WATER LIFTING

PORTABLE TREADLE PUMP

SOLUTION SELECTION

DEPTH TO WATER

0 – 7m

OUTPUT PRESSURE

COST OF OWNERSHIP

IRRIGATION CAPACITY

SYSTEM COMPATIBILITIES

- Flood/furrow irrigation
- Manually drilled tube wells
- Rivers, ponds, other surface water

SYSTEM INCOMPATIBILITIES

- Pressurized irrigation systems

The Portable Treadle Pump is a leg-operated, low-cost option for accessing large quantities of water when the depth to water is less than 6 or 7 meters. Portable models have an inlet pipe that can be extended to surface water or down a well, and can be used for larger or multiple fields. Metal-only treadle pumps have been made cheaper using bamboo, eucalyptus, and/or other local materials for treadles and ground supports.

IDEAL APPLICATIONS

- For depth to water less than 7 meters, this pump is suitable for irrigating 1,500 square meters, and is useful for livestock and other domestic water uses
- Portable pumps are ideal for shifting among multiple users and water access points
- Can be used to fill a header tank for drip irrigation if raised on a platform, as long as total lift does not exceed 7 meters
- For long treadles of local material, foot position can be varied to provide flexibility in stroke and power for users of different heights and weights

Limitations

- Not suitable for irrigating plots located at a higher elevation than the pump outlet
- Treadles on portable and fixed treadle pumps are not connected as is the case on pressure treadle pumps. Gravity, not body weight, is responsible for returning treadles. Therefore, pumping rate is reduced when gravity is insufficient. Adding counterweights to treadles can improve performance.
- Piston cups need replacement after three or four growing cycles, depending upon water quality.

MATERIAL COMPONENTS

MATERIALS

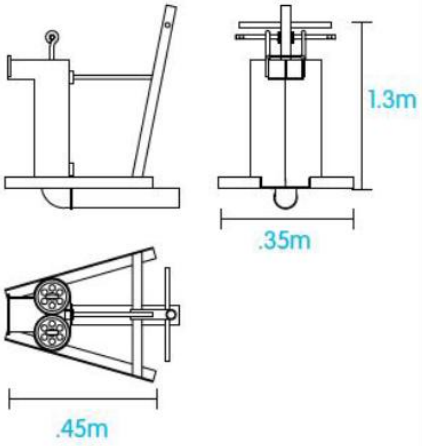
Steel cylinders (plastic is also found in some regions). Treadles are generally steel but these and the frame and handle can be local materials. Piston cups are rubber or plastic. 1.5" rigid inlet hose recommended.

OVERALL DIMENSIONS (PUMP AND FRAME ONLY)

0.5m tall, 0.45m long, 0.35m wide

WEIGHT

~15 kg



Portable treadle pump and bamboo frame

PORTABLE TREADLE PUMP OUTPUTS		
Depth to Water	Maximum Water Output* (liters/min)	Daily pumping** to irrigate 200m² (minutes)
1m	90	18 – 25
4m	60	30 – 40
7m	34	50 – 70

* Assumes single adult focused on the task **Daily pumping time will vary based on quality of well, strength of operator/s, soil / crop type, irrigation method, and environmental conditions.

Option	Application	Weight	Water Interface	Regions used
PORTABLE TREADLE OPTIONS				
Surface Pump	Lifts surface or well water to furrows	17 – 18kg	Inlet hose	**India:** *KB Surface Pump*, **Bangladesh:** *Mobile Treadle Pump*
Superior Surface Pump (prototype**)	Similar to Surface Pump, but less metal used	~ 8kg	Inlet hose	Market testing in **India:** *KB Superior Surface Pump*
River Pump	Lifts surface or well water to furrows	8 – 10kg	Inlet hose	**Zambia, Ethiopia** **Bangladesh:** *Semi-Mobile Treadle Pump*
Plastic Treadle Pump	Lifts surface or well water to furrows	~ 2kg	varies	India, other
Other Local Models	varies	varies	varies	Most
OTHER INNOVATIONS				
Pump raised on a platform	Lifts water to header tanks	See Surface Pump	Inlet hose	Most

*Does not include weight of local materials (Bamboo, Eucalyptus) as these components are typically collected on site, and left on site.
**KB Superior Surface Pump is expected to be available in early 2011