Office of the Principal Scientific Adviser to the Government of India

RuTAG Technology Commercialization Programme

FICCI

The RuTAG Technology Commercialization Programme is a joint initiative of the Office of the Principal Scientific Advisor to the Government of India and the Federation of Indian Chambers of Commerce & Industry (FICCI). The programme aims to provide the necessary support for commercialization of shortlisted validated technologies developed at the RuTAG centers across seven Indian Institute of Technology (IITs) catering to the rural market in India as well as BIMSTEC and African countries.

Applications received for the technologies under the RuTAG Technology Commercialization Programme from 7 IIT RuTAG Centre's:

Summary of Application Received	
IIT RuTag Centre's	**Applications Received**
IIT Bombay	6
IIT Delhi	14
IIT Guwahati	9
IIT Kanpur	3
IIT Kharagpur	5
IIT Madras	7
IIT Roorkee	5

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Details of Technology Received:

S.No.	Technology Centre	Technology Title	Sector	Technology Description & Uniqueness
1	IIT Bombay	Locally Aavailable Fibers for Water Storage Tank Construction in Rural Villages for Watershed Management	Environment	In rural watersheds, for effective water management, surface water tanks/ ponds are used. These tanks are used to collect and store water during rainy season and the stored water is used for various purposes such as farming and domestic needs, once the rain is over. The NGO “Jalvardhini” recently started using natural fibers such as coconut, banana and Flax for surface tank construction in rural areas. The natural fibers are used as a substitute of steel to cope with tensile stress and to deal with shrinkage. Its effectiveness to deal with seepage and durability has been evaluated scientifically. As different types of fibers are available with different density and the cost of the tank depends on the type, optimization has been done with respect to type and density of fiber through appropriate scientific studies. The technology will help farmers in two ways: 1) use of fibers, its production and marking will enhance rural economy; 2) implementation of project in rural areas will improve water availability for farmers. Hence it will improve rural economy.

2	IIT Bombay	Portable cow lift for the 'Downer cow'	Agriculture & Farming	We have two models of portable downer cow lift system: • Model I - Suitable for lifting smaller animals -weighing in range of 200-300 kg • Model II- (Work in progress) This will be enhanced version of our Model I suitable for lifting animals weighing up to 500 kg Since Model II is proposed to be an enhancement of Model I and can naturally cater to smaller animals, we propose to commercialize Model II only Salient features of the technology • Suitable for lifting animals - weighing up to 500 Kg like HF, Jersey, small size cows and buffalos. • Emphasis on local fabrication: Material/components used for the machine are easily available everywhere with adequate documentation to ensure fabrication at local level. This is a major advantage as opposed to existing machine available in market from the vendors in Madhya Pradesh and Tamilnadu. • Light weight compared to other existing technologies. • Easily operated with 2-3 people. • Safe lifting of animal without causing any discomfort or physical injury. • Assembly and disassembly option for ease of transport. Suitable for cow sheds having doors of 6 x 3 sq. ft. • Lifting Canvas (Cloth) is strong waterproof, adjustable for different sized cows and safe to udder.

3	IIT Bombay	Hirda Decortication Machine		• Hirda decortication machine designed and fabricated by RuTAG IIT Bombay is unique in the category of small scale hirda decorticators. (single-phase single HP motor powered product with an output of 100 kg/hr decorticated Hirda). • Easy gap adjustment between rollers provided for hirda decortication makes it suitable for varying shape and sizes of Hirda. • The machine can operate on single-phase electricity and runs on 1 HP motor. Hence machine is suitable for remote rural and tribal areas where quality and reliability of electric power is a challenge. • Our user-friendly machine is suitable for even unskilled workers. • Women with small children can also work on this machine comfortably since special consideration is given for safety (of children) from moving parts. (protecting children playing near their mothers) • Some of the agricultural universities have designed small scale hirda decortication machines using different mechanisms. However, most of them have failed to achieve wide acceptance and were found less useful by users. • Commercially available hirda decorticators are of higher capacity of 5 HP and 10 HP, hence need Three phase electricity connection. Also, the machine cost is around ? 90,000 (5HP). These machines are comparatively complex and need a skilled operator.
4	IIT Bombay	Personal protective suit for Apiary bee keeping	Manufacturing	• Gloves provides good grips to hold the frames of bee box. • Ventilation provided in body sweat parts. • Need of Apiary bee keeping suit which is suitable for Indian rural women (Wearing Sarees) is identified.

5	IIT Bombay	Personal protective suit for wild bee honey bee harvesting	Manufacturing	• Takes less than 2 minutes to wear the suit before the harvesting process without any help of other person. • Suit is light weight • Protective headgear is removable. • The suit fabric is comfortable for the user to wear, remove, store, wash and maintain the product. • Production can be done in regional level. • Adequate viewing angle and ventilation space. • The bee veil is corrosion resistant.
6	IIT Bombay	Floating fish cages for inland aquaculture	Aquaculture	We have 2 models Model I The dimension of the structure is 3 m X 3 m X 3 m and is made up of threaded GI pipes, couplings and FRP gratings. It is a battery of 4 cages with a total volume of 108 cubic meter. The structure has high endurance to waves and winds. The structure is safe and very comfortable to work on even for the inexperienced first-time user. It is most suitable for rearing fries to fingerlings (nursery of fish), stocking fingerlings, rearing ornamental fish, and growing small table size fish. Unique features of Model 1 • The structure has high endurance to waves and winds as compared to most of the commercially available models. • The structure is safe even for the first-time user who doesn't have idea about working on fish cage platform. • It is a sturdy and robust structure where 30 persons can work at any given time on a 4-cage battery. • Also, it can be easily assembled at site in 3-4 days (without any electricity). Model II Model II introduced in 2019: The structure dimension is increased to 6 m X 4 m X 4 m, with the material and configurations remaining similar to Model 1. It can be used for all the purposes such as growing fry to fingerlings, stocking fingerlings, growing fish to table size and cultivating ornamental fishes and generate more value to user and also less complex for manufacturing. This model also can be easily assembled at site in 3-4 days. (without any electricity). The only negative point about this Model is that it is less stable

				and less durable in comparison with Model -I. Unique features of Model II • The structure is easy to maintain as it is floating type and can be painted/bolts tightened without taking out of water; hence easily maintainable. • Growing table size fish is convenient since the volume of 96 cubic meter is available in a single cage. • It can be easily assembled at site in 3-4 days. (without any electricity) • In terms of cost -this model is cheaper than Model I (half price) and at the same time available volume for growing fish is equivalent.
7	IIT Delhi	Standardized Animal Driven Gear Box for Multiple Rural Applications.	Agriculture & Farming	Standardized Animal Driven Gear Box (ADGB) with reduced cost, constant in demand. Fuel dependent applications can now run on animal power which is renewable. Efficient harnessing of animal power. Environment friendly. Lever support is provided to reduce load on bullocks. Therefore RuTAG IIT Delhi took an initiative to standardize the Animal Driven Gear Box (ADGB) and power transmission system developed by M/S. Panchal Pumps & Systems, Kanpur. Further, gear box was coupled with multiple applications such as Screw Pump, Chaff Cutter, Atta-Chakki, and Paddy Thresher. The technology was very much appreciated by small farmers who use bullocks for farming.

8	IIT Delhi	Improved Furnace for Joint-less Glass Bangles	Handicraft	It was decided to retain the original configuration of the furnace along with a chimney and modify the dimensions so as to attain better efficiency. This was to ensure that there is no major change in their current working method and the artisans do not suffer from any production loss. The furnace body is being molded with refractory casting material so that desired shape could be obtained. Grating is provided to supply enough primary air for proper burning of the fuel. A high density insulation blanket is provided to reduce heat losses. A chimney is provided along with a damper so as to regulate the draft. A mould for casting furnace is made with brick masonry. 70% alumina refractory casting material was used for casting the body of the furnace. Mould was made in two parts: one internal mould which is fixed and a second which was made using bricks to create a cavity for refractory casting material.
9	IIT Delhi	Improvement in Batasha Making Process	Food Processing	The design is made modular, that is, it have height variation feature as in previous setup, and also the upper frame is made to detach from the pillar support, and thus if a batasha artisan do not want to use chair, he can detach the upper frame, place it on the floor and start making batasha. Although by this practice the posture problem is not solved but the hygiene problem is solved. This makes the setup more versatile than previous setups. Channels for supporting the rollers are made horizontal. The channels are made horizontal to have the benefit of setting the gap between the plates at desired level. The horizontal channels are available readymade in market therefore reducing cost of production. The channels have guided path for movement of rollers thus removing the chance of any undesired movement. This setup is sturdier than the previous setup because instead of L-section, square section pipes are used which fits together

				better than the L-section. There is almost no noise during the motion of the racks due to use of plastic rollers instead of metal rollers.
10	IIT Delhi	Ergonomically Designed Bullock Driven Tractor	Agriculture & Farming	The improved BDT has a steel rope and winch mechanism for lifting attachments. Better sitting posture for the farmer. Easier to turn the tractor.
11	IIT Delhi	Ground Water Level Measuring Device	Environment	The device Complies with IS 15896:2011. The Probe is made with Stainless steel rust resistant material. Probe is an assemblage of four parts i.e. Plumb bob, perforated tubular body, high pressure cord holding gland, and a sensor. One end of the probe is a plumb bob for vertical stability and other end for holding electric cord through a leak proof gland. Improved operational stability using plumb bob as added mass. Better quality cord for high tension load capacity. Light-weight aluminum casted cable spool with better operational life.
12	IIT Delhi	Metallic Loom for Carpet Weaving	Handicraft	The metallic loom were designed considering all aspects of carpet weaving. The upper and lower beams are supported on side columns and locked in the plane normal to the plane of the warp threads using ratchet and pawl and worm and worm gear, respectively. The metallic loom is easy to assemble, high strength and rigidity due to seamless tubes for upper and lower beams, more stiffness allowing more tension in the string/Tana, environment friendly (fabricated using metals only), colorful and modern design, minimum maintenance required, stronger locking devices on both sides of upper beam and one side of lower beam, easy and fast tensioning with the help of worm and worm gear arrangement, only one person can generate tension in the string/Tana. Smooth rotation of work due to roller bearing. Bush bearings at the beam's ends provide smoothness, Polypropylene shading rollers which give easy shading action, Minimizes tensioning,

				shading, loading and unloading times, and human safety-reliable than wooden looms.
13	IIT Delhi	Ergonomically Design of New Model Charkha	Textile	New Model charkha (NMC) is very popular across India for producing coarse to fine count cotton, blended and worsted yarns. This micro size machine consisting of six to eight spindles (production Positions) is turned by hand in a sitting posture by the village women. The NMC has been redesigned to eradicate drudgery and improve productivity. Bicycle pedal driven mechanism with option to operate by hand also. Number of spindles increased from 8 to 10. Reduced number of gears and spindles makes it lighter to operate hands-free operation. Central seating arrangement of operator (ergonomically suitable) and user friendly. Delivery increased by 10% (From 7.1 inches per single rotation of handle in traditional NMC charkha to 7.83 inches per single rotation of pedal). Also an RPM meter was attached to the new model charkha so that user can operate the machine at optimum speed.
14	IIT Delhi	SSPV- Modified Pitcher Irrigation	Agriculture & Farming	A frustum shaped sub-surface porous vessel (SSPV) has as follows: • Less soil disturbance while re-inserting and extraction from soils. • Due to its frustum shape and compositional variation freedom, distinct porosities of SSPVs can be manufactured which can help in different functions such as saline soil remediation, root medication, use as a drainage management tool for an agricultural farm. • Mechanized production of frustum shapes is easy using a SSPV Molding Press Machine. • Optimal porosity SSPVs can be used as a flood management technology during a flooding event in the farm. • Possibility of a good composite ditch for wet composting for enabling organic agriculture is possible. This composting strip gets compartmentalized in a pitcher due to its shape. • Once the porosity of the SSPV is function of the

				soil properties of the region, it would help as a resource conservation technology in water use, medicine to the roots of the horticulture plants. • Both manual as well as motorized screw jack option can be provided to the SSPV Molding Press machine.
15	IIT Delhi	Improved Up-Draught Pottery Kiln	Handicraft	The improved kiln incorporates a grate to provide primary air for combustion, thus minimizing smoke emissions during firing. Air-gaps are introduced through rat-trap type of wall construction which act as a low-cost insulating medium that minimizes heat absorption by the wall or heat loss to the environment. Floor of the furnace, on which the firing actually happens, is insulated from the ground by channels of bricks, providing an air gap between the floor and the ground. When the energy absorbed by the floor of the furnace and the wall is minimized, and more heat is retained in the kiln volume, thus increasing ware temperatures during firing, with no additional fuel input. In different sites, fuel savings of 40-60% have been achieved with such modifications in the kiln. New kiln design uses up to 10?wer bricks than the traditional kiln. This offsets the additional construction cost of providing a grate below the firing area. Thus the new kiln is cheaper than or at most of the same cost as the traditional kiln.

16	IIT Delhi	Hand Tools used for Carpet Weavers/Artisans*	Handicraft	The ergonomically designed hand tools are very much acceptable to the users/artisans. Since their developments, around 200 sets of hand tools are in use in several places of the country namely, Bhdohi (UP), Shrinagar (J&K), Valsad (Gujarat), and others. The beater and knife are aesthetically and ergonomically designed. Standardized parts have been used. Life cycle is more. Easy and comfortable to use. Positive gripping with cushioning as comfortable operation. Ergonomically and aesthetically designed handle. The gap between the blades optimized. Shape of the blades improved. Knife Shapes of the blade and handle are changed using ergonomic and aesthetic concepts in designs. Spring steel was used for making cutter, which has self-sharpening property. Weight of the knife reduced to avoid any harm to the fingers and reduce fatigue to the wrist/arm during operation.
17	IIT Delhi	Scrapping Machine for Carpet Washing*	Textile	The purpose of washing of carpet is to remove water, dust particles, excess piles and chemical from the carpet surface. It needs a massage to open the piles and to provide shininess of the carpet. For this purpose, the first machine was developed to copy the action of the human washer called washerman. The machine used slider crank mechanism where the slider was the scrapper pad. The machine hit the carpet and removed water from the carpet surface. This type of profile allows to throw water and dust particles in one direction and returns without touching the carpet like the washermanís scrapper. The machine is expected to ease the manual scrapping process in less time, thus, removing the drudgery of the washerman. Alternatively washermen will be able to clean more carpets in a day using these machines, thus, improving their daily income.

18	IIT Delhi	Sheep Hair Shearing Machine	Textile	The only way to get this device was to import from foreign countries which is quite expensive way. Due to this reason, the availability of the device is not much in India. Only the Government bodies buy the device then give them for the operation to the shearers. Since, IIT Delhi worked on manufacturing of the device in India itself with equivalent materials, it results in low-cost manufacturing of the device. Therefore, not only the Government bodies but also some small group of shearers/shepherds can also afford to buy it.
19	IIT Delhi	Ergonomically Designed Treadle Pump	Environment	The newly designed treadle pumps are made using readily available hand pumps spare parts and plumbing parts. It has a discharge rate of about 3500 to 4000 litres per hour. It also has a projected life span of around 10 to 15 years.
20	IIT Delhi	Tulsi Mala Bead Making Machine	Handicraft	Conventional lathe machine is not appropriate for making tulsi beads faster as the headstock remains fixed. Tulsi mala bead making machine provides a sliding mechanism to the headstock which makes the bead making process faster. It is also provided with limit switch which allows immediate switching option to the bead maker.
21	IIT Guwahati	Betel Nut Cutter	Food Processing	It can cut slice open multiple betel nuts (6-7nos.) into two pieces in a single stroke depending on the size of the nuts. Whereas in the traditional method only 1 nut can be cut at a time. • It makes the entire process faster, up to 3.5 times and reduces the labour cost. • Raw materials are easily available, easy maintenance and more safe working conditions make the cutter more attractive. • The technology is manually operated and hence quite suitable for remote villages. • Other similar nuts can also be cut using this technology.

22	IIT Guwahati	Chaff Cutter	Food Processing	Small, table top, light in weight and easily portable. • Uniform pieces of straw can be obtained. • Negligible maintenance required. • The same technology can be used to cut fodders for different livestock animals.
23	IIT Guwahati	Feed Block Machine	Food Processing	Small, light in weight and easily portable. • Manual as well as hydraulic powered technology is available. • Easy to operate and low maintenance. • Useful for animal rearers living at high altitude
24	IIT Guwahati	Heavy Duty Bicycle	Transport	This bicycle is one of the low cost technologies that can be used by the rural vendor for selling products from door to door. • Rural farmers and vendors can easily afford this bicycle as its cost is much lower comparative to other mode of transportation. • As it is operated without consuming any fuel unlike motor vehicles a farmer saves Rs. 400/- to 600/- per day. • It is field tested that the cycle is faster than the normal bicycle and its maintenance is also easy. • As a lady's version of this bicycle is available, it is very beneficial to the women vendor communities.
25	IIT Guwahati	Hank to Bobbin Winding Machine	Textile	The machine is useful for both hand loom and power loom. • This machine can wind different types of threads viz., silk, cotton, natural fibers etc. • At a single time the number of bobbins that can be wound depend upon the number of spindles. At present the prototype have 10 spindles and can wound 10 numbers of bobbins. • The machine is fabricated with the locally available materials. • Less maintenance cost and easy to operate.
26	IIT Guwahati	Pirn Winding Machine	Textile	At a single time the number of pirns can be wound depending upon the number of spindles. At present the prototype have 6 spindles and can wound 6 numbers of pirns at a time. • It can use for winding of all types of fibers. • Less maintenance cost. • Operational cost is minimum and easy to operate.

27	IIT Guwahati	Colour Dyeing Chamber	Textile	Small, light in weight and easily portable • Manually powered technology. • Ease to operate and zero maintenance. • Greatly reduces laborious work of female artisans.
28	IIT Guwahati	Improvised Pedal-operated Chaak	Handicraft	Mechanized Pottery wheel which is available in the market are not suitable for artisans in remote villages due to inadequate supply of electricity. However, due to manually-powered mechanism, the technology has relevance in such resource-constrained settings. • Exiting technologies don't have incorporated ergonomically corrected sitting arrangement. Addition of ergonomically sitting arrangement, it will help in reducing heath drudgery like musculoskeletal disorder, muscular pain etc. among artisans.
29	IIT Guwahati	Value added products from Hibiscus sabdariffa	Food Processing/Pharamaceuticals	1. There existing products from calyx i.e. jam, dried calyx and beverages but as food ingredient (color, flavour and health benefit) are not well characterize so far. 2. Hibiscus leaves are consumed as leafy vegetables or pickles but there is no commercially viable product developed for organized market. The suggested technology serves the purpose. 3. Our dehydrated leaves products are suitable for use for culinary usage as taste & flavour enhancer in variety of products including curries. There is no similar product in the market. 4. Also leaf extract is suitable as an acidulant as well as milk coagulant. Therefore, it has unique appeal among all the other acidulant and coagulants. Also it can be used as meat tenderizer in the marinate. Compared to citric acid or synthetic vinegar it has better sensory appeal. Also it is cheaper than some of the commercial acidulant as well as milk coagulant. 5. The processing technique for Dried Hibiscus calyx, beverage mix and Hibiscus calyx based functional colour extract is cheaper and adoptable even for micro industries.

30	IIT Kanpur	Design and Development of a Mini Dal Mill.	Food Processing	The whole idea is to make this machine economically viable so that 'ordinarily well to do farmers' can afford it and can also be service provider to the poorer farmers/ community.
31	IIT Kanpur	Improved Metallurgy of Horse Shoes	Manufacturing	A significant research achievement is that quenching in graphite powder is a completely novel idea and has not been reported in open literature. The uniqueness here is that a solid medium has been used as a quenchant, opening up potential applications in the development of new and innovative heat treatment schedules in other applications. The process patent has been filed (Application No 201711004727).
32	IIT Kanpur	Powerless Solar Dryer for Food Processing	Food Processing	More expensive method of drying involves use of electric ovens that use either radiation or convection heating to remove the moisture. These units are very expensive and consume huge amount of electricity. In addition these units cannot be afforded by small manufactures, and ofcourse are of no use in places in India where electricity is still not available at all times. The design proposed in this invention overcomes all of the limitations of other means of drying. The unit does not require electricity to operate and still gives comparable results to other expensive dryers.
33	IIT Kharagpur	Foot-operated Ambar Charkha	Textile	The driving handle eliminated and a new pedal drive system introduced with the help of an angular treadle. Both feet of the operator can rest on the treadle and alternately exert force on the treadle such that the treadle edge moves up and down in tune with the feet movement. The drudgery to operate the charkha has reduced. The same operates operation foot-operated Ambar Charkha, productivity increased from 16-18 to 32-34 spindles per day compared to the hand-driven charkha without exerting higher force. Force exerted by the two legs in succession ensures more uniform

				rotational speed of the driving shaft, thereby reducing breakage of thread.
34	IIT Kharagpur	Pedal-driven Pottery Wheel	Handicraft	This pottery wheel is based on a revolutionary concept using the bicycle pedal as the source of power, the bicycle is familiar, easy, comfortable sitting portion with little strain on the back. This design allows smooth operation for longer time once set into motion, which is very good for small size products. It requires nominal force and a person with reduced capacity can also operate it. In this manner, the efficiency and productivity have increased by 5 times from traditional wheel. This way the machine protects the potters from the occupational health hazards (backbone pain, arthritic diseases, etc.) This pedal-driven pottery wheel cost Rs. 8,000- per unit.
35	IIT Kharagpur	Mechanized Dhenki.	Food Processing	Salient Features of Mechanized Dhenki: 1) Eliminates the need for one operator at the foot pressing end. 2) 1 Hp motor driven pounder and impactor. 3) Ensures similar frequency, amplitude and gravity fall as traditional. 4) Productivity is about 15-20 kg/hour compared to traditional (Productivity of traditional dhenki is 4-5 kg/hr.)
36	IIT Kharagpur	Motorized Rope Making Machine.	Handicraft	Salient features of Motorized Rope Making Machine are : 1) Our machine is motor driven, even a single person can operate it and feed the jute simultaneously. 2) Power source is a 0.5 hp induction motor running at 1440 rpm. 3) Productivity is 8-10 kg/hour of rope (depending on the thickness of the rope).

37	IIT Kharagpur	Sisal Fiber Extractor	Handicraft	Employing the engineering principles to translate one simple cycle of a paddle needing just around a second into 76 times scrapping of the leaf may modestly be considered as the innovativeness used in developing the machine. This is a simple but highly efficient machine which increases the productivity to the tune of about 15 times as compared to that of a conventional artisan. It is highly ergonomic and is susceptible to no occupational hazards. It ensures almost complete removal of drudgery. It uses locally available resources and solves the problem of gender sensitivity too. Does not need any specialised skill of the operator and can be used equally by a male, female operator. It is a foot operated low cost machine and does not need any electrical power.
38	IIT Madras	Small Scale Paddy Thresher	Agriculture & Farming	• The machine separates the paddy from the stack without any winnowing process. • It should remove the paddy form the stalks of the crops and mildly crush the straw to make it edible for cattle. • It does not chop the straw and hence we get it in full length. • Low cost and high power threshing machine. • The device is easy to install and maintain
39	IIT Madras	Household cold pressed oil expeller (tapered screbased)	Food Processing	• It is a cold pressed oil expeller designed in a rural concept. • Full automation facilities with easier, simpler and single touch operation. • Used food grade stainless steel for parts in contact with seeds/oil. • Gear mating mechanism is introduced into the oil expeller to reduce the Rpm. • Compression rate is also good in gear mating mechanism. • Compact and exquisite design, small size and convenient to place at home. • User friendly design to enable workers mostly women SHG groups for easy • Assembly/disassembly and quick cleaning. • Wide range of seeds can be used viz. peanut, sesame, beans, walnut, ground nut, Copra etc.

40	IIT Madras	Electronic Jacquard Handloom with design software for grass weaving	Handicraft	• Electronic Jacquard facilitates easy storage and retrieval of design. • It works on the principle of 7 wheel take up mechanism. • The ergonomics of the handloom is improved to facilitate comfortable sitting posture for the weaver enabling them to extend the working time by at least 25% • 192 hook electronic jacquard has been developed and installed recently in place of 120 hook mechanical jacquard to enhance the design capability. • No expenditure on punching card which exist in mechanical jacquard handloom. • Productivity increased due to improved shedding technique.
41	IIT Madras	Microwaveable pottery	Handicraft	• Quality product out of common red clay • Appropriate for cooking/ heating and serving directly • Cost of production: Rs. 25 per liter capacity • Value added products: Increase in income of up to 2 times for potters
42	IIT Madras	Design of sensor based standalone system to protect the farming land from wild boar intrusion using hybrid alarming	Agriculture & Farming	• The device is portable and light weight. • Very simple and easy to operate. • 85?curate in detection of specific animal like wild boar. • Low cost compared to the market product, single pole cost about INR 4000
43	IIT Madras	Bidriware	Handicraft	Alterrnative process for using sand from bidar fort, which is a archaelogical monument.
44	IIT Madras	Semi automatic coir ratt	Textile/Manufacturing	• Suitable for rural areas with unskilled workforce and semi-skilled mechanics • Different variety of Yarn (Twist, runnage, score) can be produced • Evenness in twist and score • No physical strain • Power consumption is low • Ergonomic considerations • Cost-effectiveness, quality of yarn, productivity and almost maintenance free mechanism.

45	IIT Roorkee	Cold Storage Powered By Pico Hydro	Food Processing	Pico hydro based small cold storage technology is useful for preserving locally grown fruits and vegetables. Although a large commercial cold storage are available in selected areas and its transportation adds up to the sale price. RuTAG IIT Roorkee has designed and developed a small scale cold storage unit powered by improved watermill or Pico hydro for local storage of fruits and vegetables. USP of the cold storage technology- The operation of cold storage by improved watermills and pico hydro which is effective for developing local capacity for storage of fruits and vegetables. Large cold storage units require high financial inputs and large land area and it take longer time for construction. It cannot be sustainable at rural scale because of production of short storage time vegetables in remote area as compared to the plane area. Small scale cold storage units are more financially feasible and adoptable at rural scale in remote areas as power generated from local source can be used in other livelihoods.
46	IIT Roorkee	Pump As Turbine.	Water	PAT technology is a unique technology for pico-hydro power generation. Although turbine for specific site are available but it is more costly as compare to the PAT. In view of this RutAG IIT Roorkee has designed and developed a PAT with flow control mechanism for flow control when the discharge varies. USP of the cold storage technology- This technology not available in the market because it is quietly different and cheaper from the turbine PAT technology is highly useful for pico hydro power generation. There is no existing technology available except turbine which is more expensive then the PAT. So centrifugal pump with flow control mechanism can be used as a turbine for power generation. PAT technology is highly feasible and economical for pico hydro.

47	IIT Roorkee	Modified Bageshwari Wool Charkha (Version-2)	Handicraft	• USP of The modified Bageshwariwool charkha :Suitable for hand spinning for different sized yarn. • Capable of spinning different types of wool in different mode operations (manual, electrical and solar) in a single unit, which reduced cost overall. • Powered by with 75 Watt of solar panel and motor with 110 Watt and speed can be increased upto 3000rpm. • Battery backup, USB charging port and emergency paddle light has been provided. • Control panel for coarse and fine adjustment through which motor RPM can be set in range between 150 to 3000 RPM.
48	IIT Roorkee	Pomegranate aril extraction machine	Food Processing	Uniqueness of the technology: 1) Machine is compact in size with low cost as well as easy to use USP of Technology- The aril extractor is capable of extracting seeds from 60 kgs of pomegranate in an hour and uses 80 watts of power.
49	IIT Roorkee	Mechanized Roller for Felt Making	Handicraft	• It is based on pushing and pulling by hand instead of kicking and pushing by legs. There is substantial reduction in physical labour. • It can be transported easily and does not require major modification of existing floor used for felt making. • Winding and tying of mat for rolling felt is much easier and faster as compared to the traditional method. • There is saving in rolling time while felting in bulk or large sized pieces. • Limited shrinkage in felt size while rolling. Layered wool remains in place and there is no distortion of embedded designs. • It allows production of 4 excellent quality ornamental felt sheets per day of different sizes by a skilled craftsman as compared to average of 2 felt by conventional method.