



Windmill operated tube well

Consolation

Mohammad Mehtar Hussain and Mushtaq Ahmad

Darrang, Assam

Scout: Mr. Karunakant Nath, a NIF awardee of second round, Assam

Background

Looking for a low-cost alternative to pump water in the fields for the winter crops, Mohammad Mehtar Hussain (32) and his younger brother, Mushtaq (28) devised this simple windmill made up of bamboo and tin sheets.

Married, with one son, Mehtar lives in a joint family with his widowed mother, one sister and brother. The family owns two acres of land, which the two brothers jointly look after. Both have completed their education up to higher secondary and since then have been practicing agriculture. They produce just enough paddy for their own consumption, with a little surplus in some seasons.

The main source of income for the family is a pension of about Rs. 2,500 per month in the name of his late father, who had retired as a Primary school teacher. Though economically poor, theirs is a happy and close-knit family.

Though the water table is not too deep, but drawing water is not easy since electricity supply is

erratic and most small farmers can not afford other means also.

Genesis

Mehtar and his brother while growing paddy in winter season (also called bodo paddy), needed irrigation from the well. Continuous pumping by hand involves a lot of effort and drudgery. At the same time, pumping out water by using diesel sets was a big drain on their resources.

He pondered over the problem and looked around for a solution. It was after a while when his sharp eyes started minutely observing the working of sewing machine. He noticed that the circular movement of the hand drive wheel caused the up and downward movement of the needle. This formed an image in his mind, which was the genesis of the solution that he was going to come up with.

One fine day, while resting on the lush grass by the side of his field and lazily watching the clouds, he observed a kite in the sky. A sudden gush of wind soared it high in the sky, which triggered the thought

of harnessing wind power in some way as a component of the solution he had in mind.

He concluded that if he could develop a large wheel, which could run on wind power, and connect this wheel (turbine) to the handle of the hand pump, he might pump out water continuously as the turbine rotates.

Getting a base of available hand pumps to experiment on was not a problem. In the 1990s, NABARD had done a lot of tube well boring in the district, as a part of their subsidy scheme to promote winter cropping and this became the experimentation platform for these brothers.

Both of them then started building a windmill unit, using locally available materials such as bamboo, wood, strips of old tyres, pieces of iron, etc. Although they had never seen a windmill before, they were able to develop the windmill in no time and the first prototype became functional in only four days with the help of a local carpenter. This was possible because the brothers had constructively



debated long on the form that they wanted for the turbine and had put down everything on paper.

Innovation

The windmill actuated bore-well pumping unit consisting of a tall tower structure made of two parallel bamboo posts supported by two inclined bamboo posts each. An iron shaft is mounted on bearings near the top of the tower, ends of which rest on the parallel bamboo posts on either side. At the centre of the shaft, a wind turbine with four blades is mounted. The shaft is connected to the tube well handle on the ground through mechanical linkages

(crank lever mechanism).

As the turbine rotates, due to motion of the wind, the shaft also rotates. Through the mechanical linkages, rotary motion of shaft is converted to reciprocating motion of the lever of the hand pump, which in turn pumps water from the tube well continuously.

While the working principle of the windmill is similar to conventional ones, the use of low cost, locally available material instead of costlier metals for the framework and the direct drive to do automatic pumping of water from the tubewell has given it an innovative shape.

This entire arrangement is like a portable unit, which can be dismantled in an hour, and then reassembled and connected to a tubewell in another location in almost no time.

Since the supporting framework is made of bamboo, hence, the final product costs only Rs 4500, which is very low as compared to commercially available windmills, which cost over Rs. 40,000.

This device is only used during winter season, for rest of the year it can be kept aside after dismantling. The turbine is preserved while the bamboo is utilized for other tasks.

It is an environment friendly product with low initial cost, zero operating cost and has great relevance in today's world. Since it is fitted to a tubewell, it meets the needs of light irrigation and potable water too.

Doordarshan-NE and NDTV aired a small program on his innovation, which resulted in him being ap-

proached by a local entrepreneur for possible technology transfer. However, the deal could not get through, as it was felt that the product needed further refinement.

NIF supported the innovator through GIAN NE and provided him support from the MVIF Fund in two phases. In the first phase, he made four prototypes, which were sold at Rs 4500 each. In the second phase, there were more than one hundred inquiries from nearby areas but since the windmill had certain structural defects, it was decided that the project be deferred for some time until further improvement on the device were made.

The innovator is further refining the product by optimizing the number of blades to increase efficiency and improving the product structure. Department of Mechanical Engineering, IIT Guwahati has been involved in performance evaluation and value addition at the initiative of GIAN-NE cell.

“How can I sell my turbine to the customers for more than Rs. 4500/- per unit? They can afford slightly more, may be, but I cannot make profit out of the need of my fellow peers...,” says Mehtar Hussain, a poor and a socially conscious innovator.

