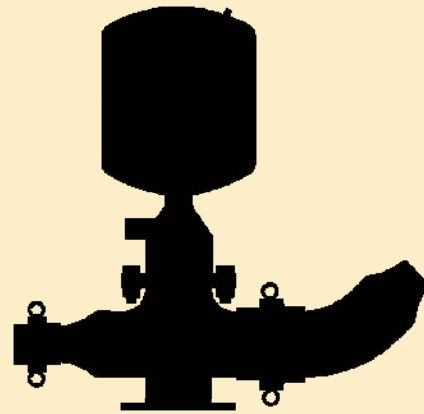


Rain Tree Foundation



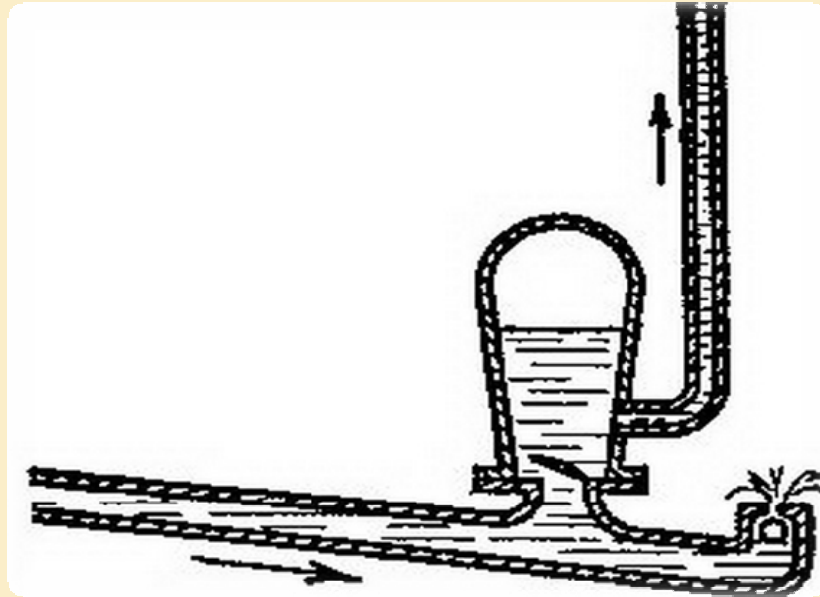


The Basic's of Hydraulic Ram Pumps

History of the Ram Pump

The Amazing Hydraulic Ram Pump

Once upon a time a Frenchman named Joseph Michel Montgolfier (1796) (he and his brother were best known for being the first to send livestock aloft in a hot air balloon; it takes all kinds...) rigged up a couple of valves to automate a process. As flow developed, it would slam a ball against a seat, forcing the pressure through a check valve and into an air chamber.

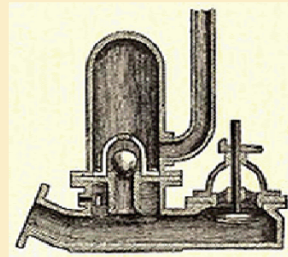


- It were also the Montgolfier Brothers who invented the first self-acting ram pump for rising water in his paper mill at Voiron. His friend Matthew Boulton took out a British patent on his behalf in 1797. The sons of Montgolfier obtained an English patent for an improved version in 1816, and this was acquired, together with Whitehurst's design, in 1820.
- Altogether the ram pump designs changes after the centuries and a hundreds of different types were manufactured all over the world.
- Until now some of the old ram pumps are still doing their jobs as well as time stood still. If you are lucky enough you can see them all over the world mostly in farming areas. But also in some museums there are some antique pieces. (below an old ram in the German museum in Munich)



Parts and Function of the Ram Pump

- A hydraulic ram has only two moving parts
- a spring or weight loaded "waste" valve sometimes known as the "clack" valve
- a "delivery" check valve, making it cheap to build, easy to maintain, and very reliable
- a drive pipe supplying water from an elevated source
- and a delivery pipe, taking a portion of the water that comes through the drive pipe to an elevation higher than the source.



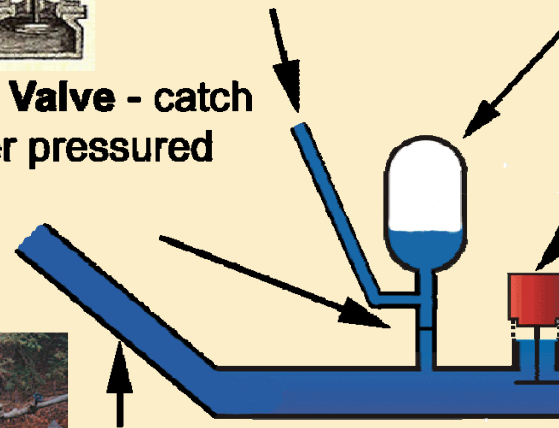
Pressure Valve - catch up the over pressured water



Delivery Pipe - pipe from the ram pump to a collection tank



Pressure Vessel - serves as a buffer and catch up the over pressure



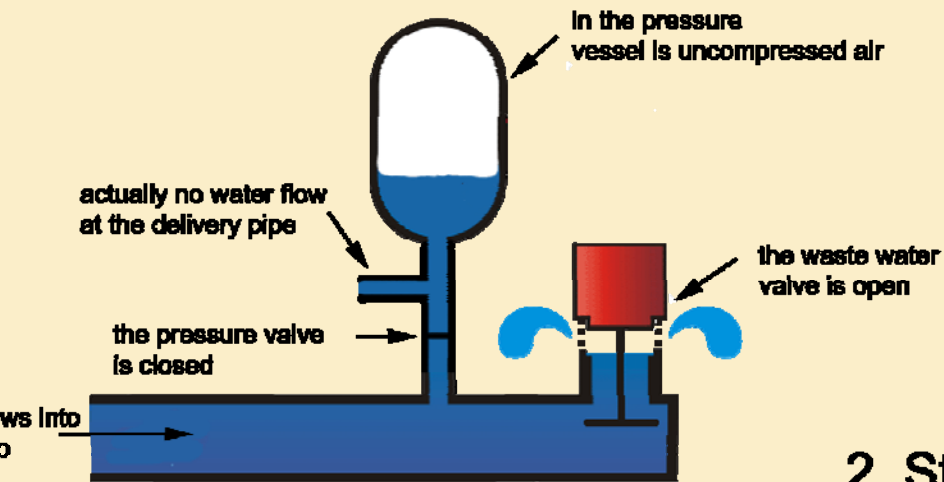
Drive Pipe - supplies the ram pump with water for a proper operation



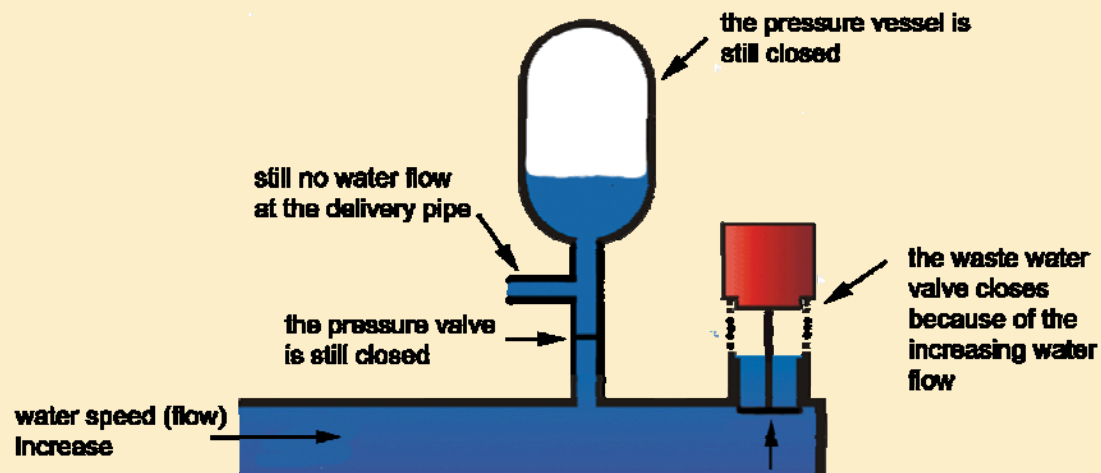
Waste Water Valve - stops the intrushing water and is mainly responsible for the over pressure

Schematic Ram Operation

1. Initial Position of the Ram Pump

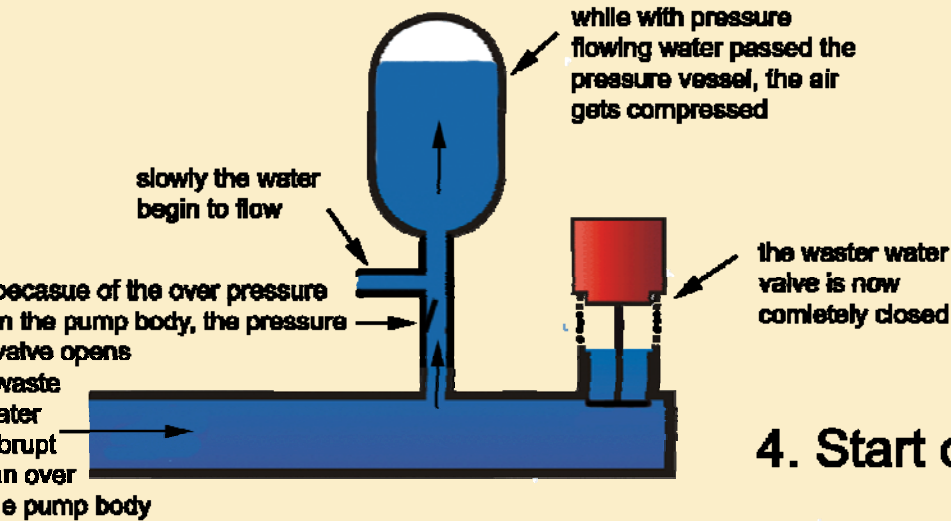


2. Start of the Ram Pump cycle

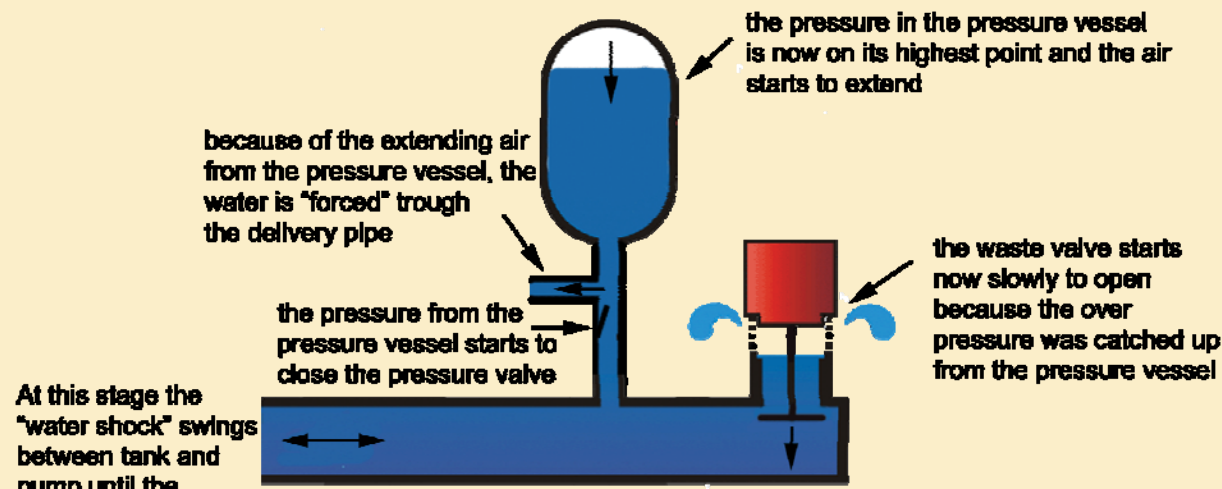


Schematic Ram Operation

3. Over pressure phase

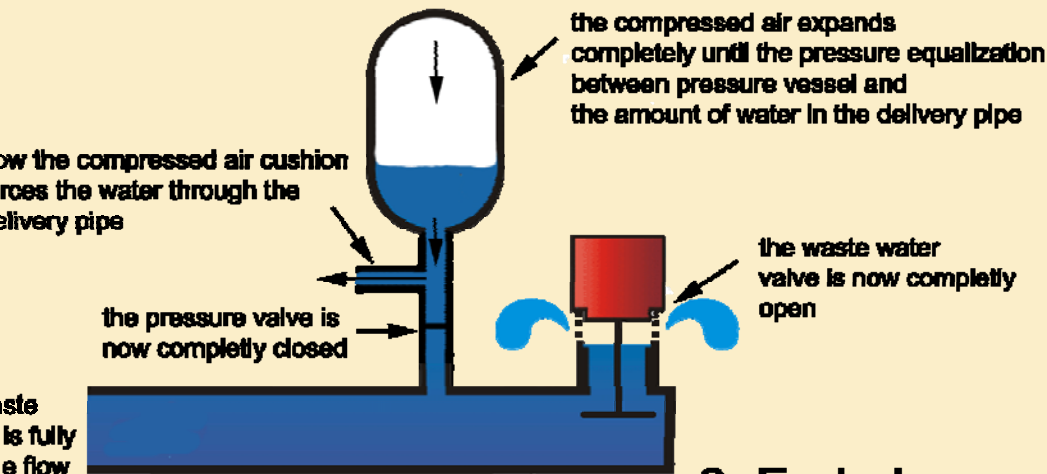


4. Start of the delivery phase

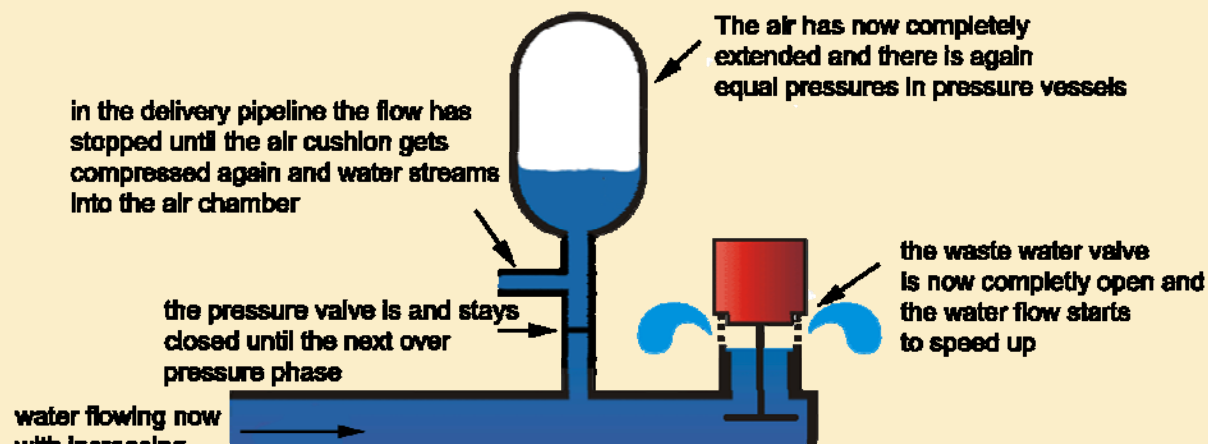


Schematic Ram Operation

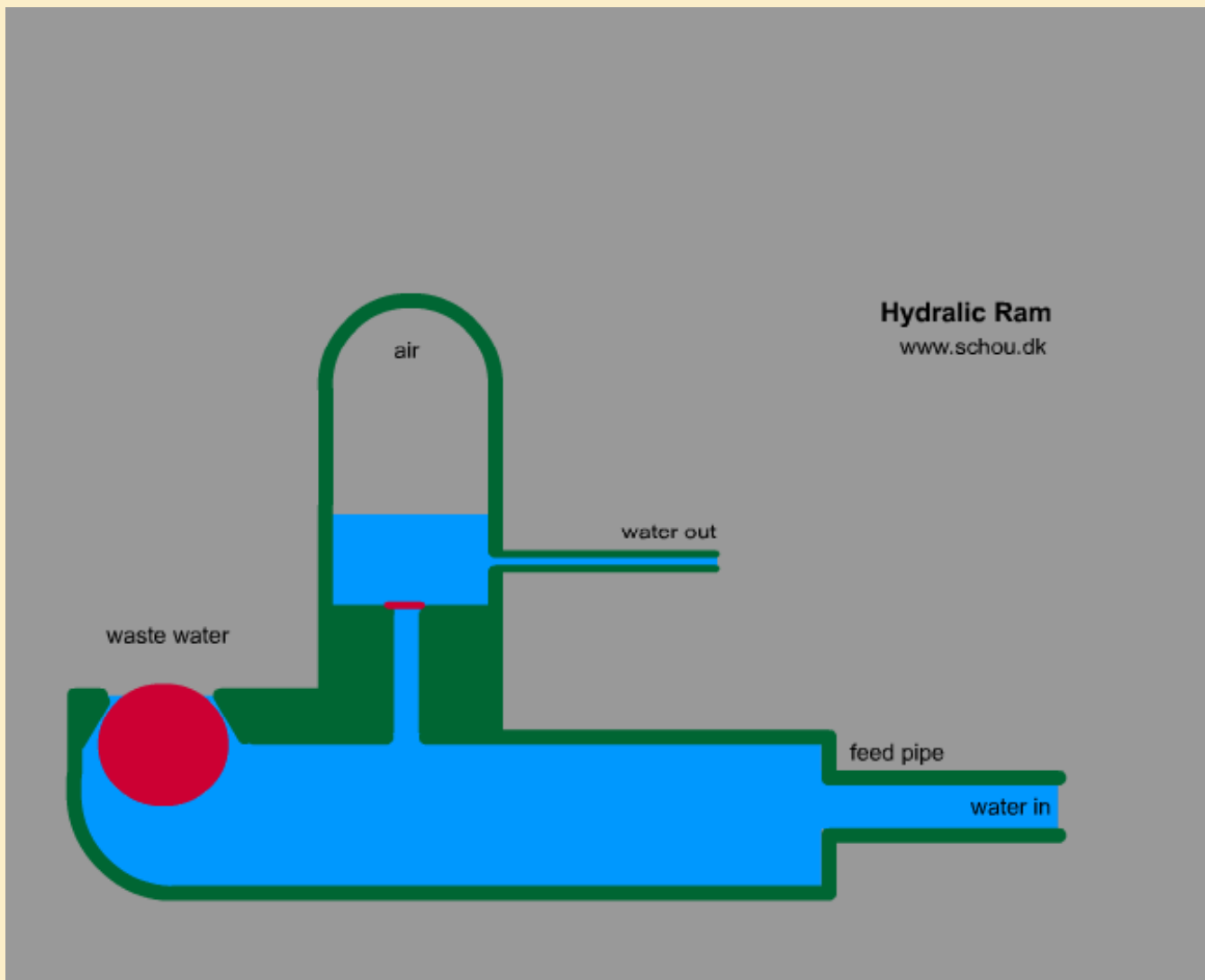
5. Delivery phase



6. End phase and begin of a new cycle



Animated Ram Operation



Different ram designs



Pump (Indonesia)



AID Pump (Philippines)



Hemphryes Ram (England)



Lifeboat Ram (NZ)



Ram Pump (USA)



Alibaba Pump (Taiwan)



New Dawn Ram (Africa)



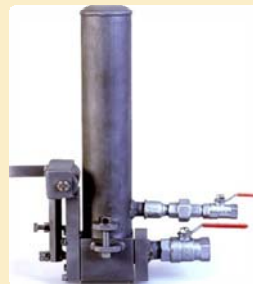
Dyngo Pump (Australia)



Pump (Thailand)



Finisilla Pump (Australia)



Talman Pump (Switzerland)



Mulvaney Pump (England)

Common misunderstandings

There are a few misunderstandings about Hydraulic Ram Pumps and the operation of them.

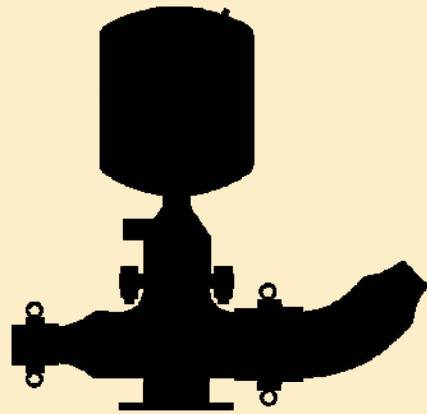
We have to remember the basic requirements of a Ram Pump:

- A sufficient water source
- A slope or incline towards the pump
- A physically possible delivery high in interplay with the drive head
- And a realistic amount of water to be pumped up

The Ram Pump isn't a magic machine so it's a mechanical device which need also a bit of care.

You can get a whole array of Ram's starts from the low cost models which needs mostly regular maintenance and they are just built for low parameters with a little amount of delivery water.

On the opposite the more expensive heavy models are mostly maintenance free and guarantee a trouble free operation for a couple of years. Also the stronger design is constructed for longer and higher distances with a bigger spoil of



Basic Ram Survey & Installation

Site Survey

The first step to do is a site survey to choose the right place, model and configuration for your needs.

Choose where you want to have the delivery water and how much would be needed.

What is a good place for the collection tank and the ram (rain session, spring flood, aso.)

Where is a sufficient water source / where could water be diverted to tank.

Most important there must be a slope from the water source to the ram pump, without any downfall of the source it's impossible to run a ram.

Be creative. Many users haven't the necessary slope next to their water source. But like common cases they have a spring, a well, a small stream or something and everywhere water flows down. So go up the stream and have a look there if it's possible to divert a sufficient amount along the riverbank until you reach the settling tank

Schematic Pump Site

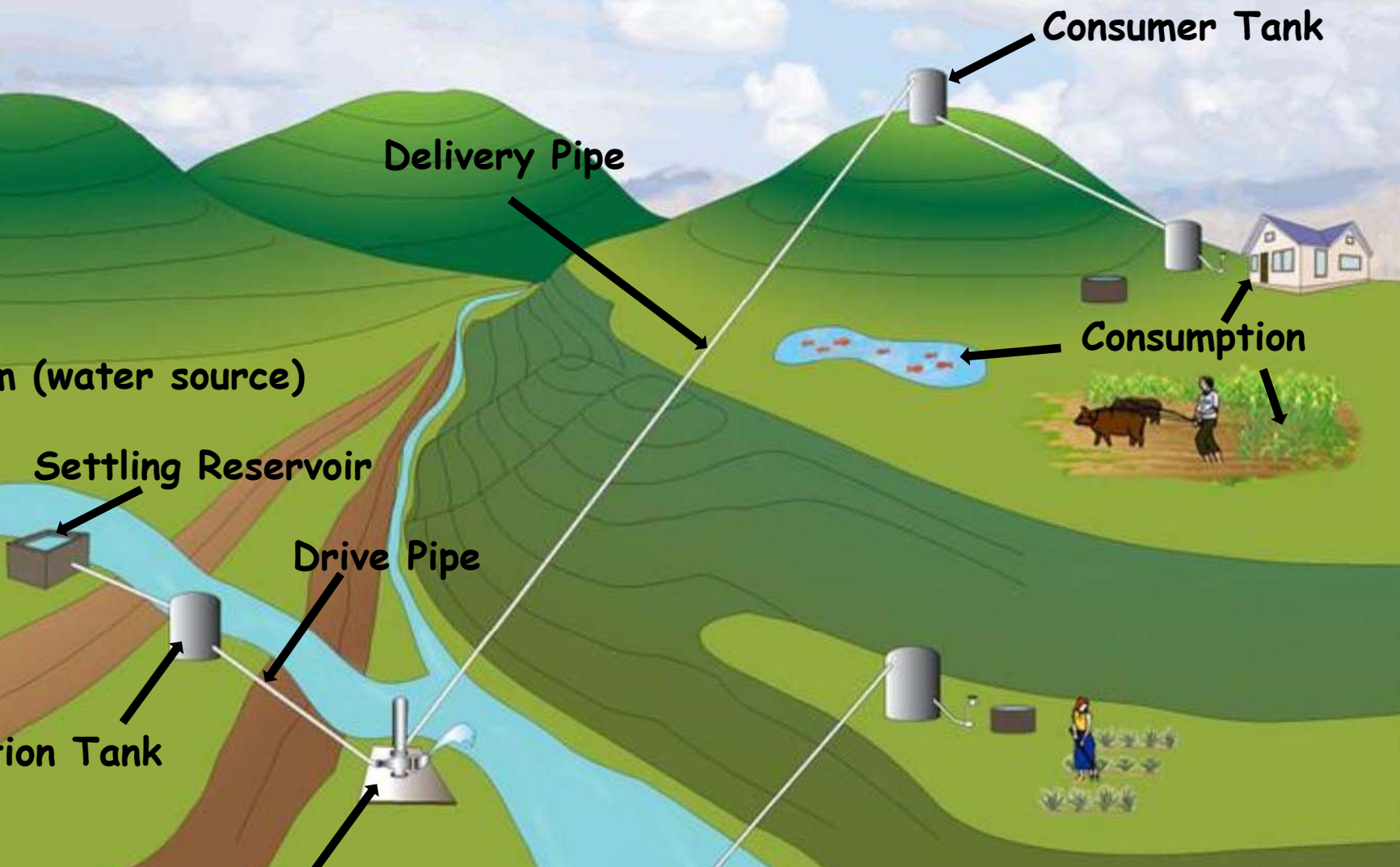


Chart from Meribah

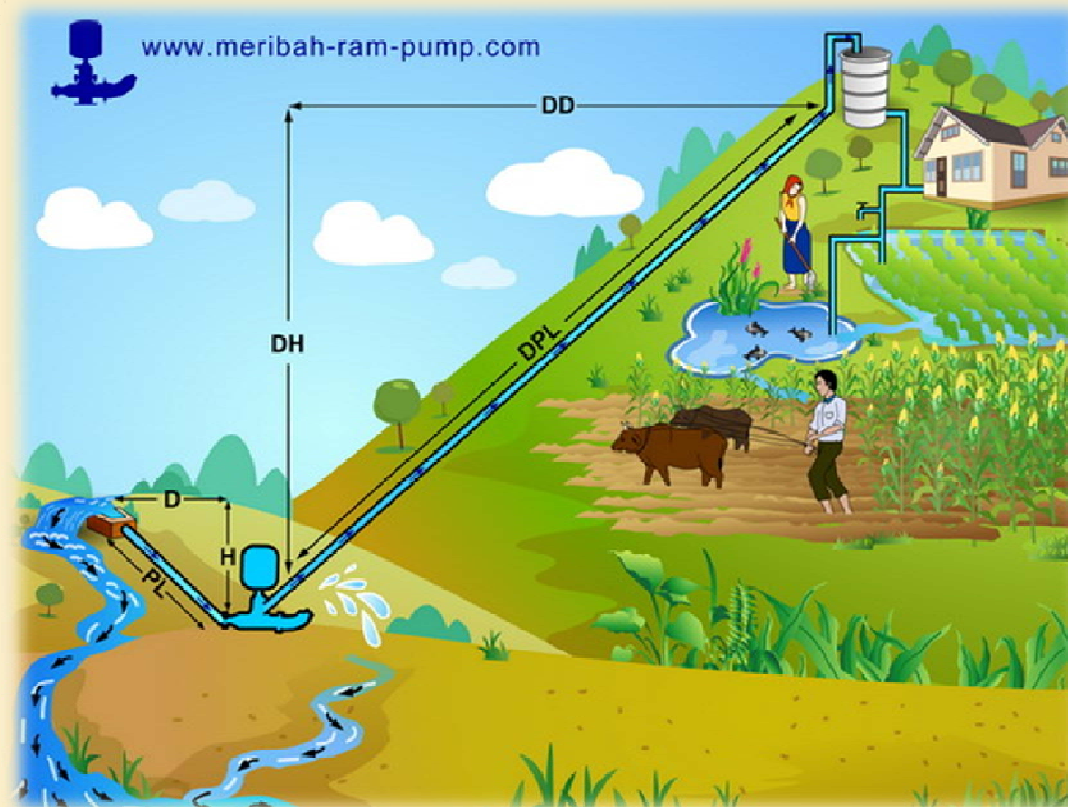
Meribah Acronyms:

Dead Lead → high difference between source and pump

Propelling Length → length between source and pump

Delivery High → high difference between pump and consumer tank

Delivery Pipe Length → length between pump and consumer



Checklist of requirements

Which amount is needed for consumption (in liters a day or minute)

The water amount from the source (check the flow with a 1 inch and a 2 inch pipe)

What's the high difference between the water source and the collection tank (H) which feeds the ram pump (in meters).

The pipe length (PL) between the collection tank and the place for the pump (keep in mind, the pipe length should be 2-4 times of the drive head).

Measure out the high difference between the ram and the consumer tank (DH) (in meters).

Then the length from the pump to your consumer tank (DPL) (in meters).

Remarks

Like we saw before there are a few important steps to do for the right configuration of a pump site.

This is necessary to give an advise for the best solution.

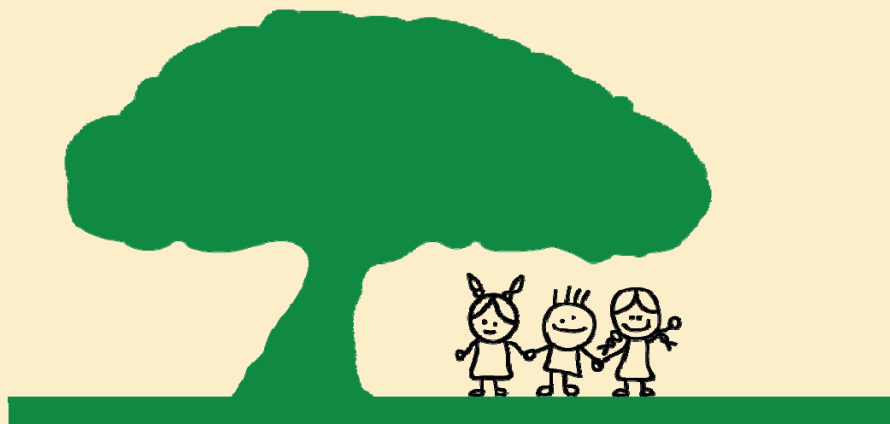
There are a lot charts and formulas to calculate everything but how our experience showed each site is quite different.

For a new installation is an individual case and everywhere we have to make new choices.

For any further information visit us on our booth or have a look at www.meribah-ram-pump.com

For any further information or
question have a look at
www.meribah-ram-pump.com or
www.raintree-foundation.org

Thanks for your interest !



Rain Tree Foundation