Hand operated water lifting device

Consolation

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Thiruvarur Tamil Nadu.

Background

K Sakthimainthan (47) has devised a simple low-head hand operated water-lifting device, which is capable of giving high discharge.

He is a farmer, an innovator, a poet and priest at the Kali Temple in Nannilam, a small town in Thiruvarur district. Living on the banks of river Cauvery, he has developed many products for the Tanjavur Delta farmers. To call him a versatile genius would be an understatement.

Due to economic difficulties, he dropped out of school in sixth standard and joined his father's profession of working as a priest. It was in the temple that he started displaying his extraordinary skills of composing devotional and secular poetry, song compositions and writing compelling secular essays.

His lyrics have been used in famous songs, sung by renowned playback singers such as T. M Soundarajan, Seergalai Govinda Rajan, during orchestra at the temple. Radio Ceylon, All India Radio and FM stations have also broadcast his poetry and stories. He has even received a letter of appreciation from the President, Dr A P J Abdul Kalam for one of his poems.

With his unquenchable thirst for knowledge, while leading a busy life, he has enrolled himself for B. Litt (Tamil) as a distance-learning course.

Apart from the water-lifting device, he has developed a low cost rope-making machine, which uses paddy straw and a self-operating irrigation pipe device to open and close canal pathways in the field according to water levels. He is keen to develop more of such farm implements and feels he can do that if he gets fund from government or private organization. His innovations have been widely covered in the vernacular press in Tamil Nadu.

Genesis

He was cultivating paddy in one acre of cultivable land given to the temple. To meet his water needs, he used to laboriously collect the overflowing rainwater or water from nearby fields, using a bowl like structure made of discarded tyre tubes. This also required additional labour to lift and throw the water into the fields.

Therefore, he decided to build a hand operated water-lifting device to irrigate fields from canal or pond and drain out excess water from cultivated land.

He started working out a solution to address this problem. Once, while washing implements in stagnant water, he noticed that water was moving in opposite direction. This gave him the idea of water harvesting machine, which would flush out the stagnant water from fields. First, he developed it using wooden propeller and iron rod to rotate but this mechanism was not up to the mark, as the water would flow back.

He started to think of ideas to modify it. Then he came to know that a blacksmith, who lived near the temple, was leaving the village. Sakthimainthan convinced this man of leaving him the air-blowing device used in smithy work, for research purposes. Having got his hands on it, he used the air-blower

to create vacuum suction for inflowing water and placed the impellers inside that envelope.

Next problem he faced was the difficulty in operating handle with this integration of impeller and air blowing device. He then fixed a chain and sprocket mechanism to overcome the trouble. Now there was a better pumping action, but still some splashes of water used to come on the face of user while rotating handle. To address this problem, he made a two-drive system with four impeller blades.

Then he built the final version, after refining the dual drive system idea using iron frames, tin box, and with cycle chain and sprocket mechanism.

While facing financial difficulties, incomprehension and ridicule from some of the fellow villagers, his hardship continued for a period of fifteen years. During which, he made five different versions of machine to get it right finally.

While participating in a water-harvesting workshop, he showed working of this product to the collector and local people and was much appreciated. The product was also demonstrated at the Aduthurai Agricultural College in Kumbakonam and authorities there recommended it for a journal published by Agricultural University.

Innovation

Low head high discharge pumps are common though most of them are power operated. However, manually operated bucket pump, rope pump and bicycle powered pumps are the other alternatives. The hand-operated water-lifting device developed by Sakthimainthan is simple in design and has high discharge at low cost compared to conventional hand pumps, manual bucket pump, and bicycle operated pumps (see www.nifindia.org). The water-lifting device has a selling cost of Rs. 1,200.

Tamil Nadu Agriculture University has appreciated efforts of Sakthimaithan in developing this pump from locally available materials. Their field-tests show that at the discharge angle of 26°, range of discharge achieved is projected at 18,000 to 30,000 lph for 0.5m lift and 9,000 to 22,500 lph for 0.75m lift, depending on operator's efficiency.

Some dimensions of current product are being considered for improvement. Since the discharge pipe is immersed in water continuosly, it would get corroded over time and would need substitution by stainless steel pipe. Operating the unit by hand is difficult for long periods, and hence, a pedal operated version with provision for sitting is being considered.

With zero installation and no running or maintenance cost, this is a very useful product for marginal farmers. Being portable to fit at any site, and simple to use, it is best suited for their routine work in all seasons. It requires just one person to run the equipment. Saktimainthan plans to build new lighter versions using engineering plastics, such that casing and impellers can be made lighter. Patent filing process for the machine has been initiated.

Innovator feels that technologies suitable for marginal farmers are too few and he wants to spend all his time in developing simple low cost technologies related to agriculture. He feels that "technologies existing in the present world are for big farmers, the marginal farmers are still deprived of basic needs and good technologies".