Modified Fan Design

The brothers, Nipul Bezbora (25) and Bipul Bezbora (28) hail from Bezgaon, a village in Jorhat district of Assam. They could not complete their education and earned their living by farming and ploughing. They bought a rice husking machine but were facing problems in separating the rice from the husk when the mixture fell from the machine

They then developed a multi-bladed, double-layer fan to blow air in order to separate rice and husk when the mixture falls from the rice de-husking and winnowing machine. This unique fan is made of bamboo. Unlike normal fans that have one set of blades circumferentially on the axis, this machine has two sets of larger and smaller blades located circumferentially in the same axial shaft. The bigger blades are eight in number, straight and small in width. The four curved, smaller blades are arranged next to the bigger blades.
The curvature provided to the front blades, which are smaller, helps in sucking the air due to the creation of a vortex and this feature is attributed to the Coanda Effect .The Coanda Effect is the tendency of a stream of fluid to stay attached to a convex surface, rather than follow a straight line in its original direction. The effect is named after Henry Coanda, a young Romanian Engineer who used the principle to power an aircraft in 1910.

The layer of blades at the back functions as in a normal fan and sucks in the air and feeds it into the layer of blades in the front. Because of the unique arrangement of the two layers of blades, a wedging action is formed, which pushes the air forward through the front layer while producing a vacuum in between the blades. As a result, more amount of air is sucked by the back layer at a rapid pace and is channelled out through the front layer. This unique process basically improves the efficiency of the unit and sucks in and delivers more air. Due to the unusual arrangement of the blades, they develop vortex airflow, which results in higher amount of air/unit energy supplied. The cost per unit of the fan is Rs.100/- only.

The multi-bladed, twin layered bamboo fan has several advantages over conventional designs as (i) higher value of air flow rate per unit sweep area, (ii) higher value of air flow rate at comparatively lower speeds and (iii) less noise. Further, it is environment friendly and saves energy. It is particularly relevant in rural development as it can be used as a Forced-Air Paddy cleaner in the rice mills thus saving on labour cost.