

SMART Centre Tanzania

Water solutions for the BOP

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Objectives of a SMART Centre

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



Spin off SMART centre Tanzania

- 20 trainers trained from 6 countries
- 12 private rope pump producers, well drillers trained
- 4000 rope pumps, 3500 wells upgraded, 400 boreholes, 15.000 water filters
- Cost reduction for water 40\$ to 15\$/p

i WASH program Tanzania

Winrock.

Funded by US aid

5 workshops trained in drilling and rope pumps



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

Propositions

- 1 To reduce poverty (MDG 1), it is more cost- effective to invest in self supply than communal water supply**
- 2 To reduce water borne diseases it is more cost- effective to invest in point of use treatment than in centralised piped systems**

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



Upgrading hand dug wells

Cover + pump = Improved water source.
(MDG 7)

2 Million open
wells in Africa



Hand drilling of boreholes

- 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**
Local 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 / m³
- Volumes
1 – 50 m³
- Other options
Emas tank
Plastic liners



Groundwater recharge

Tube recharge

- Made by families
- Cap. 10-100m³
- Cost 5 - 10 \$
- Other options
Vetiver, Spate
irrigation



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

Irrigation of tomatoes + Domestic use for 10 families
(Payback 6 months)



Hygiëne Tippy Tap, Wash bottle

Families copy it (after critical mass)

Educational for schools



Sanitation

- Urine Separation
- Urine as fertiliser, 5 x the phosphate of feces
- Family food prod.
- Cost; 2/3 bag of cement



1^e, Safe water at point of use

- Re-contamination betw. source & use
- 50% hospitalbeds due to unsafe water,..
- Most cost-effective action to reduce poverty



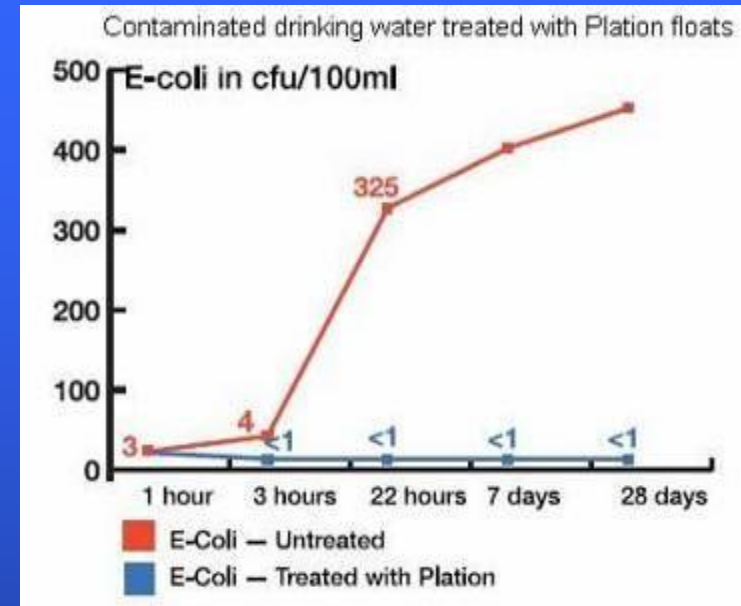
New disinfection options

Aquatabs, PUR , Watasol



Silverdyne, Plation Safe storage

- 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	Red	Red	Green	Green	Green	Red
Filtering	Yellow	Red	Yellow	Yellow	Yellow	Red
Chemicals	Red	Red	Green	Green	Yellow	Red
Combined Chemical (PUR)	Green	Green	Green	Green	Green	Yellow
UV	Red	Red	Green	Green	Green	Red
SODIS	Red	Red	Green	Green	Green	Red

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, Retention, Recharge, Reuse
- Hand drilling, locally produced pumps

Problem

Bacteria in wells, irrigation canals?

Disinfection or filter = safe water



Arsenicum, Fluoride, Pesticides, ... ?

Rainwater + HWT = safe water



Increase water quantity?

Low cost boreholes & pumps

Before

After



Economic benefit, Rope pump

Nicaragua

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

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

Family with a pump 220 \$/ year more than families without a pump. (Invest. 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. Hygiene & Safe water = money. Filter paid in 3 months**
- **People first. More products, more choices**
- **No gifts. Use subsidies for supply chains**
- **Poor families need payment options**
- **Capacity building, Smart centres**

Hands-on training

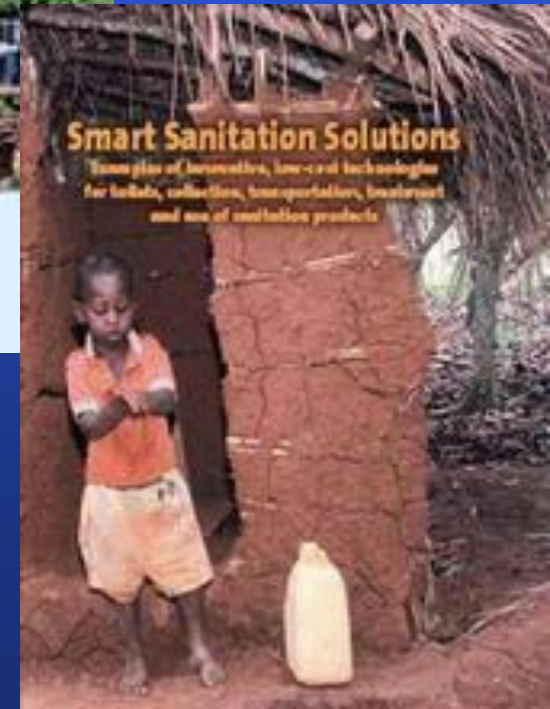


Information

Smart series on

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

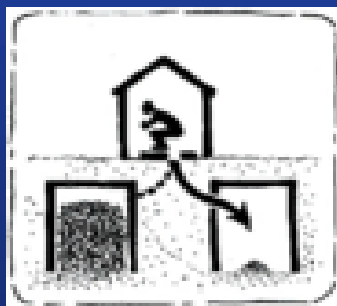
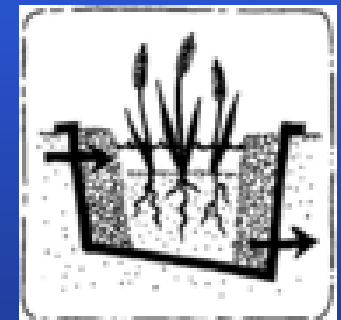
www.NWP.nl



Wikipedia for water & sanitation

www.AKVO.org

www.thewaterchannel.org



With Smart Solutions, more water, less poverty



Connect International

A non profit organization

Mission

- Community development with Smart concept (Smart techs and Innovative survey and monitoring.)

Services

- Hands on training in Smart Techs, Survey, Monitoring
- Adaptation of Smart techs to local situation
- Creation of Smart tech centres

Strategy

- Cooperation with government, NGOs and private sector
- Awareness creation, networking in water platforms

Where

- Ghana, Guinea b. Tanzania, Zambia, Malawi, Mozambique, Zimbabwe, .
- Nicaragua, El Salvador, Columbia
- India, Vietnam, Philipines