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P035 The rope and washer pump

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The rope and washer pump

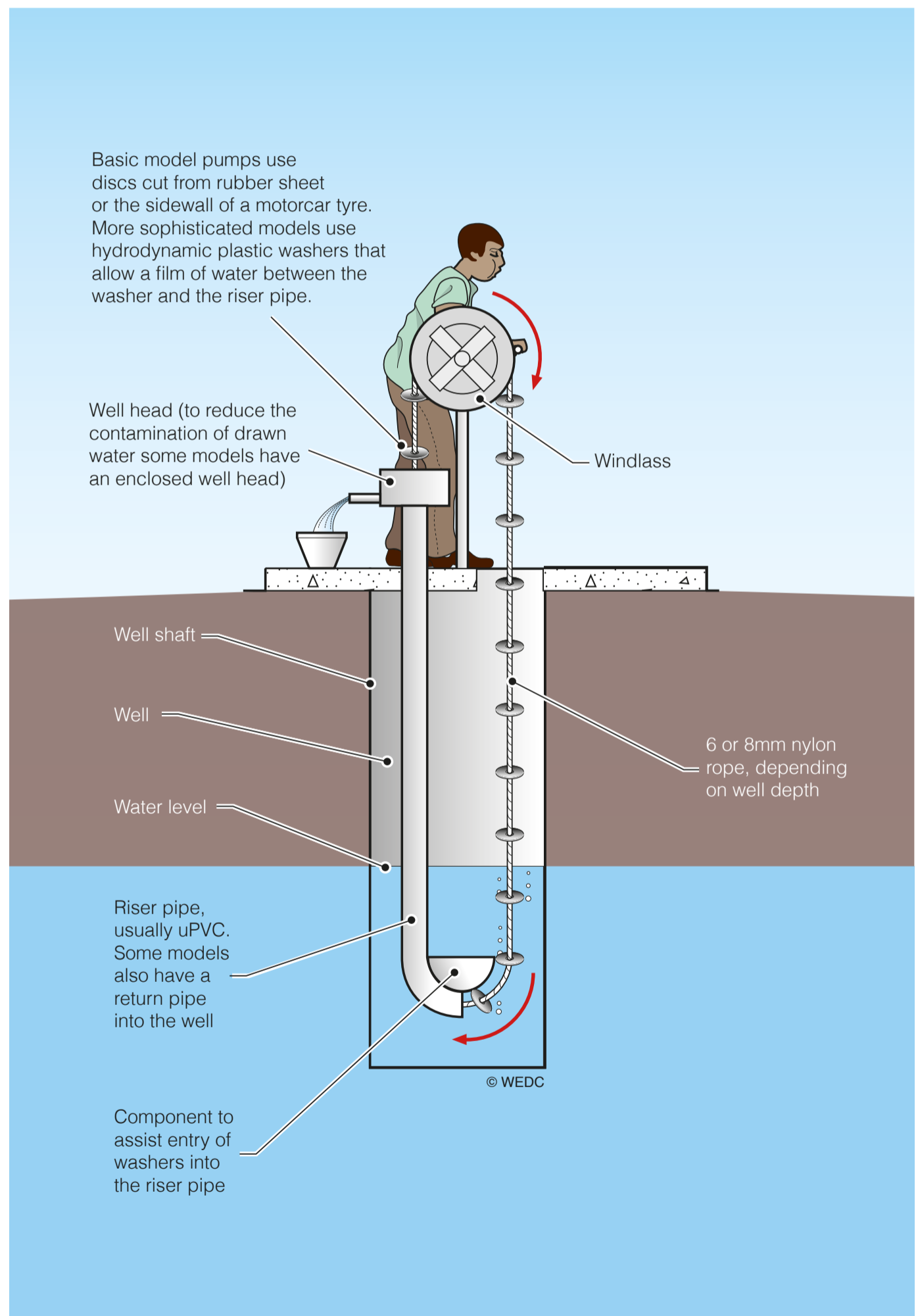
This is a very simple pump which can usually be made from local materials such as wood, rope and vehicle tyres. Traditionally it has been used vertically on open wells but inclined versions have been used to draw water from ponds or rivers. More recently, designs which allow its use on boreholes have been developed.

As you can see from the diagram, the pump is operated by pulling a continuous length of rope through a smooth pipe which has pistons attached to it. The bottom of the pipe is below the water level so that it is always full of water. As each piston enters the pipe it traps water which is then lifted up the pipe.

There is some leakage around the pistons because they are not designed to push tightly against the inside of the rising main as this would create too much friction. However, the relatively fast movement of all of the pistons means that the pump can still deliver water at a good rate. In the 'home-made' versions, pictured here, the pistons can be made out of discs cut out of the sides of lorry tyres.

In Nicaragua, cone-shaped moulded polypropylene or polyethylene pistons are used.

A version using an 18mm diameter pipe is able to lift water at a rate of 8.3 litres/minute from a depth of 42 metres. A 30mm pipe at 17 metre depth is able to deliver 18.9 litres/minute. *



* Reference: Alberts, H., Meza, R., Solís, D., Rodrigues, M., (1993), 'How the rope pump won in Nicaragua', Waterlines, Vol.12, No.2, IT Publications, London, UK., pages 3 – 5.