Human Operated Treadle Pump

Background

Treadle pump is a mechanical device which uses human power to draw water from the ground. It is a twin-cylinder reciprocating water pump presently being used by thousands of small/marginal farmers in various parts of eastern U.P, Bihar, Orissa and other places. These are particularly popular in areas where water level is not too low (around 10m or less). Treadle pump is improved by RuTAG IIT Delhi, two types of pumps are developed & modified.

- Improved existing treadle pump.
- Improved treadle pump using locally available plumbing & hand pump parts.

Improved existing Treadle Pump

Treadle Pump using plumbing parts

Area of the Project

Agriculture, Farming equipment, Irrigation.

Challenges

- The design of the pump is not standardized.
- Cylinder is made using M. S. Sheet, therefore lack cylindricity.
- Pedals are fixed on lever.
- No support structure to maintain position while treadling.
- Stress on knee & calf muscles due to inappropriate lever length.
- Rapid wearing of piston washer due to friction.

Salient Features and Advantages

- Design of the pump is standardized.
- Cylinders are made using M.S. pipe to maintain cylindricity.
- Movable wooden pedals are provided to reduce stress on legs.
- Handle is provided for support while treadling.
- Position of pedals on lever can be adjusted according to the weight of operator.
- Washers are made using NBR rubber to increase life span.

Salient Features and Advantages of the Modified Treadle Pump Using Hand Pump & Plumbing Parts

- Pump is made using plumbing & hand pump parts.
- Cylinders are made detachable.
- With ease of operation, pump can be operated while sitting on stool.

Project Timeline

- Problem Identification: 2012.
- Design Improvements and manufacturing: 2013-2017.
- Dissemination: 2017 onwards.

Impact of the Technology

- Reduced drudgery in its operation.
- Can be operated for longer duration.
- Good for farmers with small land holdings.

Success Stories

- Treadle pumps installed in Orissa, Uttar Pradesh, Bihar, Madhya Pradesh, Karnataka, and West Bangal.
- Vendors have been identified for fabrication, manufacturing and assembly.

Current Funding

Office of the Principal Scientific Adviser (PSA) to the Govt. of India.

Collaborations/ Field Agency

- Gramodaya Rachnatmak Vikas Sansthan, Deoria, Uttar Pradesh.
- Abadh Bihari Sri Ram Lok Vikas Sanathan, Mehdabal Sant Kabir Nagar, U. P.
- International Development Enterprises India (IDEI), Sec.-12, Dwarka, New Delhi.
- Madhya Pradesh Vigyan Sabha (MPVS), Bhopal, Madhya Pradesh.
- Wainganga Samudaik Vikas Kendra, Dhapewada, Balaghat, Madhya Pradesh.

In Project Pipeline

- Vendor identification and development for efficient manufacturing.
- Technology dissemination.

Benefits from Industry Collaboration

- Improved industry – academia relations.
- Better market penetration.
- Dedicated vendors/ manufacturers.
- Lower cost by mass production.

Tentative Cost of Treadle Pump is about Rs. 15,000* (including GST @ 18%)

* This cost does not include freight and installation.