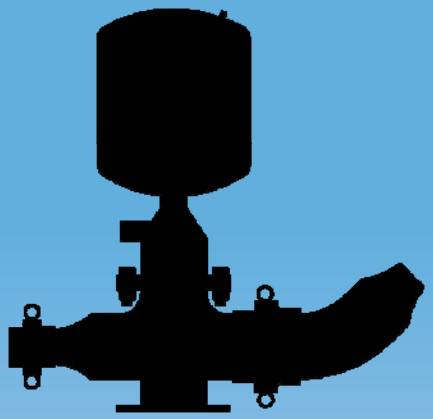
Rain Tree Foundation

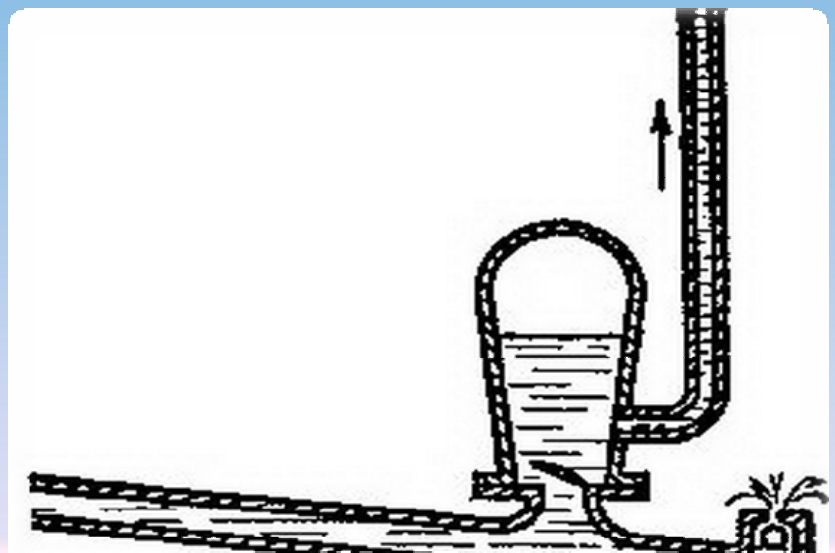


The Basic's of Hydraulic Ram Pumps

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.

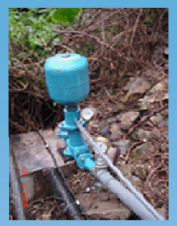
Altogether the ram pump designs changes after the centuries and a hundreds of different types were manufactured all over the world.

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)

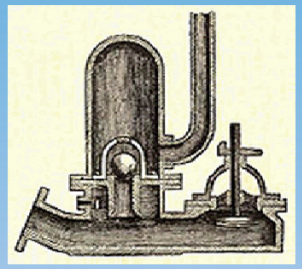
Parts and Function of the Ram Pump

ydraulic ram has
two moving parts
ring or weight
ed "waste" valve
etimes known as the
ck" valve
elivery" check
e, making it cheap
uild, easy to
tain, and very
able
ive pipe supplying
er from an elevated
ce
a delivery pipe,
ng a portion of the
er that comes
ugh the drive pipe
n elevation higher

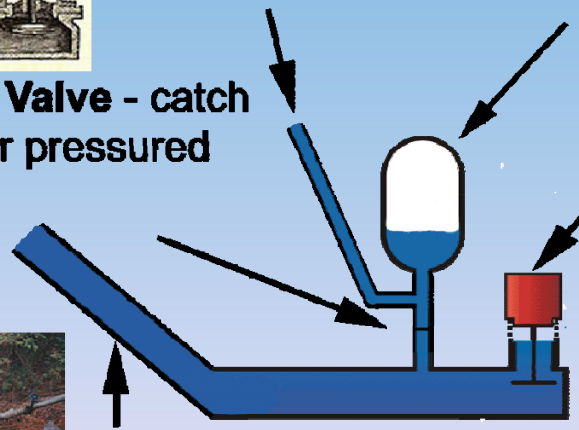
Delivery Pipe - pipe from the ram pump to a collection tank



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



Pressure Valve - catch up the over pressured water

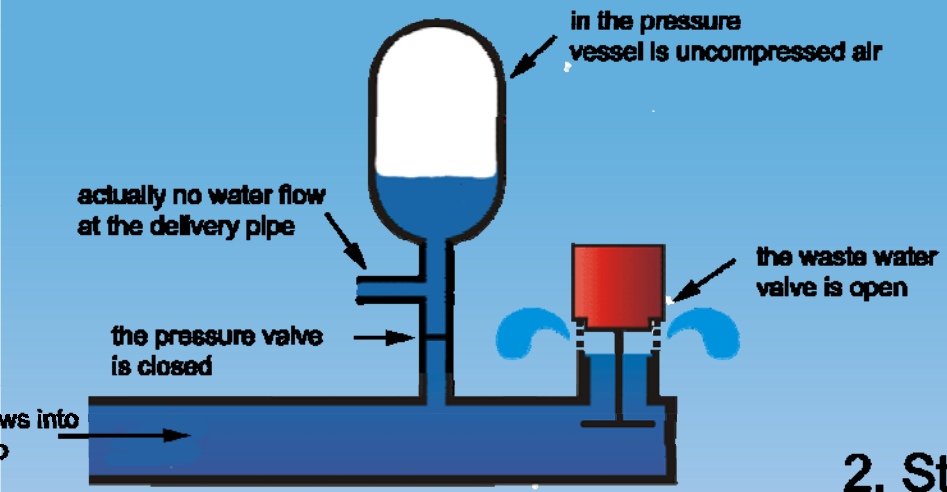


Waste Water Valve - stops the inrushing water and is mainly responsible for the over pressure

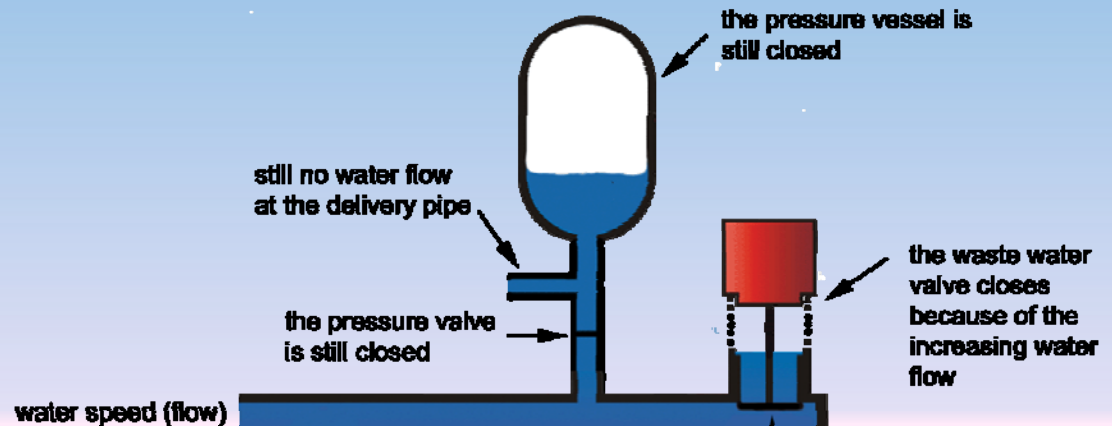
Drive Pipe - supplys the ram pump with water

Schematic Ram Operation

1. Initial Position of the Ram Pump

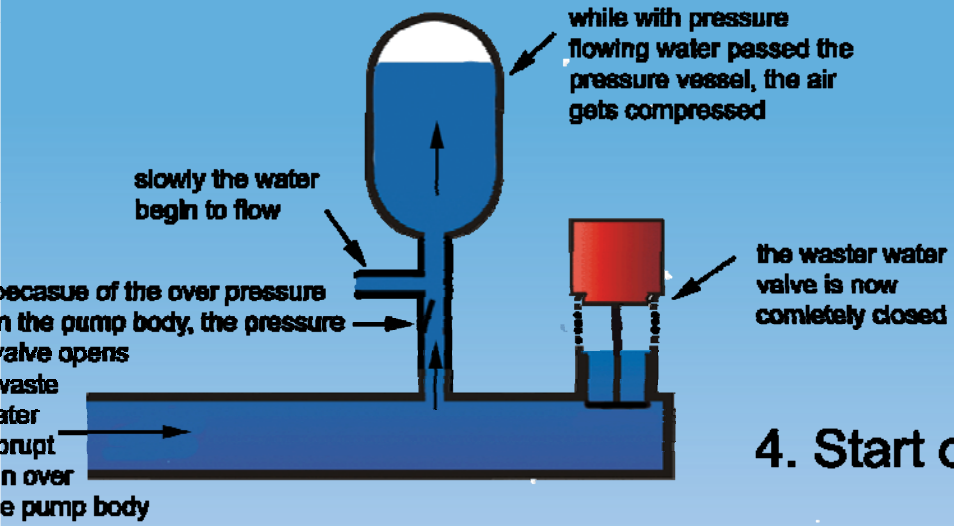


2. Start of the Ram Pump cycle

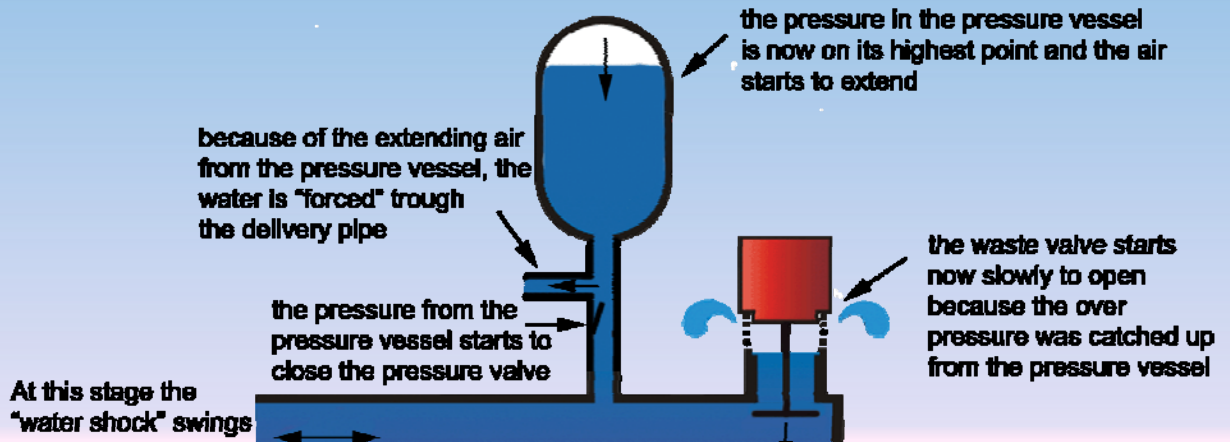


Schematic Ram Operation

3. Over pressure phase

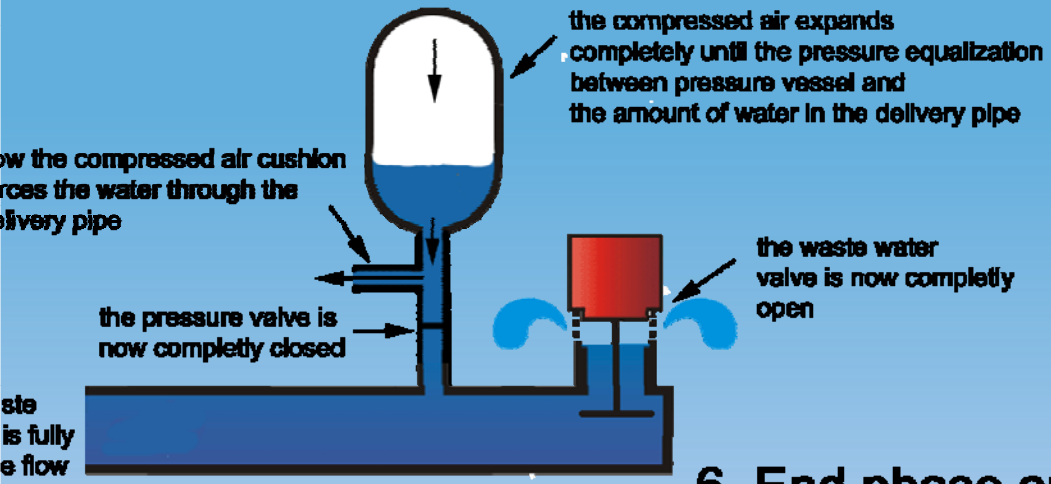


4. Start of the delivery phase

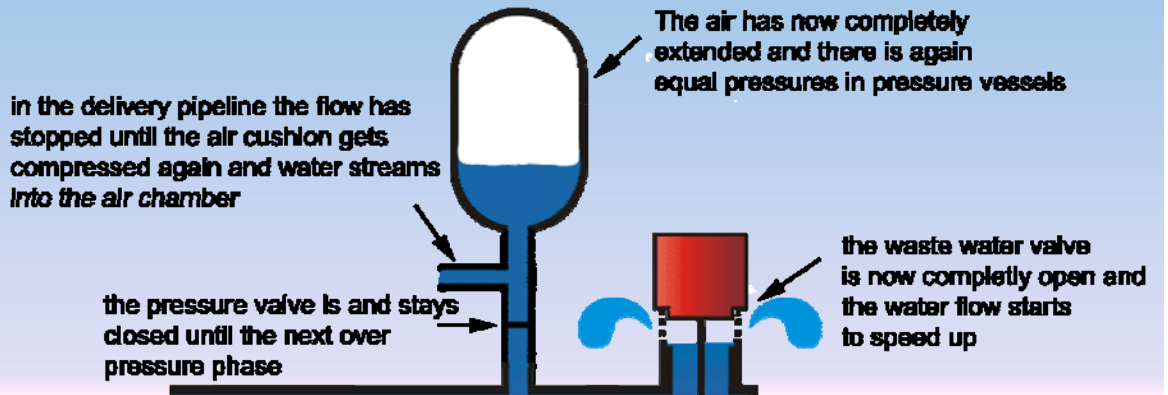


Schematic Ram Operation

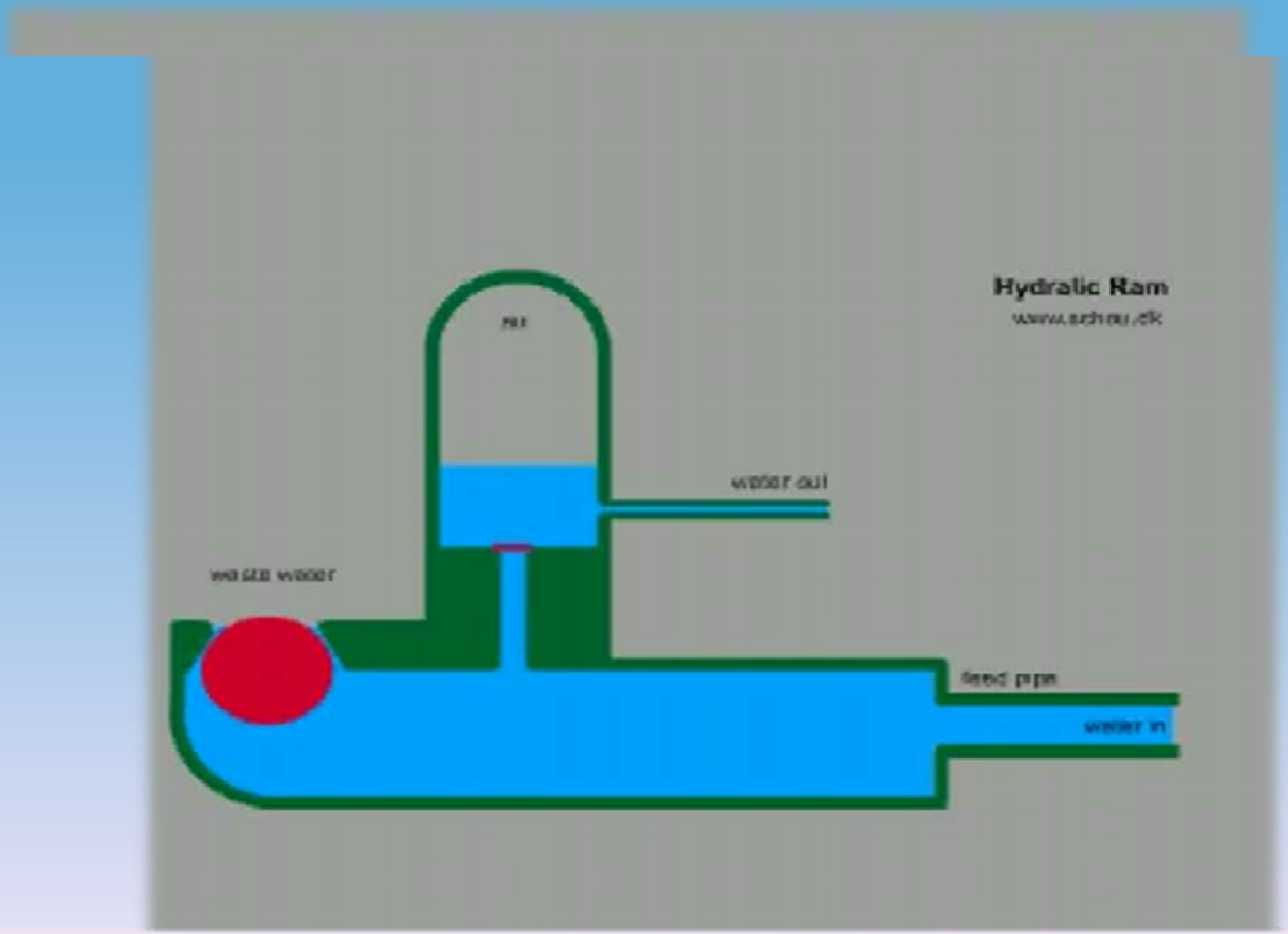
5. Delivery phase



6. End phase and begin of a new cycle



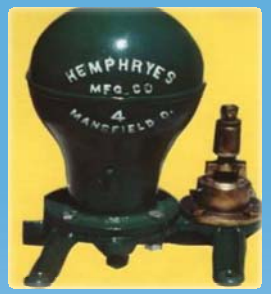
Animated Ram Operation



Different ram designs

ump (Indonesia)

AID Pump (Philippines)



Hemphryers Ram (England)

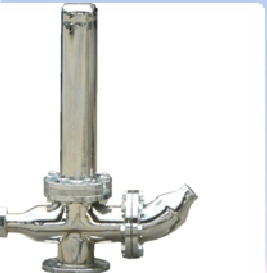
Lifeboat Ram (NZ)

am Pump (USA)

Alibaba Pump (Taiwan)

New Dawn Ram (Africa)

Dyngo Pump (Australia)



Common misunderstandings

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

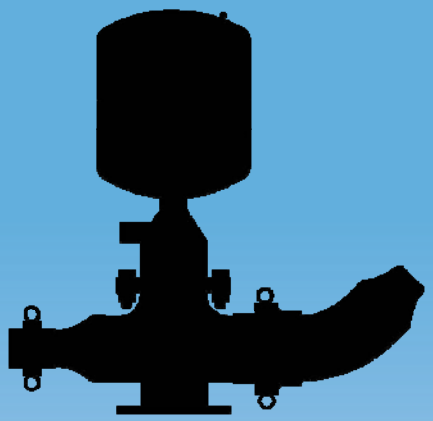
We have to remember the basic requirements of a Ram Pump:

- 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



Basic Ram Survey & Installation

Site Survey

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

hoose where you want to have the delivery water and how much would e needed.

/hat is a good place for the collection tank and the ram (rain session, pring flood, aso.)

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

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

e creative. Many users haven't the necessary slope next to their ater source. But like common cases they have a spring, a well, a mall stream or something and everywhere water flows down. So go up he stream and have a look there if it's possible to divert a sufficient

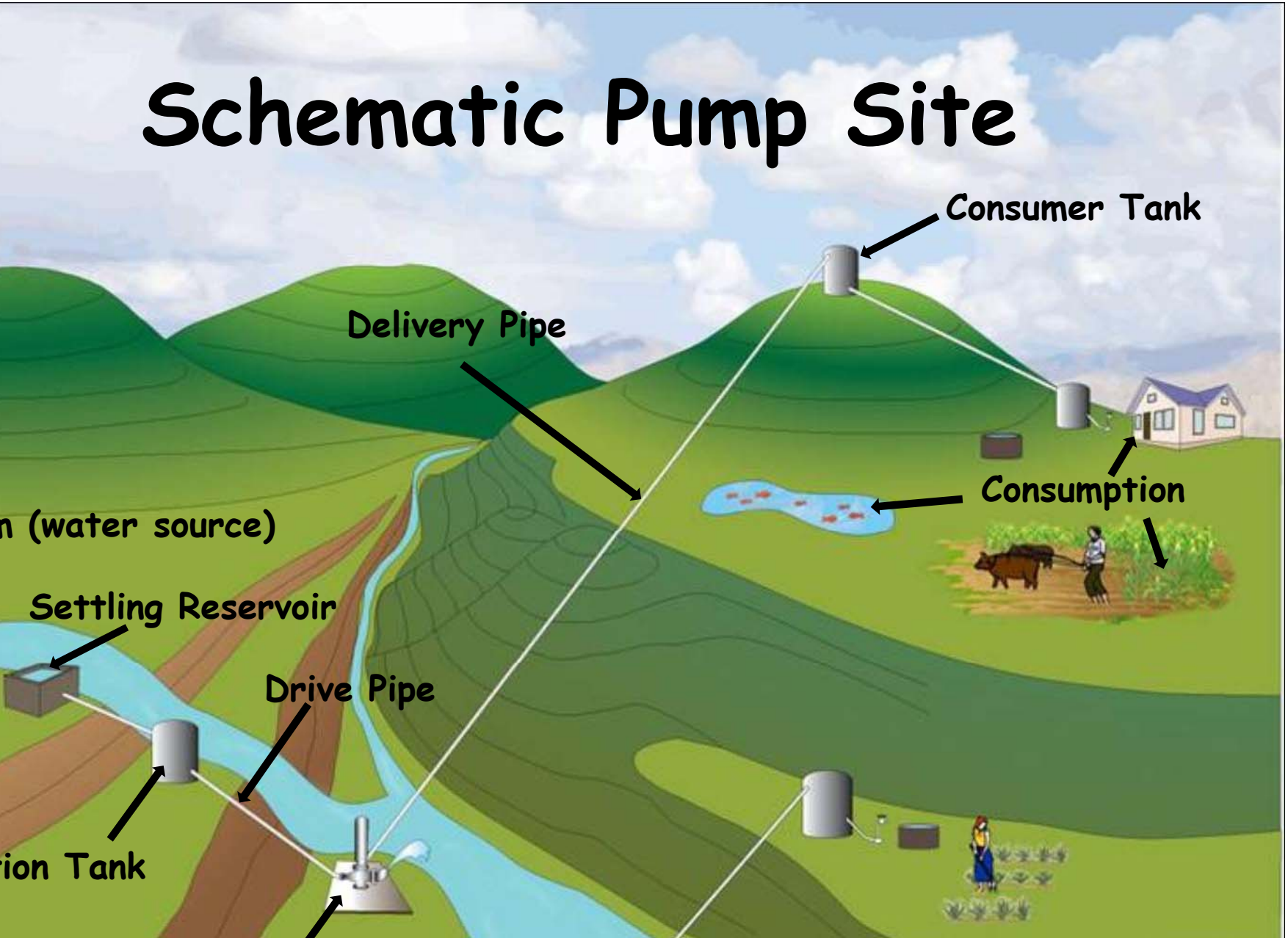

Schematic Pump Site
Consumer Tank
Delivery Pipe
Consumption
n (water source)
Settling Reservoir
Drive Pipe
ion Tank

Chart from Meribah

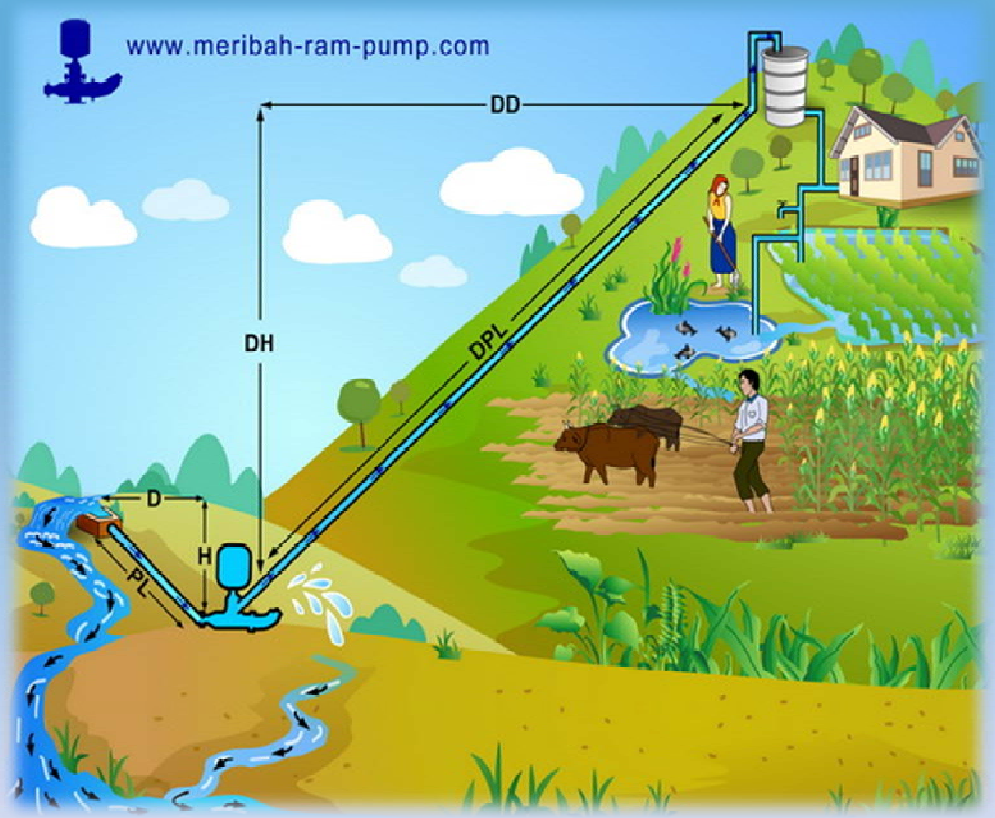
bah Acronyms:

lead → high difference
en source and pump

Propelling Length → length
en source and pump

Delivery High → high
rence between pump and
ner tank

Delivery Pipe 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)

Remarks

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

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

here are a lot charts and formulas to calculate
erything but how our experience showed each site is
ite different.

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

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

or any further information and contact
visit our booth or have a look at
www.raintree-foundation.org

Thanks for your interest and I wish you
a nice day.