa Jwala), state (RCh-1) and local checks.

This dual-purpose variety was tested for the value-added products and fruit processing quality traits at Anand Agricultural University, Anand, Gujarat. Palli variety was found to be suitable for superior quality chilli sauce and chutney and has good market potential in FMGC sector. The on-farm trials of the variety were facilitated by NIF in West Bengal, Maharashtra and Gujarat states. The variety outperformed over other popular varieties in terms of bright red-coloured lengthy fruits and better yields at all the locations tested.





Consolation award

Herbal medication for treatment of anestrus in Cows and Buffaloes

Akhambhai Vagadia
Mahisagar, Gujarat
Scout:

Akhambhai Vagadia is a agriculturist and a herbal healer. He prepares and administers herbal medications for a number of human and animal health related ailments.

The fertility response of buffaloes depends on the estrus induction, the estrus sign's intensity and the conception rate. The indigenous medication shared by Akhambhai was claimed to enhance the fertility response among buffaloes.

The medication was tested at the College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati. The herbal medicine used effectively resumes ovarian cyclicity by positively impacting estrus induction, follicular development and enhanced conception rate.



Appreciation

Flower Shower Machine

Baltej Singh Matharu
Ferozepur, Punjab
Scout:Direct

Baltej Singh (41) joined his father's workshop after completing his intermediate. Seeing his father toil in the workshop daily, he became interested in machines. Owning a small farm, he also likes to develop machines based on demand or his own interest.

Showering of flowers is essential during many special social and religious occasions like Guru Parv, Phool holi and marriage, etc. People use their hands to shower flower petals on such occasions. A few electric-operated machines are available but are not very commonly used. A drawback of such machines is that they need electricity and cannot be carried everywhere.

This machine is a small, lightweight, portable flower showering machine operated by a 2 stroke 49cc petrol engine. A centrifugal blower conveys flower petals axially and throws them tangentially through a flexible pipe. In this machine, there is a provision to control the airflow for pushing the flowers/petals. The fresh flower throwing range is about 20-25ft, and for artificial flowers, up to 50ft. Weighing about 7 kg, the machine is claimed to consume 250ml of fuel for 2 hours of operation. Baltej made this machine primarily for the Gurudwaras.





Appreciation

Standing Bar for Carpenters

Nisar Ahmad Itoo
Anantnag, Jammu and Kashmir
Scout:Direct

Nisar Ahmad Itoo (56) is a carpenter with over 25 years of experience in the field. He learned carpentry work from his father. After working throughout the day for his livelihood, he devotes extra time to giving life to his creative ideas and has crafted several chairs and beds with innovative designs.

While working along a wall, when a mason or carpenter needs to raise himself, a wooden angle bracket set at 90 degree angle is commonly used to make the working station. With wood getting costlier and the wooden bracket having its limitations, Nisar Ahmad thought of improvising on it.

The innovation is a height-adjustable standing bar for glazing workers/painters for use in construction & painting work. It provides workers with a platform to stand and work, carry material and keep it safe. The height can be adjusted from a minimum of 5 feet to a maximum of 15 feet, keeping the standing bar at the same set distance from the wall. Unlike the commonly used wooden structure, this can be safely disassembled and stored. It also reduces the consumption of wood, which is already getting scarce and costly. The innovation is gaining traction among the painters and masonry workers in the Kashmir valley region.





Appreciation

BLK-Balaji: Improved High-Yielding Wheat Variety

Bajrang Lal Kasva
Nagaur, Rajasthan
Scout: Swabhiman

Bajrang Lal Kasva (33) is a young progressive farmer known for developing an improved high-yielding wheat variety: BLK-Balaji. The variety yields 60-70q/ha with good grain quality. It is a nutrient-rich variety with high protein (13.2%) content and is resistant to rust disease.

BLK- Balaji was developed from a commercially released variety SRW-688 through pure line selection method beginning in 2011. The selection of best plants and rejection process continued till 2015 when the variety was stable for its selected traits and named it BLK-Balaji. The variety is characterized by superior economic yield, high number of effective tillers, good grain quality, and is rich in protein, iron, and zinc. It has a strong lodging tolerant stem and is resistant to stem and leaf rust diseases.

Regional Agricultural Research Institute, Durgapura, under the SKN Agriculture University, Jobner, Rajasthan, evaluated the variety's performance during 2018 -2020 and

found it significantly superior over state and national checks. The Biochemical profiling of the BLK Balaji variety conducted at Anand Agricultural University, Anand and Navsari Agricultural University, Gujarat, reported higher protein (13.2%), Zinc (15-16 ppm), total carbohydrates (67.6 %), and dry gluten (8.45 %) content as compared to checks. The ICAR- Indian Institute of Wheat and Barley Research reported that the variety was resistant to stem rust and mildly resistant to leaf rust/brown rust. During 2015 – 2021, the On-farm trials of the variety were conducted by NIF in 10 states. The variety received a positive response from the farmers, with the highest yield of 65 q/ha reported at Gorakhpur and Basti, Uttar Pradesh and Fazilka, Punjab. The variety was preferred for its lengthy spike, bold grains and biomass of the plants. The innovator sells an average of 10 quintal seeds annually through farmer to farmer network. The application for registration under PPV&FR Act, 2001 has been submitted to the PPVFR Authority, New Delhi.





Appreciation

Herbal preparation for controlling leaf curl

Hom Prasad Chauhan
South Sikkim, Sikkim
Scout: NIF - NE cell

Hom Prasad Chauhan (43), is an innovative farmer from the South Sikkim district involved in Agriculture. He has studied until class 10th and uses local plants to manage various insects and diseases. He has developed an herbal preparation for managing leaf curl disease in chilli.

He has developed a fermented herbal preparation using three indigenous plants (Name withheld due to IP reasons) to control leaf curl disease and insect pests of chilli-whitefly and thrips. The preparation can be stored for up to two months. Hom Prasad has used this preparation for a decade to manage sucking pests and leaf curl disease in chilli.

Facilitated by NIF, the validation trials of the preparation were conducted at the Department of Plant Pathology, Punjab

Agricultural University, Ludhiana, Punjab, against the leaf curl disease of chilli. The preparation was very effective in managing leaf-curl disease in chilli, causing a reduction in both disease incidence and disease severity at all doses tested.

The dose-dependent reduction in the whitefly population in the range of 53.0 - 75.8 %, as compared to control was reported. The preparation also reduced the thrips population, where maximum decrease was recorded during the third spray with 34.8 %, - 55.8 % reduction. The preparation was most effective in increasing yield resulting in 8.76%, 20.24 % and 47.2% increase in yield at the 3 doses tested compared to untreated control. The preparation was safe for non-target and beneficial insects and did not cause any phytotoxicity to the crop.





Student Award - First

Spill Proof Kangri

Asim Sikander Mir
Kulgam, Jammu and Kashmir
Scout: Direct

Asim Sikandar (15) is a class 11th student. His hobbies include playing games & sports like cricket, carom, volleyball, football & chess and he wants to become a scientist when he grows up.

The traditional fire pot (Kangri) is an effective and economical heating arrangement. Kangris not only keep Kashmiris warm during the cold, particularly in winter but also feed thousands of families by providing them with livelihoods. The Kangri remains an enduring emblem of local craft that is eco-friendly and cost-effective. Beyond Kashmir, people of the erstwhile Hill states of Himachal, Uttarakhand, and some parts of Nepal also use other local variants of Kangri.

If the traditional Kashmiri Kangri tilts or falls, hot embers may spill around, which is

dangerous. It may cause burns, and there is also a possibility of an outbreak of fire in extreme circumstances. Spill Proof Kangri is an innovative way of avoiding accidents due to the spillage of hot embers and also provides an effective way to handle the Kangri, making it easier and safer.

Asim Sikander Mir has made this Kangri “gyroscopic”. This Kangri consists of a spinning earthen pot kept inside the main base earthen pot so that its axis can rotate in any direction to maintain its orientation, regardless of any doubtful movement of the base pot. If Kangri is tilted to the maximum level, the inside earthen containing ember will retain its original position and not spill over the body or carpet.





Student Award – Second

LPG Cylinder Cap Opener

Sayen Akhtar Shaik
South Andaman, Andaman & Nicobar Islands
Scout: Direct

Sayen is a school student with very keen observational skills. In our homes, when an LPG cylinder has to be changed, the women folk need to do that. To remove the plastic cap over the cylinder nozzle, one has to pull outward a nylon thread attached to a metal clip lock and, at the same time, pull up the plastic cap. Sometimes if both actions are not done simultaneously or thread is broken, the cap may not come off. Sometimes, the nylon thread cuts the fingers.

Seeing her mother get hurt once while opening the cylinder cap made Sayen think about a possible solution. He developed an opener using which one can simultaneously pull out the metal clip lock and pull up the cap. It can also be used to open a tomato sauce bottle.





Student Award – Third

Bamboo Basket Weaving Machine

Sumit Murari
Bokaro, Jharkhand
Scout: Direct

Bamboo is a durable and sustainable material. India is endowed with a large number of bamboo species. It is put to several uses by local communities, such as making houses, shades, containers, baskets, fish traps, and incense sticks. In traditional societies, bamboo baskets are used for multiple purposes, like storing grains and carrying purposes in the fields. In cities, these can be decorative or serve as a place to keep fruits, magazines, crafts or other items at home. A well-woven bamboo basket can last for over a decade.

Bamboo basket weaving is a time and labour-intensive task where weavers can hardly prepare 3 to 4 baskets daily and thus earn much less. Sumit ideated a bamboo basket weaving machine to mechanize this work, relieving basket weavers of the hard work. The idea behind this machine is to boost production so that earnings can be maximized and drudgery reduced.





Student Award – Consolation

Sea Buckthorn Harvester

Tsering Omphel
Leh, Ladakh
Scout: Direct

Sea Buckthorn is a shrub which produces an orange-yellow coloured edible berry. In India, it is higher in the Himalayan region like Ladakh, Lahaul and Spiti, Pithoragarh, etc. Traditionally, communities have used it for centuries, but now modern science has identified its health benefits. Its fruit and leaves are rich in vitamins, carotenoids and omega fatty acids.

Due to their thorny branches, people face

great difficulty in harvesting sea buckthorn berries. Many times their hands get injured as well. Many fruits remain un-harvested due to failure to reach them by hand. Tsering has suggested a low-cost device for plucking sea buckthorn fruits, which are hand plucked manually. This device can not only be easy to handle and time-saving for them but also reduces the wastage of fruits.





Student Award – Consolation

Shock Absorbing Stretcher

Hema Pradhan
West Sikkim, Sikkim
Scout: Direct

The stretchers used for carrying patients are made quite sturdy as they need to be used anywhere – in hospitals, on roads, at home, in villages, in sports arenas, wherever their requirement is! Moving them over a smooth level surface, like in a hospital, is not uncomfortable for the patient. Still, when s/he is being carried on a stretcher on an uneven surface like a road, the experience becomes forgetful for them sometimes.

Hema observed this first-hand when an acquaintance was being carried on a stretcher on a rough surface. She thought that if bicycles and motorcycles can have a spring/shock absorber, why can't stretchers? Her idea is to have a spring/shock absorber-supported stretcher. This would reduce the impact of jerks/shocks while attendants carry a patient or keep the stretcher down, making the patient feel better.





Student Award – Consolation

Bed with integrated wheel chair

Arushi Tandon
Kolkata, West Bengal

Arushi (20), now in college, saw her grandmother's struggle in using the washroom, once while she was bedridden. It was worrisome for the family members as well who supported her to move from bed to the wheelchair and to the commode every time it was required. This made Arushi ponder over the problem.

She designed a modified bed where a wheelchair was incorporated. With a few easy adjustments, this integrated wheelchair can be separated from the bed, thereby making it easy for the patient or bed ridden person to be moved. Moreover, this wheelchair is built to slide over the commode so as to eliminate another transfer.





Student– Appreciation

Life Jacket with an Oxygen Mask

Mauwang Wangham
Longding, Arunachal Pradesh
Scout: Direct

While life jackets help people stay afloat in water, sometimes, in an emergency, oxygen requirements may also be there. Mauwang, a young student from Arunachal Pradesh, has given an idea about a life jacket with an attached oxygen mask to use when required,

especially in an emergency. Seeing a friend drown in a river and the helplessness of being unable to save him ignited this thought in his mind.





National Innovation Foundation - India

Grambharti, Amrapur, Gandhinagar-Mahudi Road, Gandhinagar, Gujarat- 382650

Tel: 02764-261134/35/36/37/38