

## Ravjibhai Savaliya: A 'Dropout' Innovator

*Always concerned with finding solutions to social problems, Late Ravjibhai showed signs of Creativity from an early age. The story of his achievements and failures in market place and his deep human values remind us of the need to see grassroots innovators not just as tinkerers/mechanics but also as philosophers emerging from ground.*

In 1958, in a small village Babapur in district Amreli, all the efforts of engineers to start a new water pumping machine had failed. On the insistence of a villager, a 12-year old boy from amongst the curious villagers, was allowed to tinker with the machine and to everyone's surprise, he made it work! This boy, Ravjibhai Savaliya grew up to be known as a 'maverick innovator' in Gujarat.

As a small boy, he often stared at the new electronic toys in the village exhibitions and thought of making them himself one day. He brought recognition to his school, Sarvodaya, by participating in various Science fairs. But then, there came a time when his family could not afford his school fee of 50 paisa. Ravjibhai had to leave his studies. However, his teachers Gunubhai Purohit and Hasuben, recognizing his aptitude towards science and his potential to innovate, sent him to Mumbai to do a vocational course at ITI.

In 1966 he returned to Babapur with the dream of setting up a laboratory, which he did, in due



Ravjibhai and his younger brother Babubhai Savalia, 9th standard, prize in Science Exhibition, 1958

course of time, so that his mechanical innovations could minimize hardships of the villagers. He often explained the working of the farm and water machineries to the folks around and fired their imagination. Unfortunately he had to leave his village due to the lack of proper facilities and his susceptibility to water borne infections there.

### Call of Karmbhoomi

After shifting to Ahmedabad in 1968, he stayed with his cousin, Ramjibhai Nakrani. After getting cured of his illness, Ravjibhai started earning Rs 60 per month by working as an assistant in an electric supply store. The flame of scientific spirit could not be smothered for long and soon he set up a workshop along with his cousin. They carried on with the experiments that he had abandoned



Ravjibhai Savalia and Ramjibhai Nakrani in 1969

in the village. Joyfully dealing with the vicissitudes of experimental life, the cousins became the best of friends!

In 1971, after getting married to Triveniben, Ravjibhai started an electrical shop. His wife became a symbol of strength in the new chain of struggles. The electrical shop had to be closed as there was not much profit. Ravjibhai innovated his first 'social-appliance' *Chaas Valona Yantra* (Buttermilk Churning Machine) in 1972. The response to his first innovation was an outright rejection. Triveniben Savaliya narrated teary eyed, how those were the most difficult days. Ravjibhai had drained all his resources and had huge loans to be repaid. He had asked his



Ravjibhai and his wife Triveniben in 1973

wife to pack the bags to return to the village. But his uncle encouraged them to stay back. He sold his ancestral land to help Ravjibhai start anew.

Later, the Buttermilk Churning Machine was improved upon and in 1974 he developed a commercially suitable design. But selling an electrical gadget to replace the age old wooden butter churner was tougher than all his previous struggles. The traditional churner was integral to the cultural set up of the state. All types of stories preceded its sales. People said that women could die of electrocution; some said that buttermilk from it was poisonous.

Patience and consistent communication with the villagers started bearing results. Triveniben shared an incident of how once there was an order of 15 machines from a village near Surat and all the money that Ravjibhai had, went into manufacturing those machines. There was not enough money to even hire a tempo to go to the village. He along with his cousin Babubhai hitched a lift in a tempo that was going in the same direction, to deliver the machines. With no money they were dropped outside the village. They carried the machines on their head and walked through two feet deep silt to sell them.

With determination, integrity and commitment Ravjibhai made some money and restarted his workshop. The buttermilk churning machine soon became a household object. In 1977, the Savaliya



Buttermilk Churning Machine, 1972

Research Centre was started. This gave the impetus to his vision of rendering social service. He always tried to find the scientific answers to the daily chores and problems. And all his thoughts led to a single question, "Will this be useful for the society?"

### A Social Innovator

As Mahesh Patel from GIAN recalls, Ravjibhai was an innovator for the working class and all his innovations were aimed at reducing drudgery. These were centered on the problems faced by the villagers and hard working people. Through sheer self-learning he built his knowledge base of renewable energy - wind, water, aerodynamics and pressure. Energy conservation was also his passion and a frequent trigger for innovation. His innovations are as follows:

- 1) **Butter Milk Churning Machine (1974)** - It reduced three hours of churning buttermilk by hands to just 20 minutes of work for women. In the history of thousands of years, the rural women who would sleep late doing household chores and get up early to churn the butter, got freedom from tiring, strenuous hours.
- 2) **Wheat Thresher (1974-76)** - This thresher reportedly saved 80 percent energy as compared to the old models.
- 3) **Foot Pump (1984)** - Looking at the problem faced by the people in filling the air in the tyres, Ravjibhai innovated a foot pump. With



- its help even a child can pump air in the tyres of the tractors. He was awarded by the then President of India, Giani Zail Singh for this innovation.
- 4) **Electrical Furnace Type Wood Based Crematorium (1991)** - This furnace saved wood significantly. Gujarat Energy Development Association (GEDA) subsidized it and it is now widely used. Crematorium designed by him has sufficient air flow for better aeration from all three sides (bottom and two side walls) so that there is proper burning of wood.
- 5) **Water Harvesting Methods (1998)** - To recharge the ground water, Ravjibhai developed low cost techniques for water harvesting. He got a tank of one lakh liter capacity built for the same purpose in his house.
- 6) **Electrical Burner (1999)** - Using this, the diamond industry has been saving power worth Rs 12 crore every year.
- 7) **Diamond Polishing Lathe (2001)** - Used in diamond industry, this lathe replaced old



- machines, and saved energy up to 90 megawatt, equal to a small power station.
- 8) **Artificial Rain (2003)** - He conducted artificial rain experiments in Kutch, Saurashtra and Mumbai. In his "Cloud Seeding" experiment he sprinkled the Silver Iodide (AgI3) on the burning coal. Instead of copying expensive experiments of Israel, he devised the economical method of dispersing the silver iodide on the coal.

- 9) **Agate Grinding Mill (2006)** - This machine has helped thousands of workers who used to suffer with fatal silicosis disease in the Agate (*akik - a type of chalcedonic quartz that has irregular or curved bands of color.*) industry, in the Khambat region of Gujarat, famous for the gems industry. While polishing the gems, the workers used to inhale the dust of the stones, causing silicosis and death in a few months. The Agate Grinding Mill has a vacuum pump that pulls the dust in the opposite direction.
- 10) **Ribbed Tawa (Griddle) (2007)** - The Indian traditional iron tawas are very poor in thermal



- efficiency and also cause wastage of fuel. The tawa innovated by Ravjibhai saves energy through a ribbed bottom. The surface area increases and the cooking is also done evenly. Indian Institute of Petroleum, Dehradun tested this tawa through NIF's agreement with CSIR. They certified that ribbed bottom had improved thermal efficiency by over 1.09% over the plain bottom. Mumbai University Institute of Chemical Technology (UICIT) also tested the same and confirmed the advantage.
- 11) **Permanent Magnet Direct Current (PMDC) Motor** - A brushless motor, as its name suggests, is a motor without brushes, slip rings or mechanical commutator, such as are required in conventional D.C. motors. Outer Rotor Brushless P.M.D.C. looms motor is believed to have



Ravjibhai receiving President's Award in 1984 by the then President of India Hon Giani Zail Singh

high efficiency, which minimizes the electricity bills, besides bringing down the fabric cost. It gives much higher torque than other devices, which is a prior requirement for power loom. It does not heat up much and hence the need for lubrication, replacement of ball bearings, windings, and maintenance cost, etc., is reduced. The outer rotor also works as cooling fan.

Domestic floor mill (1990), oil free compressor (2005), battery bicycle, water generated engine, wind mill, etc., are all the other translations of his social innovations.

### A Philanthropic Rationalist

Ravjibhai used to call himself "a mere matric fail". But as his family narrates, he was always studying, finding solutions and innovating. Einstein and Thomas Edison were his idols. Making the students aware of the world of science used to be his priority. He visited schools to give lectures and spot financially weak, but intelligent students and helped them.

Garnering knowledge and spreading it were the most important endeavors of his life. His wife tells how he would get up in the middle of the night and call up his 11-year old grandson to answer his query, after a whole day of searching in the Science encyclopedias. Once there was a loud, thunderous sound in the skies in Saurashtra. People connected it to some divine intervention; scientists took time to decipher it. It was Ravjibhai who connected that sound to the supersonic jets that had just been introduced.

Mahesh Patel informs that Ravjibhai could do anything to promote a grassroots innovator. He

tells, "I only had to tell him that there is an innovator who needed some help." He used to come to GIAN and take that innovator in his vehicle to his home. He would help him through his knowledge and resources. He also advocated policy changes in favor of the innovators. For an open bidding for his technology organized by state government, he wrote to the Chief Minister and the concerned Secretary demanding that there should not be any open bidding without legal permission from the innovator.

### Rebuilding Traditions: Gold for medals, not for dowry


He was always a torch bearer to dispel the darkness of the ineffectual traditions. Instead of giving hundreds of kilos of gold (as is the tradition in the Patel society) to daughter Kirti in marriage, he got medals made of it and instituted awards and scholarships for poor but intelligent students. Though an atheist, he had read lot of religious books of Jainism, Buddhism, Christianity and Hinduism. He would laugh away astrological predictions related to birth and auspicious occasions, saying actual birth time is biological not physical. How could our recitation of hymns affect the crores of planets in the void space with no atmosphere above five miles from the earth? According to him our actions determine our good and bad, not the movement of the planets or silent corners (*vaastu*) of the house. His daughter-in-law informs that there is no worshipping of idols or incense burning at their home. His family did not perform any traditional rituals after his death on June 7, 2007. That is the way Ravjibhai lived and inspired others also.

Ravjibhai used to call himself Eklavya, the epic Mahabharata hero who pursued training in archery, in spite of lack of resources and rendered his most important art to

his teacher as obeisance. This modern Eklavya gave to the society much more than he received. His last wish to construct a 'Science Temple' still



Ravjibhai at Savalia Research Centre

remains a dream. His son Vinay Savaliya told that the concept of Science Temple was to attract millions of people, who would visit temples, not Science Museums. He wanted to keep at least 1000 prototypes of his inspiration, Thomas Edison there. 

### Motivations for Innovations

Riya Sinha in her on going doctoral research found several reasons for people to innovate, a) **to help one self**, b) **to help others**, specifically when someone comes to them with his/her problem, or generally, that is third party problems which they have heard, seen, or just felt about, c) **problem of community without hurting nature**, or with minimal hurt, protecting crops without hurting animals (revolving light to keep blue bulls away which damage the crops, or create scaring devices to keep wildlife away). d) **problems of nature**, nonhuman sentient beings, or trees, some disease of trees in public forest and e) **innovation for just fun** (with no particular user in mind, except in pure logical sense that every thing could be of use to some one after all) e.g. Kanak Gogoi who made cycle with energy from bumps for his child, or compressed air car, and so many other things. There could be other motivations too: Ed.