SMART WATER SOLUTIONS

AN UPDATE ON NEW LOW COST WATER TECHNOLOGIES

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Water channel
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Water challenges

1 Volume > 20 l /p/day
(3 l/p/day safe water)
2 Distance < 500 meter
3 Quality > Clear. No biological, chemical pollution

Proposition 1

To reduce poverty (MDG 1), it is more cost- effective to invest in self supply than communal water supply

Proposition 2

To reduce water borne diseases the most cost- effective is to invest in hygiëne and point of use treatment

New Low cost options for

- **Wells**
- **Pumps**
- **Storage**
- **Ground water recharge**
- **Irrigation**
- **Treatment (drinking water)**
- **Sanitation**
- **Hygiëne**

Wells. Underlining

Simple option to avoid collapsing of wells

Hand drilling of boreholess

- Rota sludge
  to 40 m deep
- Baptist
  to 80 m deep
- Cost $ 100 - 800
  incl. casing, hand pump

Low cost hand pumps. EMAS

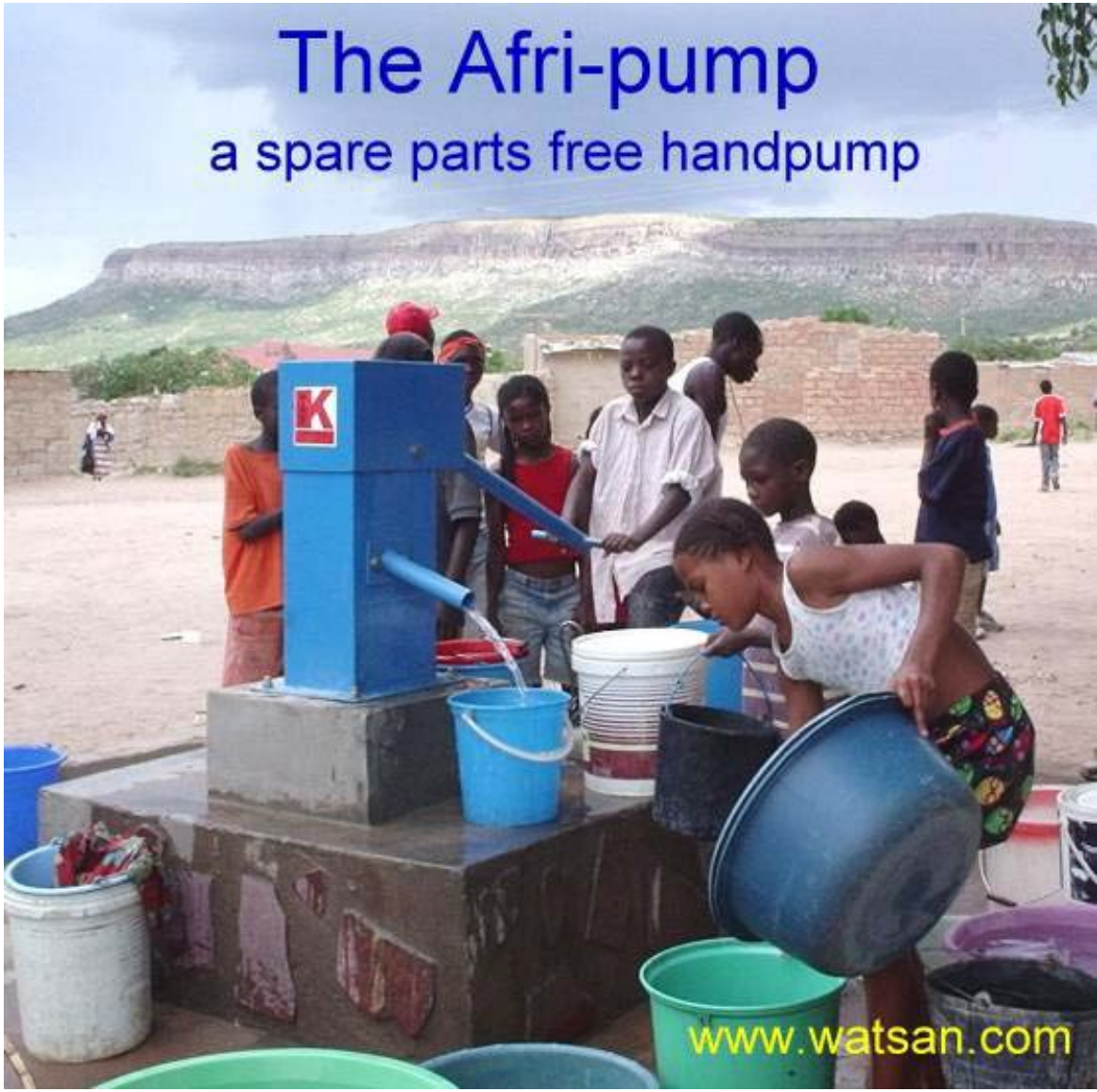
- Pressure pump
- 5 - 40 meters deep
- 20.000 installed in Bolivia
- Cost: $ 20 - 80

Ram Pumps

- Water powered
- Lifts to 200 m high (AIDFI)
- Cost: $ 200 - ..

Blue Pump

- Extreme low maintenance
- Till 100 m deep
- Cost: ca $ 2000



Treadle pump

- Suction pump for irrigation
- 1.5 million Asia and Africa
- Cost $ 15 – 100
- Generates income $100 - 400 / year

Rope pump

- Communal, Domestic use
- 5 million users
- Cost: $ 30 - 150

Models for 2m dug wells to 2“ boreholes

Nicaragua

- 90.000 installed. National standard
- **Increased rural water supply 3 x faster** than other countries.
- 90% stay functioning
- Very useful for MUS
- **Profit based sustainability** Loc private sector makes profit

Rope pumps with Pedal, Horse, Engine, Wind

Etiophia, Zimbabwe, Malawi,..

- 2.5 mln users now
- 15 mln in 2015
- Zimbabwe may reach water MDG!

Ghana

- Worldbank funded project
- 80% defect after 1 year
- Errors
- Devil is in detail
- Simple is not easy…

Lessons learned For sustainability:

- **Repairability**
  Simple, affordable, available

- **Profit for all involved, private sector**
  Profit based sustainability, create value chains

- **3 C`s of marketing, Cost ,… , …**

- **Simple is not easy**

Storage Wire cement tank , Balanta tank

- Bricks, bamboo
- 1 bag of cement / m^3
- Volumes 1 – 50 m^3
- Other options

Emas tank
Plastic liners

Groundwater recharge
Tube recharge

- Made by families
- Cap. 10-100m3
- Cost 5 - 10 $
- 3 R options
  - Reuse
  - Recharge
  - Retention

  Vetiver, Spate irrigation, Dams

Irrigation

Nica drip, Easy drip

- small farmers, < 2 Ha
- They can manage simple low cost irrigation
- Income / food security

KB drip Cost $40/ 400 m2

Multiple use (MUS)

Irrigation of tomatoes + Domestic use for 10 families
(Credit of 400US$, paid back in 6 months)

Hygiëne Tippy Tap, Wash bottle

Families copy it (after critical mass)
Educational for schools

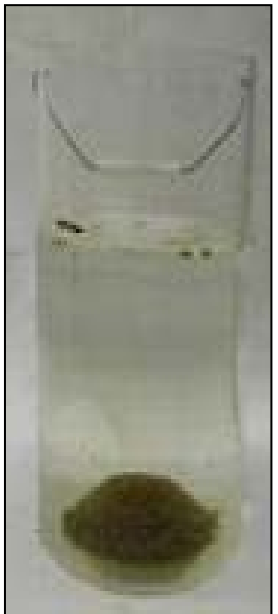
Sanitation

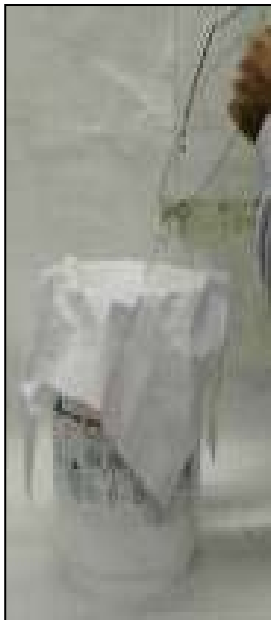
- Urine Diversion
- Urine as fertilizer, phosfate of
- Family food prod.
- Cost; 2/3 bag of cement

Reduce water borne diseases? Start to treat at point of use

- **Re-contamination betw. source & use**
- **50% hospitalbeds, related to unsafe water**
- **Household Water Treatment, cost benefits up to 60 x the investment (WHO)**
- **Safe water maybe most cost-effective action to reduce poverty**

New disinfection options
Aquatabs, PUR , Watasol





WATASOL
Local production of Chlorine

- **Users;** over 0.5 Million
- **Price;** $0.3 - $ 1.0
- **Cost;** $0.1 - $ 0.5

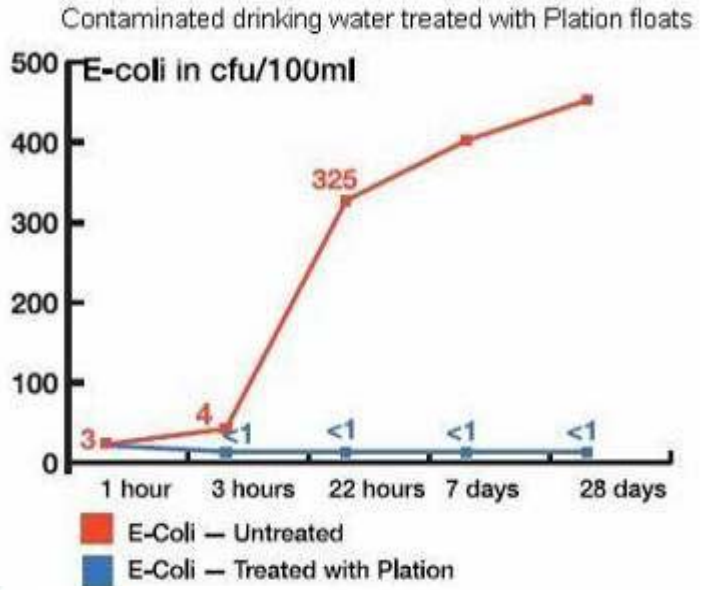
- Extremely low costs
- Local business development

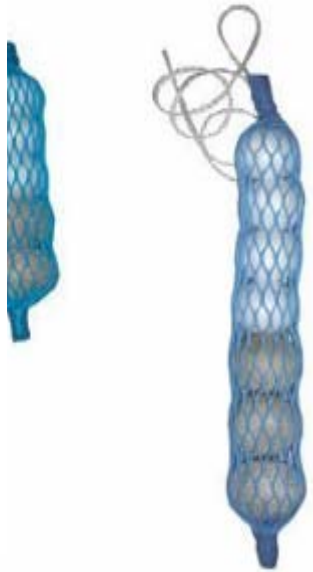
Silverdyne, Plation

Users; 0.5 ? mln.
Price; $20/unit/20ltr
Cost; $4 - $6

+
- Extremely simple
- Functions one year

-
- High costs





New Water filters

Reduce diarrhoea up to 64% (Unicef / WHO)

Candle

CWP

Life straw

Siphon

No option is ‘the’ solution

	Turbidity	Heavy Metals	Viruses	Bacteria	Parasites	Pesticides
Boiling						
Filtering						
Chemicals						
Combined Chemical (PUR)						
UV						
SODIS						

Summary of Effectiveness—All ages

Intervention Type (no. trials)	Estimate (random)	% Δ (1-RR)	95% CI of Estimate	Heterogeneity* (Chi-square)
Source (6)	0.73	27%	0.53 to 1.01	p<0.00001
Household (32)	0.53	47%	0.39 to 0.73	p<0.00001
Filtration (6)	0.37	63%	0.28 to 0.49	p=0.56
Chlorination (16)	0.63	37%	0.52 to 0.75	p<0.00001
Solar Disinfection (2)	0.69	31%	0.63 to 0.74	p=0.73
Flocc/Disinfection (7)	0.48	52%	0.20 to 1.16	p<0.0001
Flocc/Disinf (ex Doocy)	0.69	31%	0.58 to 0.82	p=0.08
Improved Storage (1)	0.79	21%	0.61 to 1.03	n.a.

*Note that in a test for heterogeneity, a low p-value (eg <0.10) suggests an actual underlying difference in effect between studies that is unlikely to be attributable to chance.

Low cost options for almost all problems

Improve water Quality

- HWTs, Ugrading hand dug wells,..

Increase water Quantity

- 3R, Recharge, Retention, Reuse
- Hand drilling, locally produced pumps,..

Problem
Bacteria in wells, irrigation canals?

Disinfection or filter = safe water

Arsenicum, Pesticides, … ?

Rainwater + HWT = safe water

Increase water quantity?

Hand drilled boreholes + low cost handpumps = more water

Before

After

Improved water source? (MDG 7)

Well cover + pump = Improved water source

2- 5 mln open wells in Subsaharan Africa !

Economic benefit. Rope pump

Nicaragua

Cost **US$ 1 mln aid**, in capacity building

Benefit **US$ 100 mln** increase GNP in 12 yrs

Family with a pump earn 220 $/yr more than families without a pump. (Inv. 5000 fam. Icidri/ICCO)

Zimbabwe; 1 pump = 80 people food all year

Zambia; Rope pumps generate 100 – 400 $/ yr

Actions Governments, NGOs ?

Create awareness!

- **Social marketing.** Hygiëne & Safe water = money. Filter paid back in 3 months
- **People first.** More product choices
- **No gifts.** Use subsidies for supply chains
- **Demonstrate new options.** Smart centres
- **Train local private sector.**

SMART Centre

- **Demonstration**; Focus on low cost options
- **Training**: Production,O&M, marketing, ..

Hands-on training

Workshops trained in rope pumps

i WASH program Winrock. Tanzania Funded by US aid

SMART centre
Tanzania

- 20 trainers trained from 6 countries
- 12 private pumpproducers, welldrillers
- 4000 rope pumps, 3500 wells upgraded, 400 boreholes, 15.000 water filters
- Cost reduction water, 40$ to 15$/person

Information on 3R

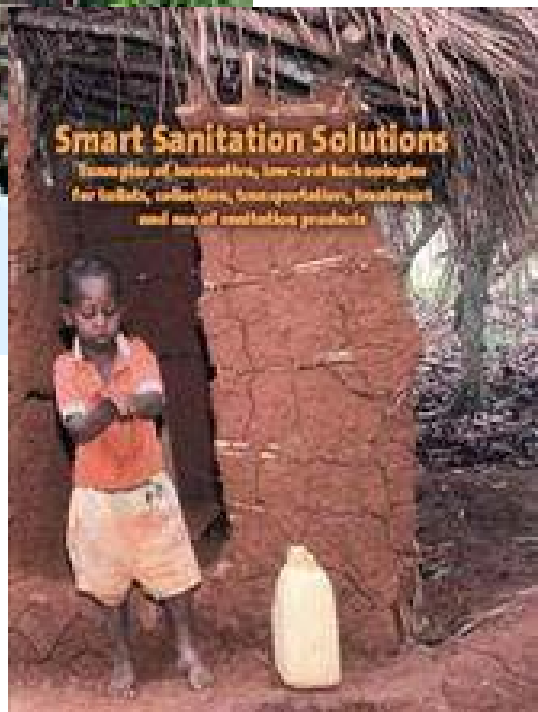
- Recharge
- Retention
- Reuse

www.bebuffered.com

Publications

Smart series on

- Water
- Sanitation
- Water harvesting
- Hygiëne
- Disinfection
- Financing



Download www.NWP.nl
or www.300in6.org
Hard copies www.kitpublishers.nl

Ideas on scaling up & business development ?

www.300in6.org

Safe water for 300 million people in 6 year with HWTS and safe water delivery systems

Info on low cost WASH options

www.AKVO.org Wikipedia water & sanitation

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Questions?

Thanks!

- Materials will be available on http://webinar.thewaterchannel.tv
- Evaluation survey available in your webinar account
- Questions to the speaker: Holtslag.dapper@kpnmail.nl
- Questions to TheWaterChannel: info@thewaterchannel.tv

Next webinar: September 28
David Zetland - Agricultural Water and Water Markets

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