

Surjeet Basmati 1: High Yielding and Salt Tolerant Paddy Variety

A bloom from Salinity

During 2008, the innovator sowed a paddy variety Pusa 1460 in his field. Due to Sheath blight disease the entire field was severely affected except one plant. The plant was harvested separately and prepared in a nursery. It was then transplanted in the main field and 225 plants were selected during the harvesting based on more number of tillers, lengthy spikes and free from foot-rot disease (Bakanae disease). Selection continued for another two years and desirable characteristics were found. Thus, the variety was named as Surjeet Basmati-1

Surjeet Singh is well known for producing high quality aromatic basmati rice. He has been practicing agriculture for over four decades. He follows three farming systems viz., Wheat-Rice, Barseem-Rice, Garden Pea-Rice.

Salient Features of the variety:

- High yield - 60 q/ha
- Tolerant to salinity condition
- Suitable in high EC water
- Free from foot-rot disease (Bakanae disease).
- Milling recovery – 67 percent

The innovator has distributed seeds of the variety in salt affected areas of Haryana, Gujarat, West Bengal and Maharashtra. Every year he sells around 20 Q of seeds of his variety. The initial reports at Farmers' field suggested that the performance of the variety was appreciable in Haryana, Gujarat, Maharashtra and West Bengal.

The field experiment were conducted by CSSRI, Karnal, Kharif 2013 & 2014 in sodic and saline stresses condition result showed better stress tolerance in terms of lesser reduction in grain yield. The multi-location trials were conducted at farmers' field in Haryana, West Bengal, Gujarat and Maharashtra in Kharif 2016 and found to be superior in terms of production.

Shri Surjeet has received various regional, state and national awards and recognition. His variety is also listed in Limca Book of Records for its high production.



Surjeet Singh
Haryana



BamHum-An innovative wind musical instrument

Meri Aawaz Suno

Mr. Moa Subong's wife, Mrs. Arenla Subong is a music guru and taught music to pupils in a cultural centre. Both of them are folk fusion artists who improvise and contemporize traditional music and songs. Being a vocalist, she faced problems while making music, the traditional instruments were beat or percussion based, playing various notes was not possible. Moa Subong made the BamHum to help her wife in 2005. He was successful in creating this musical instrument within a year.

BamHum takes its name from Bamboo and Humming. It is a medium sized wind operated hand held bamboo musical instrument like flute. The bamboo used for making the BamHum is the one used for fencing, as it is sturdy and durable. Bamboo piece with a node (closed internal partition) at one side is taken and treated heat for 10-15 minutes or more. There is a rattle at one end of the instrument (for amplifying notes) and a hole in the bamboo node (closed internal partition) for passing of the air on the opposite end. It has only one opening (hole) through which the user has to hum, which then gets musically amplified through the instrument. The user can moderate the tone of his/her to get desired musical notes and pitch from the instrument, which takes some practice and requires some knowledge of music.

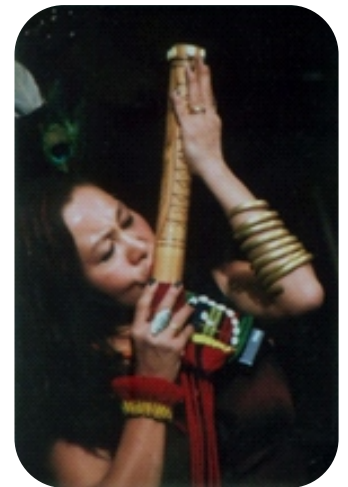
This is a very simple musical instrument, which anyone can start using within a few minutes to make music. The novelty is its simplicity in construction and ease in using. This can be alone used to hum songs (even by an untrained person without music knowledge), as part of a musical choir and as the lead instrument providing playback (of songs) as in instrumental songs. It can be used from right to left or vice versa, top to down or vice versa, the user has full flexibility to use it in any way s/he wishes or can creatively use. It blends well with other musical instruments and can be used for any genera of music. The sound produced from BamHum is similar to the sound of violin or saxophone.

The innovator has sold over 5000 units in the last ten years. This instrument has been purchased by Big music bands like Parikrama and Regional/Bollywood singer Papon. The couple have performed widely in India and abroad and their performance has been much appreciated. One of their albums was released by Sa Re Ga Ma music company, and was also nominated for 50th Grammy Awards in 2008 under Contemporary World Music category.

The genre of their music is Folk fusion, which they call "Howey", traditionally the sound farmers used to make while working in the fields. Through their music and films, they are contemporizing folk songs/music so that it remains in sync with today's generation.



Moa Subong
Nagaland



Functioning - Very simple to use, one just has to hum (and not blow air like in the flute) into the opening.

Cost: Model: 1 - N-Series i.e. Normal/ Beginner series: Smaller - Rs. 1200

Model: 2 - P-Series i.e. Professional series: Bigger - Rs. 1700

Farmer's Friendly Compressor for Biogas Bottling

A stepping stone toward harnessing sustainable energy



Ajay Kumar Sharma

Uttar Pradesh

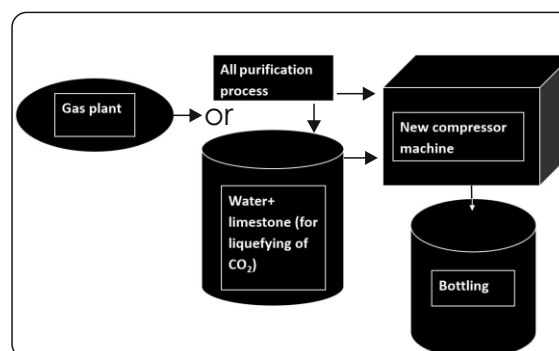
Ample quantity of biomass is available in India and converted into biogas by digestion in biogas plants. However, the use of biogas is limited to domestic cooking in the kitchens near the plant. Due to lack of adequate affordable technologies for bottling, the gas is not finding scope in using locations, far away from the biogas plant.

Innovator Ajay Sharma has developed a portable, energy efficient and cost effective biogas compressor machine, which compresses the biogas up to 200 psi and enable to store in a conventional gas cylinder.

The unit consist of motor (1.5hp, 1400 rpm) which runs a 3 hp compressor. As an option to operate the unit by solar energy, the innovator has also provided DC motor (12-24 V, 1000W, 3000rpm). The motor gives drive to compressor through two gears and pulley belt system. He has also provided a fly wheel which makes the operation so easy that it can easily be operated by manually.

Prior to compression, the biogas is filtered and scrubbed through water and lime. It remove impurities and CO₂ from the gas. A small pressure accumulator is attached in between the gas cylinder and the compressor.

He has also tried to modify the gas cylinder to enable it filling gas at low pressure. Another inlet having low pressure return valve and a pressure regulator is added through extra hole in the LPG cylinder. One can fill the biogas in the cylinder through this additional inlet even in the absence of power, by manual cranking.



Non-invasive Self Diagnosis of Silent heart attack

Prevention is better than cure

On July 3rd 2015, Mr Akash Manoj 's grandfather collapsed due to heart attack and this served as an impetus for Akash to find a solution to this problem. Silent heart attacks, which appear with little to no symptoms, are alarmingly common and extremely deadly. There is currently no way to detect a silent heart attack because it quite impossible to detect the FABP3, an optimal biomarker for cardiac ischemia. Hence, it seems that the only way to enable biomarker-based diagnosis for silent heart attacks is to allow at-risk patients themselves to frequently analyse their blood for these proteins and subsequently, the patient will be alerted of a silent heart attack.

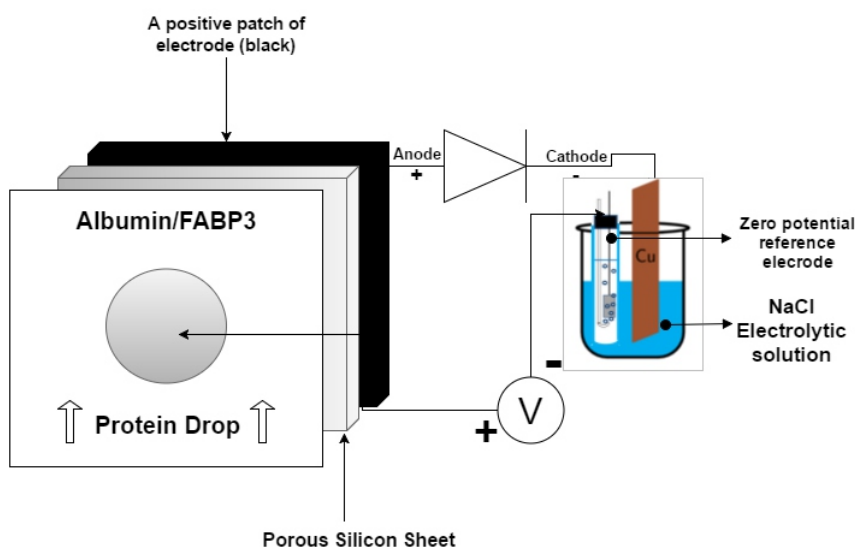
The purpose of the innovator was to investigate a technique that can potentially be coupled up with transcutaneous UV-protein quantification to non-invasively measure the amount of FABP3 in a patient's blood and alert him or her of a silent heart attack.

While conducting the experiment, Akash found that it is possible to transcutaneously detect FABP3, a biomarker of heart attack-associated cardiac ischemia, in the blood through a two-step process. FABP3 is one of the smallest proteins that can be present in blood, and is charged negatively (so it attracts to positive charges). These properties can be used to identify it in blood without puncturing the skin. His results showed that:

When a small enough positive electric potential is applied to a thin and translucent area of skin (i.e. the external ear), FABP3 is the only protein that attracts to the positive charge because it is the smallest (and therefore the most sensitive) protein that can be present in the blood. As a result, the FABP3 accumulates on the capillary walls in this positively charged skin, while all other proteins pass by unaffected.



Akash Manoj
Tamil Nadu



A Schematic diagram of the prototype

Non-invasive Self Diagnosis of Silent heart attack

Prevention is better than cure

The results showed that, when a 173 mV potential of positive electricity was applied to the model, at this point the accumulation of FABP3 exceeded that of albumin on the silicone. Slightly below 173 mV, albumin accumulation ceased altogether, and only FABP3 accumulated at voltages lower than this. This means that it is true that, if a positive potential of a low enough voltage is applied to thin human skin, only FABP3 will accumulate on the dermal capillaries and become detectable by UV quantification.

This consisted of a method that allows daily self-testing would have to be noninvasive, safe, and easy to use. Ultimately, it would have to involve a transcutaneous blood analysis, which examines the contents of one's blood without penetrating the skin. In searching for ways to tackle this challenging prospect, Akash examined the various distinguishing characteristics of blood proteins that would all of them to be identified transcutaneously and found out that proteins have distinctive masses and electric charges in blood. To check this, he used a model to test whether different magnitudes of charged electricity, when applied to a thin area of skin, would isolate FABP3 from the other blood proteins and attract FABP3 to the capillary walls and the results to this examination showed that this is true.

When enough of the FABP3 protein has accumulated on the charged capillaries, it can be measured through UV light quantification, in which UV light is passed through the thin skin in which the FABP3 accumulated, and a sensor detects the amount of protein there based on the how much of the light was absorbed. UV protein quantification is already commonly used ex vivo. He used a model to simplistically resemble FABP3-positive blood in dermal capillaries with several positive electric charges applied. The model consisted of a silicone membrane (representing the dermal capillaries), and a drop of albumin/FABP3 solution to simulate blood, on top of it. An electrode patch applied positively charged electric potentials of several different magnitudes to the silicone and the accumulation of the FABP3 on the silicone was compared to that of albumin for each potential. The next follows the UV quantification process to determine.

Low cost borewell Scanners

Making invisible, **visible**

Water availability in the bore well is one of the major concerns to the farmers for irrigating their crops. For irrigation, investment in digging bore well is very crucial for farmers. Conventionally, farmer takes decision based on type of soil coming out in water and discharge rate while digging the borewell. The Borewell scanners available in market are very expensive and capturing image only and cannot analyse effectively about water flow and kind of source. Moreover, they are too expensive.

The innovator realized that need of device that could also withstand underground conditions like pressure, temperature and can be monitored it from remote place. Innovator has developed a low cost automated capsule shaped bore scanning device , which is equipped with a high definition camera, digital compass, temperature and pressure sensors, flow and depth detector, GPS device and a LCD screen to display the assessment results. It weighs about 1.5 kg and can scan the bore well up to a depth of 600 feet.

It is a multifunctional device, detects ground water availability, its pressure and temperature. Additionally it also checks stones blockages and also measures inflow/outflow rate and direction of ground water. Borewell scanners are used to ascertain the depth, inflow and outflow of water, kind of water source and the borewell formation (structure and material around the bore) and i helps farmers to make an informed decision about going ahead with the installation of motor/pump and the kind of crop to be sown in particular season.

- Girish charges Rs 1500 for the services and the availability and status of water inside the borewell. Raichur University has also purchased one unit for its research purpose bore well scanners and study of underground water table.

- Central Ground Water Board, South Western Region, Bangalore confirmed that the technology is innovative and useful to common people at a very low cost.

- It is useful to know about the depth of well, depth of casing, water yielding zone/zones and depth of fractures, temperature etc.”.

- It helps farmer to know the exact water source (perched or regular) and reliability of the borewell, thus reduces the burden for the farmers in the initial stages (before installing motor/pump to the borewell).

The borewell scanner developed by innovator has a great social and environmental impact because the farmers can take decision not only for making investment in installing pumps but also for growing crops based on availability of water.



Girish Badragond
Karnataka



Mitti cool refrigerator, Non-Stick clay Tawa and Clay cooker

Soul of the Soil



Mansukhbhai Prajapati
Gujarat

Mansukhbhai Prajapati is a serial innovator and traditional clay artisan. He has developed an entire range of earthen products for daily use in the kitchen. These products include mitticool refrigerators, non-stick tawa, clay cooker, water filters, and other such items of daily use.

Mitticool refrigerator made of clay for storing vegetables, fruits, milk and water. It does not need any external source of energy for the cooling effect. This refrigerator is eco-friendly and a good economic option to store drinking water, food, vegetables and milk as it preserves the original taste and can be stored fresh without deteriorating the quality for 2 to 3 days.

Non-stick clay tava is an earthen griddle with a non-stick coating. It gives advantages of non-stick cookware while preserving the natural taste of food cooked using earthen griddles. It is a cheaper alternative to metallic non-stick cookware. As the coating gets absorbed in the pores of the earthen material, it does not wear off easily too. The non-stick coating in this tava provides low oil cooking facility, clay generate a unique taste of food.

The clay cooker made from special clay with a capacity of 3 litre. Dye and press machine was to make this cooker followed by baking in furnaces at high temperature, which makes it sturdy and durable. His cooker adds a different style and ethnic touch to the kitchen.

The innovator has sold about 6500 refrigerators, 50,000 tawa's and 30,000 clay cookers. Apart from these, he has also developed many clay products like water bottles, water pot, dinner set etc. Innovator has been awarded in NIF's Fifth National Competition for Grassroots Innovations and Traditional Knowledge in 2009. He was selected in FORBES in the year 2010 as one of the most powerful rural entrepreneur of India in the coverage of international innovations.



Modification in Milk Boiler

Energy could neither be created nor delayed;
however, it could be conserved



Subhash Ola
Rajasthan

Innovator noticed that the conventional boiler based mawa making machine consumed -large volume of wood and water for making mawa. The machine used over 100 kg of wood and 4000 litres of water to extract mawa from 100 lit of milk. It also consumed significant amount of electricity for running chiller pump to condense the rejected steam, making the whole process very costly.

Innovator has developed the improved boiler based mawa maker where the steam circuit (boiler, kadai, condenser, pipes) has been made as a closed leak proof design resulting in better fuel efficiency and minimal wastage. Used steam is also fed to the boiler along with condensate water through gravity. The close circuit design stop leakages, thereby reducing the additional water requirement (reducing from about thousand litres per hour to few litres per hour).

Later he improvised mawa-making machine and designed a comprehensive condensate and heat recovery system for its application in other industries.

Unique Selling Proposition (USP) of the innovation is that it saves Energy and Water up to sixty per cent compared to conventional boilers.

The innovative technology and the system integrates an equipment along with the existing Boiler System, which is capable to re-circulate the energy associated with used Steam.



It a very cost effective and energy efficient way of recycling steam to generate power and/or improving efficiency in textile ,milk and food, pharma, paper mills, Hot Water Boiler Generator, Plastic Recycle, Laundry, Hospitals, plywood industry etc.

Major benefits include long life of boiler, less water consumption, reduces fuel consumption, eco-friendliness and economical.

Subhash is making machines with capacity ranging from 40 lit/hr to 3000 lit/hr depending on demand of customers. He has sold over 60 machines in different parts of India.

Modified walker with adjustable legs

Attitude overcomes Altitude

It is quite difficult for old, physically challenged or person recuperating from lower limb problems to climb up or down stairs using conventional four leg walkers. Shalini observed senior citizens have problem in walking with a standard available walker because these are not flexible enough to provide support for climbing stairs.

Shalini's grandfather used a walker as assistance to walk. She noticed that he could only use the walker comfortably while walking on a leveled surface. Her grandfather enjoys walking on the terrace however; he found it difficult to walk up the stairs. Seeing her grandfathers' plight, Shalini came up with the idea of the "modified walker with adjustable legs". It is a one of its kind product to provide flexibility of using walkers to climb and descend stairs.

The modified walker has an innovative self-locking mechanism through which front legs of walker can be raised while climbing up the stairs and lowered while climbing down. It is very stable, light weight, adjustable to all sizes of stairs and can also be used while walking on inclined surface. This walker is quite useful for children, old, or any other person with a disability, patients undergoing medical treatment etc.

- It is very stable, light weight (only 4 kg) and ergonomically designed product.
- It adjust to all sizes of stairs and can be used for climbing and descend. The product can be used regardless of the person's height and weight.
- This product can also be in walking on inclined planes and one can use the walker independent of any external help.
- Adjustable walker helps users to move about in their living premises and mainly supports them to climb and descend using this walker. It reduces users dependency of external aid while moving in the premises or commuting from one place to another on inclined plane (even when it means climbing stairs, places not having escalators especially in underdeveloped and developing nations).
- Senior citizens, the handicapped and patients undergoing medical treatment need most assistance while walking and commuting from one place to another and also commuting within their house. Very useful for Hospitals, Old age home, Senior citizen communities, Back up assistance for armed forces.



Shalini Kumari
Bihar



Bamboo strip, incense stick and Incense making machine

A fragrance for Livelihood

Bamboo sticks are used in the Agarbatti (incense stick) industry. For processing of bamboo, electricity operated high capacity machines are suitable for industries but not for smaller rural communities who use knife to make strips and sticks. A step further Paresh Panchal addresses the entire value chain of incense stick manufacturing business, and his innovation has created employment for many citizens of the country, particularly women and those in the tribal / rural sector.

Innovator has developed manually operated incense Strip making machine, stick making machine and incense rolling machine and thereby created a entire value chain of incense stick manufacturing business, and his innovation has created employment for many citizens of the country, particularly women and those in the tribal / rural sector music.

The first machine is used to slice the bamboo pieces of definite size, thickness and length. The slices cut are then fed into the strip making machine to produce the sticks. The agarbatti rolling machine is used to add the masala to incense stick which is later burnt by users. The innovation in this machine is that it can also use a square bamboo stick as an input which isn't the case with other machines.

Till date, 1800 machines have been sold which have generated employment for nearly 1500 households.

Easy to use & maintain, most suitable for the rural/tribal people who can use this machine comfortably, apart from their regular domestic chores. Manually operated, reduced drudgery and risk of injuries to the rural people. Easily accommodate at home as it very compact and do not occupy much space. On an average one person can earn minimum 100 to 150 Rs, by using any one or both of these machines.

Till date, innovator has sold about 500 bamboo strip making machine, 500 bamboo stick making machine and about 1800 agarbatti rolling machine which have generated employment for nearly 1500 households in rural and triable part of India.



Paresh Panchal
Gujarat



Laxmangarh Selection: Improved Carrot Variety

Flourish Carrot for Swasth Bharat

Smt. Santosh Pachar is known as innovative farmer in her village Jhigar Badi of Sikar district of Rajasthan. She has studied up to class 8th and owns 5 acres of agricultural land wherein she cultivates different crops. Sixteen years ago, she had collected carrots for consumption from a farmer of her nearby village. Carrot was very good in appearance and there were very less number of forked root. She adopted the root-to-seed method of planting at her farm to produce seeds of the above carrot. Criteria of selection of carrot for seed production were long root-length, sweetness, red color and softness. She collected seeds from first year plants and sowed it again in small field and adapted same selection method continuously for 4 to 5 years. The carrot was stable for its yield and other desirable characters.

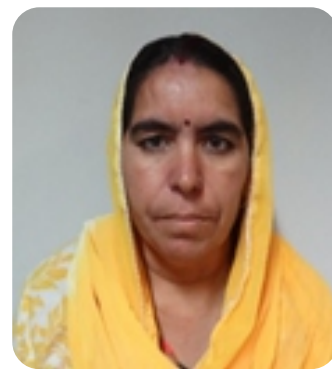
Salient Features

- High yielding 50 – 60 tons/ha
- Average Length of carrot up to 1.5 ft
- Carotene content – 124.5 mg/kg (dry wt basis)
- Iron Content – 143.42 mg/kg (dry wt basis)
- Red in color and sweet in taste
- Maturity period : 80 to 90 days
- Fetches high market price due to better quality and shelf life
- Very less percentage of forked roots
- Adapted well to different agro-climatic zones

Field trial was conducted at Rajasthan Agricultural University, Bikaner and it was found superior than check varieties of Pusa Kesar and Ganganagar local. Biochemical profiling was also analysed and recorded highest beta carotene (124.5 mg/kg db), iron (143.4 mg/kg db), crude protein (10.1% db) and Vitamin E (22.3 IU/Kg). Farmers' field trials were also conducted in Rajasthan, Gujarat and Maharashtra where the variety was found to be superior in terms of lesser forked roots, length of carrot, better shelf life during transportation and excellent colour value and farmers are interested in cultivating this variety in next season also.

Innovator has sold over 4 quintal of seeds to various farmers of Rajasthan, Haryana, Punjab Delhi, Maharashtra, Madhya Pradesh, Uttar Pradesh, Tamil Nadu and Gujarat. She has got various awards/recognition from state and national level for her extra ordinary work for crop improvement.

Farmers from different districts of Rajasthan and other states also visit her "Model farms" to learn about carrot cultivation practices and organic farming. She has been acknowledged and recognized from state and private agencies for her efforts in carrot cultivation.



Santosh Pachar
Sikar, Rajasthan

