Bullet Santi - Multipurpose motorcycle operated farming equipment

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Mansukhbhai Jagani was not too interested in pursuing education. He was always more inclined towards tinkering with nuts and bolts. In his early years, he helped his father in agriculture but soon he became restless and went off to Surat to work as a diamond cutter. But even the glitter of diamonds couldn't shake off his restlessness. He returned home and with his savings, set up a small welding and drilling shop. It was here, in this modest workshop that also doubled up as a cowshed, that Mansukhbhai made his life's greatest creation, the Bullet Santi

(Indian Patent No: 205097 US Patent No: 6854404B2)

Bullet Santi

In the drought prone area of Amreli it was getting increasingly difficult to use animals to plough the land as they had become weak due to lack to fodder. Less number of farmers kept bullocks and were looking for mechanical alternatives. Also, labour had become scarce, as the tough times had led to migration to the towns. When Mr. Mohan Patel a farmer came over to Mansukhbhai asking for a replacement for his two bullocks, Mansukhbhai had a creative idea.

It was in 1994, inspired by a local mode of transport called chhakdo (essentially a three-wheeled vehicle used for transport), he designed what he called the Bullet Santi. This amazing contraption was made from an Enfield Bullet, a hardy motorcycle whose engine was converted to a 5.5 HP diesel engine and the rear wheel was removed and replaced with an attachment with two wheels. Once a toolbar was fixed to the attachment this unique machine could perform lightweight ploughing, weeding and even sowing of seeds. The machine was also cost effective and fuel efficient. Ten hectares of land could be weeded in a day and cost of weeding was a mere eight rupees a hectare.

Problem Addressed

In Saurashtra, where cotton is abundantly grown, the tractor is not a suitable option for farmers. The small landholdings and smaller row distances require a solution that has a low turning radius and can easily move between rows of cotton crops even when fully grown. Increase in the cost of fodder for bullock, regular occurrences of drought and shortage of farm labour forced the farmers of the region to look for an alternative to oxen.

Product

Using the self fabricated chassis, drive and power of an Enfield Bullet motorcycle in front the innovator has retrofitted an attachment with two wheels at the rear with a tool bar to fit various farm implements. The rear wheel of the motorcycle has been removed and an innovative assembly unit has been attached. This meets various needs such as harrowing, ploughing, weeding and sowing seeds and spraying. It can improve productivity and reduce operating costs for farmers, who currently use bullock-driven plough and cannot afford the tractors or power tillers. The device has evolved greatly from the earlier Bullet based model. The current model, now popularly called “Sanedo”, uses a 10 hp Greaves Engine and very few recycled parts. Some fabricators are making devices with all original parts.

Technical specification

Can perform 8-12 acres of light farm work in 8 hrs.
Can plough light soils about an acre in 2 litres of diesel
Can plough 2 acres in 8 hrs (1 day) depending upon the type of soil.
Distance between rear wheels can be adjusted as per crop row spacing
Provision for a hydraulic plough lifting mechanism & reverse gear facilitates easier field operations

Performs multiple farm operations:

harrowing, ploughing, weeding and sowing seeds and spraying pesticides

Key Competitive Advantage:

Smaller than the tillers and tractors, but stronger than draught animals
Fuel efficient, sturdy, easy-to-operate
Multiple farm operation: Farming, inter-culturing and sowing operation
Because of light weight, it prevents soil compaction, can be used for orchards and plantations crops

Price:

The cost varies from fabricator to fabricator but a good quality Sanedo can cost between Rs 1,45,00 to Rs. 1,65,000 onwards including main attachment and four different types of farming equipment's for Shallow

ploughing, Harrowing, Sowing, inter-culture operations.

Financial Assistance Received

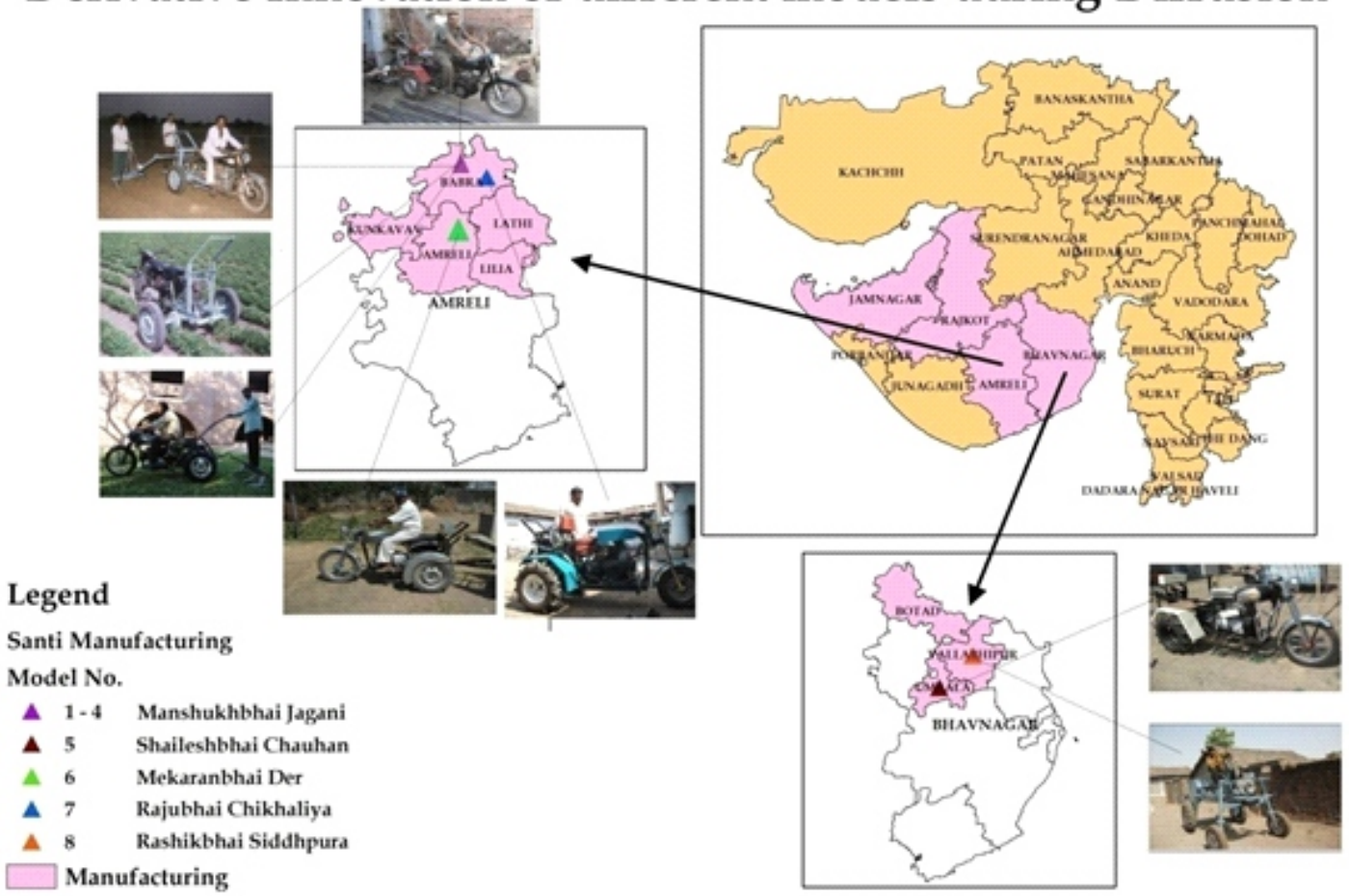
NIF has provided financial assistance of Rs.1.5 lakh. GIAN - West, is operationalising the support. His patent application is being filed in India and U. S. A. through voluntary help of Boston based patent lawyers. His innovation has been displayed at the Indian Science Congress 2000 at Pune,and the Swadeshi Vigyan Mela at IIT, Delhi where it received an excellent response. Students at MIT Boston have developed a business plan for his technology. National Institute of Design, Ahmedabad is working on improving the design of the Santi as a part of GRIDS set up by GIAN at NID.

Achievements and Impact

Mansukhbhai's innovation and his generosity in not patenting the Bullet Santi, has paved way for a flourishing Bullet Santi ecosystem in four districts of Gujarat - Amreli, Bhavnagar, Rajkot, Jamnagar. There are about 500 fabricators of the Bullet Santi. These fabricators support an even wider ecosystem of spare suppliers and scrap dealers in Rajkot. According to local estimates there are about 15000 Bullet Santi's plying in these districts.

Mansukhbhai was awarded the National Award from NIF's First National Competition for Grassroots Innovations and Traditional Knowledge in 2001.

Derivative Innovation of different models during Diffusion



Mansukhbhai has visited South Africa as a part of a delegation led by SRISTI on the invitation of Commonwealth Science Council to share his innovation with his counterparts in Limpopo province. Innovator got a patent in India and USA. Given the fact, many other users and innovators copied this technology, he has appreciated the concept of 'Technology Commons' implying no restrictions for other innovators to copy and adapt. But commercial firms will need license from members of the 'Technology Commons'. He has also been selected by FORBES in their list of most powerful seven rural Indian entrepreneurs whose inventions are "Changing Lives" across the country. The Bullet Santi was one of three technologies handpicked by SRISTI for technology transfer to Kenya in a USAID FSO funded technology transfer project. The Bullet Santi design formed the basis on the development of Shujaa – a low horsepower tractor developed for Kenya.

Mansukhbhai has sold around 700 units in the last 15 years.