

## THE GOLDEN TRIANGLE



Gian



**D**NTNU



Non-stick cookware has become essential in low-fat conscious urban kitchens though safety concerns have been raised because of the Teflon kind of chemicals used . But who could have imagined that tribal communities in Gujarat, India, would be using nonstick coating made from natural ingredients on their earthenware for millennia?

Members of Dhanuka, Nayak and Bhil community of Chhota Udepur region of Gujarat and the nearby areas in Madhya Pradesh have been traditionally using 'lac' grown on a specifc tree to coat their earthen utensils. The clay pan is coated with natural lac which makes it nonstick and it takes less oil to cook food. The innovation lies in the selection of a particular kind of lac - and the process of applying it - on the clay surface using natural binding agents. *Honey Bee Network, SRISTI, GIAN* 

It also prevents the surface from getting scratched or damaged while scraping the food since it enters the pores of clay vessel.

Besides Ambala in Chhota Udepur, other villages of Gujarat where this tradition of lac-coating can still be found are Devhaant, Kharkhad, Teemla, Bodgaon, Rangpur and Kanalwa and, in Madhya Pradesh, mainly in Chandpur and Khandala villages. Scientific evidence proves that lac is non-toxic.



#### Salient features

- The products are non-stick, non-toxic, chemical free
- The coat gets adsorbed on the surface of the earthen pot and does not get scraped. Hence, unlike commercial non-stick products it does not get into your body and cause harm.
- Completely Handmade

#### Challenges

When GIAN saw that in spite of the willingness to buy such products, not many orders were being received. The problems were identified and listed. The challenges were:

Heavy to Handle Products with uneven rims: The local communities produced thick products because they believed if they made lighter products these might break during the firing. During the training period, this myth was broken as most of the new designs produced were thinner than their normal products

Rough to Feel: The finishing was done at the bone-dry stage. Because of addition to clay, it becomes very coarse and it's difficult to sand it. Lac Application: As the products, were not very smooth, the quantity of lac applied was more which left uneven traces which was not visually appealing.

Tilted/deformed Products: In pottery the basic creation of forms or product starts with the

principle of centering. The process of centering is necessary for equal distribution of clay for balance. This principle has to be used at all stages of creation to avoid lopsided products. They were also using excess water in moulding the shapes and as the water dried out, it caused more deformations.

#### Overcoming technical challenges

A few training sessions were conducted with experts teaching them how to refine their products. They were taught how to see levels and cut proper rims, usage of less water and proper handling to avoid deformation. They were taught to use moulds and that actually helped them quite a lot to get better shapes. They make lighter pots now with better finish.

#### Future aspirations





Going global is the next thing. Being handmade, non-stick and chemical free, makes them an ideal solution for the environment concerned, health conscious, global community. It can also supplement Slow Food Movement which makes food healthier, retain more nutrition and consume lesser energy.

#### Help is needed on

- Launching their products outside India by identifying local entrepreneurs
- Designing proper packaging for ensuring minimal breakage in transportation
- Working out supply chain/logistics to be able to deliver these new age products at a low cost in different parts of the world
- Connecting with the more advanced potter/ceramic community for better tools
- Ascertaining new forms/pot types which may match European tastes and may be used for serving snacks

## How can you help?

Can you ascertain if such products have a market outside India? Can these products find a market in Norway or any other European market? Can you identify the supply chain logistics that will be needed to introduce this product range in the new geography? Can you find the cookware manufacturers if they will like it to be a special supplement for slow food movement followers? Honey Bee Network, SRISTI, GIAN



## About the Innovator and his innovation

N ilesh bhai Dobariya, a farmer from Amreli, Gujarat, also ran a small rope making unit . Many people in his village started making rope which lead to competition and hence reduced margins, leading to losses. It had to be shut down. The lack of business proved to be an opportunity for Nilesh bhai as he then innovated a machine to clean the floor in a temple. The temple committee funded this project. The machine became huge success!

The rope making business was still sluggish which again prompted Nilesh bhai to invest his energy in solving the problem of dearth



Norwegian University of Science and Technology

#### Salient Features

Machine is tractor mounted and work as an attachment. Hence, the thresher can be easily attached to tractor and taken to the field.

There is a separate engine to run the thresher.

A machine has a unique conveyor belt picking the harvested groundnut pods lying on the ground while moving in the field.

A storage system for storing fodder and crop separately while the machine is moving. The storage bags can be raised or lowered by hydraulic system to dump the product and by-products.

The entire operation requires only one person i.e. the driver who operates the machine, no extra labour required.

## Unmet need identified by the innovator

- Threshing is labour intensive but during peak season, there is a shortage of labour escalating the wages.
- There is a huge loss of yield if threshing not done in time.
- If threshing is done in the field, the topsoil particle adhering to the pods and roots will be deposited in the field itself, hence loss of fertile topsoil is minimised.
- The nutritive biomass/crop residues stay in the field fertilizing the soil

#### Challenges

The thresher was combined with tractor in the first model, hence testing and certification was difficult. In such a case, it has to go through a registration process as a new kind of vehicle, the process for which is very complicated and lengthy as there are no standards for such vehicles.

Wear and tear of the parts was more rampant. Honey Bee Network, SRISTI, GIAN

#### Overcoming the Challenges

The thresher was made into an attachment rather than the part of the tractor, which made it eligible to test for regulatory requirements.

The design was reworked to minimise wear and tear.

#### Advantages

As the threshing happens in the field itself, the soil is enriched by the biomass and soil adhering to pods falls in the field

Saves time, ensuring timely threshing of the pods

Ensures cleaner fodder, fetching good returns to the farmer

#### Future aspirations

The machine can be used for other pod bearing crops like moong beans, soybean, etc.



Huge demand exists from farmers for the machine. Hence, with some more investments, it can be scaled up

Trials and demonstrations in other parts of the country will help in further increasing the demand

The problem of timely threshing of groundnut is faced in many parts of Africa and other groundnut growing regions . Global market for the machine can be explored as well.

#### Help is needed on

Launching his product outside India by identifying regulatory requirements and local entrepreneurs who could take it up there.

Provide better services to customers by contacting expert mechanics.

Working out supply chains that can deliver this machine to them at low cost Connect the more advanced mechanics and tools with the innovator for better manufacturing practices.

### How can you help?

Can you explore the market scope of such a machine in some other counties? What kind of support will help the diffusion of the machine in other parts of the country/world?

> Can you explore markets in various developing countries growing groundnut where this machine may be useful in areas of labour shortage? Are their applications of this machine in unrelated areas which innovator has not tried yet?

Video: https://www.youtube.com/watch?v=gehzQZETg-0&t=42s



## About the innovator and his Innovation

Gopal Bhai Surtia, a farmer, Katholi village, District Baroda, Gujarat, has studied upto 8th grade. He was awarded at 3rd National Grassroots Innovations Presidential award function for an innovative sprayer.

Innovator developed eco-friendly pot by using cow dung and agriculture waste, which is completely biodegradable. Such pots were not available before he conceived the idea. The innovation lies in achieving optimum combination of cow dung and other natural binders to make it sturdy. Paresh Bhai Panchal, another innovator from Ahmedabad improved the design and sells it too under a license from Gopal Bhai. He has also made a fully automatic machine too. However, the design of the manually operated cow dung machine, was made open source for people to copy and generate livelihood.



#### Salient Features

- Both manually operated and automatic variant are available
- Three stainless steel die for variable pot sizes are provided along with the machine
- Has capacity to produce about hundred pots per hour (might vary according to the user)
- The pots release moisture and fertiliser in a sustained manner, ensuring nutrition to the young seedling

#### Challenges

1) The challenge was to develop a design which is flexible and easy to use while increasing the production.

2) The cost of the dung pots are higher compared to the plastic bags which are used to raise nursery seedlings.

#### **Overcoming Challenges**

Innovators have searched tools and techniques to reduce the manufacturing cost. They went through several iterations to make the machine easy to use.



#### Advantages

66-

It is manually operated, hence can work in areas where electricity supply is not there or is irregular.

Not much maintenance or recurring cost.

## How can you help?

Ensures uniform quality of pots.

Various size of pots can be developed in single machine, using different dies (moulds) Income augmentation of cattle owners by selling the pots.

#### Future Aspirations

These pots should replace all the plastic bags in the nurseries were seedlings are raised The forest department plants millions of trees every year during the monsoons every year, but plastic being much cheaper option economically is difficult to replace, even if the environmental cost is high. Hence, they could be convinced to adopt this solution.

#### Help is needed on

Launching the product and the machine outside India by identifying local entrepreneurs, public institutions, forest departments, environmental NGOs, etc.

Identify institutions who can support training of the community members who can buy these machines and learn to make the pots.

Designing supply chains to deliver these globally to potted flower sellers

Connect environmentally conscious customers to the innovators or users who make these pots. Make these lifestyle product to signify one's conservation credentials

lease explore if these pots have a market in Norway? Can the technology be licensed to European nurseries/flower sellers or dairies? What kind of supply chain will ensure safe delivery of the product?

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Puncture Resistant Gel



## About the Innovator and his Innovation

Tukaram Verma, an auto (tuk-tuk) driver, Kohaka village, Bhilai, Chhattisgarh has made Puncture Resistant Gel by mixing four ingredients including a gum-based gel. Challenges Coming from a weak economic background, he initially lacked funds to buy raw materials to conduct his experiments. He took small loans from his friends and relatives and made the gel. After he made the product, it was difficult for him to convince the customers about his product. 11

#### Salient Features

- The air does not escape even if the tyre is punctured by nails.
- It works for three years with single (one time) coating.
- Cost-effective

#### Overcoming the Challenges

1) He tried to save money from the profit made from selling the gel so that he could purchase raw material in order to maintain minimum stock.

2) Secondly, he searched market from where he got every materials in one place and at a reasonably low rate.

3) Thirdly, he gave demonstration to few nearby customers of his product so that people could see and try his product.

4) Fourth, he came in contact with GIAN which helped him with a small loan to expand his enterprise.

#### **Advantages**

- It ensures longevity of tyres, thus reducing waste.
- t is economical as single coating lasts for three years.
- People are saved from unnecessary fuss and delays caused by punctures happening at an odd place and time.

#### Future Aspirations

Scaling up in India and globally too

Help is needed on

Identifying ways in which he can expand his



business in India and Abroad

- How should he position his product to reach maximum number of people?
- How to deal with competition in the market? Will auto company like to include it as an accessory while selling cars

#### Additional Information

He has used it in about 450 vehicles and all customers are satisfied. Till date, he has not received any negative feedback on the product.

## How can you help?



nti-puncture gels are available in the market. What do you think should be the strategy to break into the market for this low-cost solution? Can this solution be repurposed for alternative uses in plastic tube industry or water pipe user industries?



#### About the Innovator and Innovation

Jignesh Shah, Bodak Dev, Ahmedabad, Gujarat, is a lower limb immobilised innovator. He got the idea of his prototype while pursuing his business of video editing. He used to access various websites to get new ideas. Once, he saw a video of vehicle for differently abled. Since, he himself suffers from lower limb disability, he thought of making a special wheel chair carrier for himself. His clientele for video editing include government and private organisations. In addition he also fabricates and sells automatic wheel chairs under brand of his firm 'Freedom Wheel Enterprise' (https:// freedomwheels.in/). He can travel anywhere without any help or support with a social message for all and wants to provide similar flexibility and independence to other speciallyabled persons.

#### Unmet needs addressed

a) In the past Jignesh used a retrofitted gear car for traveling but he needed help for boarding and deboarding.

b) Seeking someone's help always was not feasible.

c)This problem is faced by many lower limb disabled person.

d)They have to depend on others for traveling.

#### Technical specifications

The lorry carriage: Width of the carriage is 32inch ensuring that the wheelchair fits in general width of wheelchair is 28inch.

- a) Made of Iron
- b) Carrying capacity of one/two person.

c) Back gate can be closed ensuring safety.

d) The wheelchair once boarded is locked for safety.

e) The ground clearance is 6 inches which is enough for any bumper or speed breaker on the road.

f) the Angle for ramp is 13 degrees.g) A person on wheelchair can easily drive his wheelchair and board the lorry.

h) A remote is provided for automatic opening/closing of the door.i) The vehicle also has safety belt for

the driver/rider.

#### Advantages

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It has wide social impact to physically challenged people who has lower limbed disability. With the help of this innovation, they will:



#### Salient features

A wheel chair bound person can board the carriage and drive the vehicle him/herself, without taking help from others.

The control systems are in the hand rather than foot operated as in conventional systems.

In the first model, he cut the chassis of his Honda Activa to make this design, kept the engine on the left. The scooter handle and front wheel lied on front and the lorry which carried the rider is at the same back.

In the latest model, he has designed the whole vehicle and integrated several features so that one can travel on two wheelers by mounting his/her manual or battery-operated wheelchair without needing other's help. He has solved the problem that many lower limbed disabled people face (See,

https://freedomwheels.in/shop/accessible-mobility/wheelchair-accessible-modified-scooter/)

a) get long distance mobility.

b) can drive on their own without no external support.

c) employment can be affected too due to mobility or distance issues.

d) convenience in moving from one place to another.

e) quality of life improves.

#### Future Aspirations

People with lower limb disability across the world will benefit from this innovation.

#### Help is needed on

- Identifying local entrepreneurs in other countries and license the innovation for distributed manufacturing and sell
- Design inputs to make it more attractive and useful to others.
- Working out supply chain actors to be able to deliver them at a low cost in their parts of the world

## How can you help?



an you ascertain if this has a market in Europe? What kind of supply chain will be needed for making this available there? Does such a solution help low income wheelchair bound people become self-reliant? Can you explore this possibility with wheel chair manufacturer, disability assistance organization and other NGOs/companies

working in this space? Can you explore the commercialization of this innovation in third world as well?

Video: https://www.youtube.com/watch?v=jliwwpkj3Sc

Adaptive clothing for differently-abled people

#### About the Innovator and Innovation

Soumita Basu, Kolkata, West Bengal, has psoriatic Arthritis, founded her label zyenika a years ago to offer solutions for people who have various kinds of disabilities. She started doing research. She had her own body to understand what she would have to do. Soumita is a wheel chair user and before she launches her label she spoke to a number designers to get a few designs together. Her label has wrap-up saree which can be worn with little effort. She is working on a range of Kurtas (upper wear for women and men) too without buttons. She is also working on adaptive inner wear for women and men. Her wardrobe discouraged her from meeting people or even getting on a video call. When she missed her cousins wedding due to wardrobe constraints, it became the turning point. She refused to be locked inside home anymore. And she refused to dress in pain every single day.

She started on this project since she found herself completely without anything to wear which was without pain and which she could wear on her own, after she acquired severe locomotor disabilities



#### Unmet needs she identified

The clothing industry does not cater enough to special need people including chronic pain sufferers people with physical disabilities, senior citizens, autistic people etc. They find it difficult to dress up or may be semi or totally depend on a caregiver. Being wheel chair bound or bed bound can also mean that wearing regular clothes is a challenge. But this should not mean having to wear boring illfitting clothes, when her own illness progressed, Soumita Basu found it more and more difficult to manage on her own.

A person with physical challenge knows how difficult or cumbersome and even painful something as basic and necessary as clothing

Honey Bee Network, SRISTI, GIAN

#### Salient Features

The clothing line is fashionable yet easy to wear

Helps differently abled and elderly people to change clothes themselves and live a dignified life

Saumita has experimented not only with the design but fabric as well, ensuring comfort to people wearing them

## **Current Popular Products**



can be. These challenges may be mild, moderate or severe. But she felt that one should not have to compromise on the sense of dressing or fashion.

Adapting to the challenges of cerebral palsy for a customer, Soumita designed so many hidden features like a knee pad to support her with the zips on both sides of the Palazzo to transform it to shorts for easier wear and washroom use.

#### Overcoming challenges

Sourcing the fabric, conceptualizing the designs, explaining it to the tailoring team and overlooking the execution are all done by her. With no formal training in this industry Soumita is self-taught and spent a lot of time learning the art and the trade. Not having formal training also came as blessings because that has given her a space to think outside of the norms and comfort zone of the art form. That's where most of her designs come from.

She received support for designs from a Bangaluru based NGO Enable India. She also has partnership with Impulse social enterprise for sourcing fabrics. She had got help from her family members and friends for publicity and getting number of customers of dress materials.

Soumita believes in reusing and recycling. According to her, "Give your old clothes and we will create your new restyled clothes". Her aim is to assure the independence and dignity in dressing. According to Soumita, it's cost can be reduced better with bulk sourcing and production. It is gaining popularity slowly. She is now supported by GIAN.

## Feedback received from her customers

Riddhi: This is so beautiful and really easy to wear without having to move the shoulders much. I especially like the zips that are so easy to pull. I can zip up with just one finger!" Garima: "The top is really beautiful! Thank you Soumita. Highly recommended Zyenika. Anyone can order"

Garima is a proud owner of our blue khadi top with applique work, adapted to shoulder immobility, with full opening from the arms till the very end of the waist, on both sides. Neha: As a design it's very effective. Sara really liked the look too." Neha Shringarputle Dildolkar, Sara's mother, Physiotherapist Sara is wearing a blue Khadi Top with kalamkari design work. It is adapted to the challenges of her Cerebral Palsy. There are many hidden features like a knee pad to support her when she crawls and the zips on both sides of the palazzo to transform it to shorts for easier wear and washroom use.

Sanchita: Thank you so much for giving me a gorgeous look. Fits really well."

Sanchita is wearing a rust cotton jacket kurta with hand-embroidered Kantha.

"She is really happy with it. She really felt bad going to doctors in her nighty. Didn't feel dignified. But with her severe fatigue and general illness it was very difficult to get dressed in anything else. This saree really helps."

## How can you help?

Marina Varghese, 48, Tea Taster. She had gifted her mother (Age: 78) a Custom Slip on Saree.

Souce:https://zyenika.com/adaptive-clothingbrings-choice-to-people-with-disabilities/

#### Challenges

To reach scale, she will need to act on many factors like sourcing low cost materials, have a set of tailors to stitch to her specification without compromising on quality.

Making people aware of her designs and making them available in next door shops as well as in popular online platforms.

#### Future aspirations

Taking the label global is one of her aspirations along with reaching the nuke and corner of the country

#### Help is needed on

- Help with sources of cheaper fabric, especially one which can absorb large amount of liquids to help people with the problem of incontinence
- Suggest changes in designs and styles according to the current fashion trends.
- Popularise her designs and increase clientele in India and abroad

an you ascertain if the clothes will find a market in Norway and other European nations? How do you think she can find out more about the fashion trends there? Since her disability is becoming more acute day by

day, will somebody like to join hands with her as coenterpreneur.

Video: https://www.youtube.com/watch?v=6fG-cnc3orE

# Mitticool refrigerator, Non stick earthen tawa

# & other kitchenware





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#### About the Innovator and his Innovation

Mansukh bhai Prajapati of Wankaner in Rajkot, Gujarat, is a clay craftsman. He has developed an entire range of earthen cookware and crockery and other utility products. These products include water filters, refrigerators, pressure cookers and tawa(hot plate/plan). He was born in a Prajapati (potters) family in Nichimandal village of Morbi taluka of the district. He has become a signature for frugal innovation worldwide.

#### Mitticool fridge

A clay fridge that keeps food fresh and cool without electricity. In 2001, earthquake, Manshukh bhai suffered huge losses, as most of his clay pots were broken. A Gujarati Daily viz., Sandesh had a feature with a photo of pots with the caption ' the broken fridge of poor. This caption ignited an idea to work on a fridge that will not need electricity and could be used by masses. Though he started thinking about it, it was only in 2002 that he actually started his work. In the same period Mansukh Bhai came into the contact of Gujarat Grassroots Innovations Augmentation Network (Gian) Ahmedabad. After a painstaking journey of three years during which he finally came up with Mitticool fridge in 2005.

#### Challenges

• The main challenge was lack of resources as Manshukh Bhai and his family were already struggling with financial crises.

Salient Features

1) It is a small refrigerator/earthen preservation unit made of clay storing vegetables, fruits, milk and water.

2) It does not need any external source of energy for cooling.

3)The first version of Mitticool refrigerator had two water chambers one at the top and other at the bottom. Water filtered from the top chamber (20 litres capacity) and got collected in the bottom chamber. Between the two water chambers, there was a space for storing vegetables, fruits (up to 3 kg) and milk. The principle of cooling in Mitticool is same as that of clay pots or matkas.

4) In second version Mansukh Bhai did away with the bottom water chamber thereby increasing more space for storage. The top was fixed on the top water chamber whose capacity was reduced to 10litres. The two bottom compartments together can store about 5 to 7 kg of vegetables, fruits and milk. The natural cooling process inside the refrigerator can keep vegetables and fruits fresh for around 6 to 7 days while milk can be preserved for three days.

• Mansukhbhai could not find the exact type of clay he needed for increasing the porosity of the clay fridge.

#### Overcoming the Challenges

1) In 1995 a businessman from Rajkot, Chirag Bhai Patel came to Wankaner looking for a vendor who could provide him clay water filters. Chirag Bhai was an exporter who had to deliver this order to Nairobi Kenya. He got the lead about Manshukh Bhai from Jagdamba Potteries where Manshukh Bhai worked earlier. They recommend his name and Mansukh bhai got connected to a bigger market.

2)He also started to visit different places where various types of clay pots were found. He collected raw materials and experimented till he found the best soil mixture with increased porosity.

#### Future aspirations

 Reaching the nook and corner of the country
 Explore opportunity in other developing or least developed countries

#### Help is needed on

- Launching his product in different parts of India by identifying local customers.
- Provide better services to customers by contacting local expertise.
- Working out supply chain actors to be able to deliver them at a low cost in different parts of India.
- Connect the more advanced entrepreneurs community for more advanced model.
- Can you explore it becoming a lifestyle product or signature asset for support to frugal grassroots innovations?

## Non stick carthen tawa and other kitchenware



#### About this Innovation

Here we describe about the non-stick earthen tawa (disc shaped pan used in Indian households) by the Innovator. Non-stick clay tawa is a combination of traditional and modern technology. The clay Tawa is coated with food grade non-stick material, which prevents food from sticking to the Tawa. Clay also adds a unique natural taste to the food. Non Stick coated tawas are essential part of kitchen to prepare low oil food but the conventional non-stick coated tawas are costly and the coating scrapes of gradually and we accidentally ingest tiny particles of the coating which has a negative effect on us in the long term.

In 2003, Mansukh Bhai's wife asked him to bring a non-stick Tawa from the market. He inquired and found that such a tawa costed a minimum of Rs 200. He thought that in his firm tawas were already being made, why not make them non-stick and affordable so that they come within the reach of the masses.

Mansukhbhai did some market research on the product. He found out that apart from being costly, Teflon coated non-stick tavas did not retain the natural taste of the food. Also the coating wears off quite soon.

He visited Mumbai to learn the process of non-stick coating and looked for appropriate materials to use in his clay Tawas. A Mehsana based non-stick utensil manufacturer helped him in perfecting the process of adding layers on the earthen Tawas. After about a year of research, and after making and breaking almost one lakh trial Tawas, he succeeded in developing the non-stick coated earthen pan using Azo Noble, another food grade non-stick Salient features:
1Available in a range of sizes
2)Non-stick food grade material for tawa [pan]
3)Stainless steel structure is provided to increase the durability of the tawa, pressure, etc
4)Wooden handle is provided for easy handling

material like Teflon. GIAN helped him access this new coating material for experimentation purpose.

The non-stick coating has been tested at the Institute of Chemical Technology, University of Mumbai. Mansukhbhai has sold more than 50,000 such tavas till date. Feedback was collected from different users who have been using this tava thrice a day for a minimum of three months to more than two years. Maximum reported no problems while using the Tawa. A few people reported loosening of handle in Tawas with handle. While most mentioned the ease in handling, some added that as the oil requirement was less, the cooked food was healthier and tastier. For this product, Mansukhbhai was also supported with an investment of Rs. 1, 80,000 under the Micro Venture Innovation Fund (MVIF) of NIF. GIAN also helped him to set up a company, Mitticool Clay Creations, in 2008. He was also assisted to develop the online retail portal (www.mitticool. in). Adding value to the original innovation, GIAN also gave Mansukhbhai the idea to have a metal ring around the Tawa so that a handle can be attached apart from guiding him in

designing the packaging material.

Apart from the this, he makes a wide range of earthen kitchen ware, ranging from pressure cookers to dinner sets.

#### Advantage of Tawa

1)Non-stick coating provides low oil cooking facility.

2)Non-stick surface prevents to sticking of food at bottom.

3)Food grade Non Stick gives a healthy food.3)Clay generates a unique taste to the foods.4)Cheaper cost makes it affordable.

#### Help is needed on

1) Launching his product in different parts of India/world by identifying local customers.

2) Provide better services to customers

3) Working out supply chain actors to be able to deliver them at a low cost

4) Connect the more advanced entrepreneur community for more advanced model

## How can you help?



an you find out the scope of these products in Norway? What can he do to reach the Norwegian market? Can the customers dissatisfied with ill health effect of Teflon coated pans, be motivated to adopt this clay pan? Can slow food movement followers like this

Video: https://www.youtube.com/watch?v=WLHne9SHs3A

Honey Bee Network, SRISTI, GIAN

Biomass Gazifier



#### About the Innovator and his innovation

Rai Singh Dahiya (56) Jaipur, Rajasthan, has developed an efficient biomass gasifier. He has changed the conventional design, especially of the filters and cooling unit to get clean gas, ensuring smooth operation of engine at low operational cost. He set up a company Enersol Biopower Pvt. Ltd., manufacturer and supplier of biomass gasifier, biogas plant, improved biomass stove, pellet stove and compost aerator machine. All his children are actively involved in the management of his firm.

He is engaged in the repair of agricultural machines, pumps and allied machines. While he has had no formal education, he has gained knowledge of science and technology by dismantling and repairing gadgets, and exposure to radio programs.

Soon after his birth, Rai Singh's father left the ancestral village with his family and settled in

the Thaldka village in Ganganagar district of Rajasthan. His parents started farming to earn their living and as Rai Singh grew up, he also joined them. While other kids went to school, Rai Singh was busy working as a farm hand and irrigating barren land, as that was the need of the hour. Missing out on a formal education, he made himself literate by studying his brother's books.

The unit consists of a gasifier, which generates producer gas from bio- waste and uses it to run an engine. The gasifier is conical in shape, compact in design and surrounded by a water jacket with the capability to handle multiple fuel sources.

Fuel wood or briquettes from agricultural residues can be fed to this gasifier. .

The filter can easily be cleaned. It is surrounded by a water jacket. The secondary filter has layers of different sizes of sieves ranging from 2" to very fine size, with the cleaning gate at the bottom.

#### Salient features:

The biomass based gasifier can be used to operate pump sets in remote fields, lift water in homes, operate basic machines such as saw mills, flour mills and generate electricity.The fuel consumption of Dahiya's gassifier is reported to be 1 kg/kVA per hour,, which is claimed to be almost 30-40 per cent less than other available designs.

#### Energy efficient & Reduces the wood consumption

#### Challenges

The innovator made everything from scratch which was time consuming. As a result, he often lagged behind in delivering products on time. Lack of seed capital for making machine in advance.

#### Overcoming technical challenges

Standard component analysis was not done. A few training sessions were conducted with experts teaching him how to refine his products. An volunteer engineer from GE Bengaluru also visited him and gave several useful suggestions. He learned how to cut proper rims, use less water and handle tools properly to avoid deformation. He also learned to use moulds and that actually helped him quite a lot to get better shapes. His firm now makes lighter pots with better finish. GIAN had supported him under Micro Venture Innovation Fund which helped him to takecare of the first few orders in the early years. Ever since then, he never had to look back. James Cameroon, famous techie filmmaker had also visited him at an exhibition at President of India house and given some suggestions. He used to fabricate different filter cylinder himself instead of cutting existing pipes to make cylinders. Once he started using off the shelf components, his fabrication time came down and quality improved.

#### Future aspirations

The machine can go to all places where ample biomass is available, hence has potential to gomuch beyond national boundaries.

## How can you help?

aunching their products outside India by identifying local entrepreneurs

identifying supply chain partners to deliver his gasifier and other solutions at a low cost in other parts of the world

Video: https://www.youtube.com/watch?v=9zru5K5FEes

Multipurpose Processing Machine



#### Innovation and Innovator details

In December 2004, Dharamveer got the opportunity to visit various Aloe vera and Amla processing units for various products in Rajasthan along with a group of farmers through the Department of Horticulture, Government of Haryana. He found this a lucrative business but the high plant cost emerged as a barrier. However, instead of backing out, he decided to develop his own machine as he had understood the processing methodology by now. He started working on the development and by April 2006, was ready with the first prototype of the machine, which he used mainly for juice extraction of Aloe vera. He further modified the machine and used it as an essence extraction unit. With the help of this feature and a few more improvements, he could use the machine for processing of several herbs and farm produce.

Multi Purpose Processing machine is a portable machine, which works on a single phase motor and is useful in processing of various fruits, herbs and seeds. It also works as big pressure cooker with temperature control and auto cutoff facility. It also offers condensation mecha-



#### Salient features

• Proven Utility of the Machine - can process herbs, flowers vegetables and fruits and many others products as below

• Aloe Vera: Herbal Juice, Hair Gel, Face Wash, Shampoo, Hand Wash, Extract, Powder

- Mango: Juice, Chutney, Jam
- Amla: Juice, Powder, Extract, Hair Oil, Candy, Sweets, Laddoo.
- Tulsi, Aswagandha, Satavar, Herbs : Juice, exatracts
- Flowers like rose, chameli, lavender etc: Extract and essence.
- Machine can extract pulp, gel, essential oils, essence and juice Machine can also be used to prepare sauce/puree/ketchup/soup/paste/gel
- Boiling is also facilitated with temperature regulation.
- It is very good option for income and employment generating opportunities for SHG, rural and tribal people by processing the fruits and selling value added products.
- It helps in improving the nutrition and in reducing the wastage of fruits, herbs and other perishable items.

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nism, which helps in extraction of essence and extracts from flowers and medicinal plants. The machine is a cylindrical container made of food grade stainless steel having an opening (with lid) at the top to feed the herbs and an outlet at the bottom to collect the residue. The machine has an electric motor to drive the central shaft.

#### Challenges

The initial prototype was made from the salvage part and need further refinement for make it marketable. The fund requires for value addition and support commercialization were the major factors. Also the patent in name of innovator needs to be filed.

#### Overcoming technical challenges

Dharamveer has been supported by NIF and GIAN North for value addition and business development activities under the Micro Venture Innovation Fund (MVIF) support. A patent application (367/DEL/2008) was also filed in his name for the technology, for which a Request For Examination (RFE) has been filed. NIF also engaged a designer to improve the machine, who has come up with an improved model with good aesthetics and certain improvements.

#### Future aspirations

Relying more on a positive word-of-mouth of his customers, Dharamveer does not aggressively market his product though he attends various trade fairs. He has sold his machine in many states of the country and also exported one to Kenya. The innovation has potential for providing livelihood and can be a source of income generation at from grassroots to global level.

#### Help is needed on

• Identify the local available fruits, flowers, medicinal plant which can be processed by using this innovation

• Identify farmers groups, self help groups, local communities who can use this innovation in developing world

• Work on modification required in this machine that suits the fruits or material available at your region.

• Work on food processing standards and rules regulation that can be maintained while using this innovation at global level.

# How can you help?

an you help to find out which other countries will benefit from this product?

How can the innovator approach those markets?

How can such a solution be a part of conservation efforts aimed at better health of lakes and reservoirs?

Video: https://www.youtube.com/watch?v=o4wDGva7O4E

Galactagogue: Herbal Milk Enhancer



There are chemical milk enhancers available for cattle in the market. However, the use of chemical milk enhancers is harmful to animals and can trigger certain diseases including damage to cattle breast and udder in the long term, said Mr. Mahesh Parmar, an Innovator of herbal milk enhancer formulation. The herbal formulation also helps in animals digestion and in turn improves animal's health and milk production capacity. As per Innovator the herbal formulation helps not only in increasing milk producing capacity of animals but also increases the fat percentage in milk. The herbal milk enhancer is the result of several years of experiences of farmers and based on the traditional knowledge of the communities making it an effective milk enhancer in animals. In all such products based on community knowledge, the

Honey Bee Network, SRISTI, GIAN

innovator is duty bound by the norms of HBN to contribute a fair part of the benefits with communities providing building blocks of such knowledge.

Innovators name: Shri Maheshbhai Parmar, Shri Manibhai Revabhai Patel, Smt Manguben Kanjhibhai Vaghela, Shri Galbabhai Meghrajbhai Patel, Smt Ratanbahen Lakshmanbhai Masani, Shri Hareshbhai Devjibhai Rohit, Smt Chaturibahen Prakashbhai Makwana and Community Knowledge.

#### Challenges

Despite being herbal and completely free of chemicals the sales of this herbal formulation is limited, the main reason for this are identified and are listed below.

Salient Features

Product is completely herbal, plant based, So chemical free and non-toxic. Galactagogue helps in digestion and Increases the fat percentage of milk too. Product is developed from farmers' experience and traditional knowledge.

1. Availability of raw Ingredient: The herbal ingredients are not easy to procure for large scale production of galactogogue.

2. Pricing: The cost of herbal ingredients is high making it unattractive despite being very effective.

3. Marketing: As per innovator-entyerpreneur, there is a lack of awareness about the product.

#### Overcoming Challenges

To overcome the availability of raw ingredients, steps were taken to collaborate with farmers to grow the ingredients needed for the largescale production of galactogogue. To reduce the pricing of the herbal formulation testing of alternative cheaper ingredients is being done so the effectiveness of the product remains the same and it becomes available at the cheaper rate. Marketing Initiatives will be taken to popularise the herbal milk enhancer.

#### Future Aspirations

Creating awareness and making it available at the cost effective price is the next step. Being herbal formulation makes it an idea choice for the people looking to enhance cattle's milk production capacity and also to increase quality of milk without any adverse effect on the cattle's health.

#### Help is needed on

• Launching their products outside India by identifying local entrepreneurs.

Packaging support

• Working out the supply chain and logistic factors

## How can you help?

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an you find the scope of this product in Norwegian context?

Can you help to identify supply chain factors and actors for the product to be launched there?

Can you ascertain from the leaders of dairy industry whether they are looking for herbal alternative to oxytocin injection used for the purpose in cattle.

A machine to remove hya-cinth from water bodies



#### Innovation and innovator brief

Godasu Narasimha, belongs to fishermen community of Muktapur village. He identified the pain and drudgery experienced by his community to deal with the disposal of a aquatic weed, hyacinth growing in the village lake meant for growing fishes. He decided to solve this problem by innovating a hyacinth removal machine.

Narasimha has been working as a teacher in a private school of his village. Besides working as teacher, he had to do his part as a member of the local fishermen group which grows and catches fish every year in the tank of the village for the contractor from Hyderabad. Local fishermen community supplies the fish to the contractor and the profits are distributed amongst the fishermen community of the village. The fish catch depends upon the health

of the tank which, like many other tanks, is affected by a dense growth of hyacinth. This hampers the growth of the fish. Fishermen continuously have to take turns to go into the lake, remove the hyacinth and dump it on to the bund. This task requires work by 50 fishermen for a period of 60 days in a year. The process is strenuous, slow and continuous exposure to water results in snake bites and fungus growth on the fishermen's legs and feet. Around Muktapur at least another 10 villagers are facing similar problem. According to Mr Narasimha, the cost of removing the hyacinth in this way works out to Rs 1 lakh per year for his lake which has a water spread area of about 2 acres. This amount, though paid by the contractor eventually gets deducted from the sale of fish.

Narasimha wanted to mitigate the pain of his community and conceived a device

Salient features:

- Mitigate the drudgery involved in the management of hyacinth
- Saved the ecosystem in the lake and improved the livelihood generation of the community
- The manual process of management involved the cost of Rs 3 lakh and that with this machine it reduce to Rs 7000 and with less labour for the management of hyacinth.

which cuts the hyacinth into pieces. When he sought financial help, the fishermen community doubted his abilities and rejected his suggestion. Eventually after discussions with his wife Mr Narasimha decided to make one with his own funds and some borrowed from friends. He spent almost Rs one lakh during the development stage of this machine.

Narasimha used a 5 hp motor to rotate a shaft with eight cutters positioned diametrically. A grill at the bottom of the cutter provides a platform for cutting and the pieces drop down from the grill. Hyacinth is supplied to the cutter through a conveyer belt positioned in front of the cutter towards the water. Hyacinth plants are manually pushed on to the conveyer then on to the cutter. It is cut to pieces of 3-4 inches length by the cutter and it flows down with water downstream. The device is installed adjacent to the pier in the water, over which the water flows downwards in to the stream. The cut water Hyacinth is then removed from the site. Four men are required for a period of 5 days to perform the same job of hyacinth removal by 50 people over 30 days. Compared to manual process, the cost incurred was

How can you help?

Rs.2000 for labour and Rs.1500 for diesel to run the motor. In a year the total cost using this device was Rs 7000 against 3 lakhs manually. He christened the machine as Lavanya Water Hyacinth Cutting Machine, after his wife who stood by him through thick and thin. This was the first machine made by him. From then till now Lavanya is his able assistant supported by their 15 year old son, Ajay.

#### Challenges

Transportability [right now it needs a tractor to be transported and then the machine is assembled at the shore of the lake or river from which the hyacinth has to be removed. Increasing the range of removing hyacinth even from the deeper stretches of the lake

#### Future aspirations

The innovator had sold some machines in Kenya through the help of Honey Bee Network and ministry of External Affairs, India and wishes to explore similar markets.

Help is needed on Finding out other markets for the innovation.

an you help to find out which other countries will benefit from this product?

How can the innovator approach those markets? How can such a solution be a part of conservation efforts aimed at better health of lakes and reservoirs?

Video: https://www.youtube.com/watch?v=D6mgI9k1ucg

# Modified Walker with Adjustable legs



It is quite difficult for old, physically challenged or person recuperating from lower limb injury to climb up or down stairs using conventional four leg walkers. Shalini Kumari, Patna, Bihar,gave an idea to mechanically alter the height of the legs of walker so that they can be adjusted as per the height of the stairs. The front legs of the walker can be raised while climbing up and lowered while climbing down.

The walker has spring-loaded self-locking front legs. When the user pushes the front legs on the upper stairs and the rear legs rest on the lower stairs, the walker is stable enough for climbing stairs.

The only factor behind her innovative idea was her grandfather's problems. Her Grandfather is fond of gardening and has a small garden at the terrace of her house. It was due to an accident that he could not climb the stairs. He seemed upset because of his inability to watch his garden through his own eyes. These factors triggered Shalini in thinking for a solution in the form of an idea.

NIF had filed the patent (1434/KOL/2011) and FER (First Examination Report) is being awaited for. She got opportunity to participate in various events and exhibitions. It also engaged an external agency to develop an alternative version.

The technology has been licensed to Vissco Rehabilitation Aids Pvt Ltd., which has launched it under the brand name Dura Step see video (https://www.facebook.com/VisscoRehabilitation/videos/vissco-dura-step-walker/2317614478338617/ and https://www. youtube.com/watch?v=D-EKtxdJNfM )

We can connect the student team to the MD of the company.

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#### Salient features:

Adjustable legs makes it possible to walk on stairs too. People cannot climb up or down the stairs using the conventional walkers. The person can him/her self-adjust the height of the walker Light weight and hence easy to carry Foldable, hence easy to pack and transport

#### Challenges

The first prototype was not very stable and was not easy to operate The adjustability of its height according to the step height was not smooth. It was not foldable.

#### Overcoming technical challenges

The company to which the innovation is licensed has been able to make it lighter in weight, more stable and foldable as well.



#### How can you help?



Herbal products for Human Use





## Herbal products for Human Use by SRISTI innovations

#### a. Zematic: Multi -action Cream for Skin Diseases

The Zematic cream works by decreasing the sensitivity of the skin towards allergens and locally treats the affected area. The formulation is effective and ideally suited for all types of skin affected with eczema and psoriasis. There are no side effects as only the natural ingredients are used in the formulation of the ointment. Activity: Various constituent herbs of Zematic are antiallergic and antifungal based on traditional use of the herbs documented and value added through experimentation. Indications: It provides immediate relief and in many cases of early stage human infections, cures the skin psoriasis, eczema, and fungal infections.

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afe Multi action Cream for Skin Disease

Innovator: Shri Ramaji bhemaji Parmar, community knowledge

Salient Features Wide spectrum of protection against skin infections, eczema and psoriasis Convenience/ease of application Uniform spreadability in all weather conditions



#### b. Care & Care: Herbal Solution for Foot Ailments

Salient features

Wide spectrum of action Active tissue regenerator Active crack healer Mitigate fungal infections between foot fingers Uniform applicability in all weather conditions

This ointment helps to treat dry, chapped or cracked heels. This ointment works by increasing the natural healing process and retains the moisture in the pores of the skin. The ointment is having the antimicrobial (fighting against microbes) and anti-inflammatory (diminish swelling and pain) properties and is safe to use. Activity: The Various components present in the Care & Care ointment have been reported to have anti-inflammatory, anti- pruritic (relive in itching), fly repellent, maggocidal properties, which offer regeneration of skin tissues.

#### Indications

Care & Care ointment heals cracks of foot as well as ringworm and fungal infections. These have been tested at IITR (CSIR-Indian Institute of Toxicological Research) and certified to be safe.

Co-Innovators: Kantibhai B. Patel, Kantibhai J Prajapati, Jaydipsinh Narpatsinh Shinora, V. Sundarrajan and Community knowledge

#### Challenges

The product needed to be stabilised under storage conditions. Sometimes the liquids used to separate from the base. Packaging was not very good, aesthetically appealing Finding right partners to market these domestically and internationally

#### Overcoming challenges

The product was stabilised and is very effective now

The packaging was redesigned, although there is a significant scope of further improvement

#### Future aspirations

The products are very effective and provide relief quickly and hence should be marketed all over the world 35

Help is needed on

- Launching their products outside India by identifying local entrepreneurs
- Designing proper packaging
- Working out supply chain/logistics to be able to deliver these to those markets.

36] How can you help? an you ascertain if such products have a market outside India? Can these products find a market in Norway or any other European market? Can you identify the supply chain logistics that will be needed to introduce this product in those markets? Can you identify need-gap in such a segment (skin and sole crack) in European market for further enhancement of product attributes and

pursue further innovations.

Video: https://www.youtube.com/watch?v=WZuCvgvqrsw