



National Innovation Foundation

National Award, Second

Farm Implements: Innovative check dam and 12 H.P three and four wheel tractor



Shri Bhanjibhai Mathukia

Innovative check dam and 12 H.P. three and four wheel tractor

Low cost Check Dam

The innovator has built check dam with series of semi circular bunds on the river Dhrafad flowing through the innovator's village. For constructing the dam he took stones of the size of 11x15 inches and placed the stones in the flowing water keeping a little distance between two stones. Later on this gap was filled up using river sand, stones and cement. The total cost for this came up to Rs.10, 000 including the labour cost. The innovator has constructed this dam without any help from the government agencies. After this dam was meaningfully completed, villages pleaded with him to build another check dam down stream. He then build second check dam in collaboration with neighbouring farmers. Students from IIT-Kanpur are studying the technical parameters so as to learn from this simple innovation with worldwide implications.



Bhanjibhai (70 years), has been tinkering with machines from his childhood. Living close to Gir Forest, he also respects the rights of wild life and often talks about the need to conserve the lion's habitat.

Due to insufficient rainfall and poor water harvesting in past, the under ground level water has been going down. He was deeply concerned with the problem of widespread water scarcity in Saurashtra. The first idea to solve this problem came to him in April 2002 after his participation in eighth 'shodh yatra' in Alwar district of Rajasthan. The efforts made by 'Tarun Bharat Sangh' to conserve water made him think about his commitment to the future generations. Another inspiring factor was Government's 60x40 check dam scheme, which made him think that if a dam was built at low cost, more dams could be built and more water could be conserved.

The dam was built with the help of one mason and four labourers within four days. Due to this innovation, the surrounding region has been green for far longer time compared to other years. The

*Village: Kalawad,
Taluka: Visavadar,
District. Junagadh, Gujarat*

Scout: SRISTI, Gujarat



10/12 H.P. Tractor

Bhanjibhai felt that a much smaller machine could perform most of the operations carried out by a tractor. He developed a small three-wheel tractor powered by a 10 HP engine. It is cost effective and provides improved maneuverability making it ideal for small farmers. The design was kept simple making it possible for the farmer himself to do the repairs. The various advantages include innovative transmission unit, interchangeability from three wheel to four wheel and vice versa, improved performance with reduced cost and adjustable wheel base to meet the requirement of inter-culturing operation in different crops.

A unique feature of the mini-tractor that has evolved over fifteen years is that it is a “convertible”. The front-axle is designed in such a fashion that the tractor can be made into a 3-wheeled or a 4-wheeled vehicle. Explains Bhanjibhai, “double-wheeled front axle is essential while carrying out



wells in the neighbouring regions have also been charged.

The innovator has also done various other innovations in the field of agriculture. The innovator's spouse gave support throughout the process of innovation. He observes,

“she takes care of other responsibilities when I am working on any innovation. But she feels that the innovations do not help us prosper while others are benefited much more out these”. The

innovator has one son who has also acquired a mechanical bent of mind. His nephews have also been very closely involved with him in their workshop. Together they worked on the design of three wheel/four wheel tractor.

Bhanjibhai has developed several other innovations and is in the process of developing few more.

He developed a bullock drawn sprayer modified seed drill and is currently working on an improved version of windmill driven pump. He was part of the delegation which went to South Africa at the invitation of Commonwealth Science Council and South African government to transfer technologies and help build capacity of counterpart small farmer and artisans.

He struggled a lot when the idea of building a three-wheel tractor came to his mind about ten years ago. Using a diesel engine of 10 HP and chasis of jeep, his first model drew lot of attention. His



farm operations which are usually at low speed and high load. However, when you want to use it for transporting goods to the market yard, many people would prefer a single front wheel. Personally, I am more comfortable with a three-wheeled vehicle in pulling a trailer. After all, the owner must have a choice." Having used the three-wheel model for several years, he is extremely confident of the "convertible" emerging as a big success at grassroots level.

GIAN has been instrumental in helping the innovator for standardizing the design and parts mandatory for the testing and certification by CFMT&TI, at Budhni. Indian Institute of Technology (IIT) Bombay could develop the external design in 1996 under the guidance of Prof Munshi. The task of assessing the market potential of the product was taken up by some students of Indian Institute of Management, Ahmedabad (IIM-A). It is planned to send a full-scale model of the tractor to CFMT&TI, Budhni for testing and certification as soon as the development is over. Actual manufacturing will begin once the model receives roadworthiness certification. Registration of the design of the tractor was accomplished in January 2002. Bhanjibhai has also applied for a patent in India and USA with the help of NIF, GIAN and SRISTI.



extended family members also wanted similar tractor and he and his son with a nephew built about nine such tractors of three/four wheel. Once Regional Transport Officer challenged him when he was taking tractor on road to his village. He was asked to sign an affidavit declaring not to ever bring his tractor again on the road. His crime; He dreamt, he solved a problem at low cost, he innovated. He was honoured by SRISTI and also at the International Conference on Creativity and Innovations at Grassroots held at IIM-A, January 1997. He has continued to dream, innovate and build upon traditional knowledge as well. Soft spoken, man of few words, Bhanjibhai joined almost every shodh yatra so far and inspired thousands of farmers, artisans and young people we met during these yatras. He has been supported by TePP of Department of Science and Technologies and DSIR, and has become an ambassador of Honey Bee network and National Innovation Foundation.