



The
SMART
Centre
Group

Training course Low cost water technologies for Self-supply and households

Location: Aqua Clara, 25 km east of Kisii, Kenya. <https://www.aquaclarakenya.com/>

Dates: Training course 1; Tuesday 3 to Friday 14 May Main training
Training course 2; Monday 16 to Friday 20 May Extra week EMAS drilling
Demonstration day; Monday 16 May, 2.00 – 4.30 PM

Target group: Training course 1 and 2: Well drillers, welders, masons, entrepreneurs
Demonstration day: WASH program officers of NGOs, governments officers and others interested in water related SDGs like poverty, food security and employment.

Fees; Training course 1; 400 US\$ or equal in Ksh.
Training course 2: 100 US\$ or equal in Ksh
Demonstration day; Free admission

More info; www.smartcentregroup.com Interested? mail to info@smartcentregroup.com

Context

Recently a World Bank blog mentioned the study "*The rising tide*" indicating that women and girls in Sub Saharan Africa spend 40 billion hours per year on collecting water.

<https://blogs.worldbank.org/water/women-and-jobs-water>.

One option to reduce the time to collect water is having a well at or near the house.

There are affordable options for small communities and households, for example EMAS technologies. In Bolivia over 70.000 household wells of 20 to 50 m deep were drilled commercially with an EMAS drill at a cost of \$200 to \$500 (including pump). Other low cost well drilling options are SHIPO (rotary) jetting, and Mzuzu drill. Low cost pumps include, EMAS, rope and ZL small solar pumps. Rainwater storage options include the EMAS underground and wire brick cement tanks. Options for groundwater recharge at the household level include the Tube recharge. For water treatment there is a range of household water filters and for sanitation there are Satopans.

If cost of water and sanitation technologies reduce they are increasingly fit for Self-supply, so families or groups of families, funding part or 100% of their own water supply. The recently published book "Self-Supply"¹ indicates that over 1 billion people world-wide have Self-supply and an estimated 80% of all Self-supply systems are wells. Scaling up water at the household level has much potential to help in reaching Sustainable Development Goals for water, poverty and food.

The training course in Kenya will include a demonstration of a range of improved or new (proven) affordable technologies for wells, hand and solar pumps and household water filters. The training course is hosted by the organization Aqua Clara with support and trainers with long term experience in low cost technologies including Wolfgang Buchner and Jaime Perez of the EMAS foundation and Henk Holtslag of the SMART Centre Group. A similar training on low cost water technologies was held in Malawi in 2021. See <https://smartcentregroup.com/>.

¹ Buy or download from; <https://practicalactionpublishing.com/book/2530/self-supply>

Training content



Premises of Aqua Clara Kisii where the trainings will take place



Picture of training in EMAS drilling in Malawi, May 2021

Training course 1

Modules:

1. Wells Hydro geology, Hand dug, Hand drilled wells
2. Pumps Focus on locally produced pumps, solar pumps
3. Storage Recharging groundwater, Storage tanks
4. Treatment Household water filters. Table top models. diatom and membrane filters
5. Sanitation Different latrines, Satopan

Hands on training in;

- Basic technologies for site selection for wells
- Production of drilling tools for EMAS drilling
- Drilling wells with the EMAS drilling technology.
- Production, installation, maintenance of EMAS pumps
- Making of EMAS underground storage tanks

Information on, and limited production of technologies like;

- Drilling with SHIPO (jetting, percussion) and Mzuzu drill (augering, bailing)
- Hand pumps for Self-supply incl. Rope pump models 2, 4,
- Solar pumps models ZL Cost range 100 - 500 US\$
- Wire brick cement tanks, Calabash tanks, groundwater Tube recharge system.
- Assembly and maintenance of household water filters
- Demo of SaTopan latrines

General information on;

- State of art on Self-supply, focus on Africa, examples of social and economic impact
- Concerns on Self-supply (water quality, depletion of ground water, etc.) discussion
- Experiences with option to support and scale Self-supply in a sustainable way
- The SMART approach, the combination of Market-based, Affordable, Technologies and approaches like Family Based Management, supported Self-supply, Faith & Water.
- Discuss if and how to apply and support Self-supply in your situation.

Training course 2

In this week a well will be drilled with the EMAS drill and a pump installed in a real situation at a family near Aqua Clara.

Examples of technologies fit for self-supply and households

Rainwater can be collected from roofs in storage tanks like **Calabash**, **wire-brick** or **plastic** storage tanks. Rainwater from run off on the ground can be collected in **EMAS underground tanks**.

Household level options to store rainwater in the ground include the **Tube recharge** which can yearly store 50 to 200 cubic metres of rainwater in the ground. Material cost 20US\$.

In areas without rocks, wells can be dug by hand or with manual drilling. For example **EMAS drilling** can drill as deep as 60 metres deep or more and cost 8 to 12 US\$/meter so a tube well of 20 m deep cost around 200 US\$ including casing and pump and with labor of users. Options like the **SHIPO drill** go to 45 meter deep and **Mzuzu drill** to 20 metres, both drill through stony layers. The Mzuzu drill is relatively simple and with 1 skilled driller, families themselves can drill the well.

EMAS pumps have a total head of 40 meters and can pump up to overhead tanks. **Rope pumps** can pump from wells to 35 m deep and give a high pump volume so fit for small scale irrigation. New **solar pumps** of 40 to 100 Watt fit in tube wells (boreholes) of 2 to 4 inch and cost 30 to 80 US\$ excl. panel. For water treatment at the household there are a range of **Table top filters** with **ceramic** and **membrane filter elements** and for sanitation there are **SaTopan latrines**. Almost all options mentioned above can be produced or assembled with materials that are available in every country so knowledge and spares are available and affordable for maintenance.

EMAS and SMART Centres

Both are training centres who train technicians in production of drill sets, pumps and the technologies complement each other. Entrepreneurs selling SMARTechs are trained in both technical and business skills. There are now EMAS Centres in Bolivia, Sierra Leone and Senegal and SMART Centres in Tanzania, Zambia, Malawi, Mozambique, Ghana and Nicaragua and starting in Ethiopia, Kenya, South Sudan and Niger. Results of these training centres include 100.000 wells drilled manually and over 100.000 EMAS pumps and 20.000 Rope pumps installed. Costs of a Tube well and hand pump with these options range from \$150 to \$1200 depending on depth, soil, and diameter of casing. Over 60% of the rope and EMAS pumps are paid for by families (Self-supply)

Information EMAS see: https://www.emas-international.de/images/weltweit/Fieldnote_2013-04_01.pdf

Information of SMART Centres in Tanzania, Malawi and Zambia are www.smartcentretanzania.com, www.smartcentremalawi.com and www.smartcentrezambia.com

Pictures of technologies fit for Self-supply and households



EMAS drill



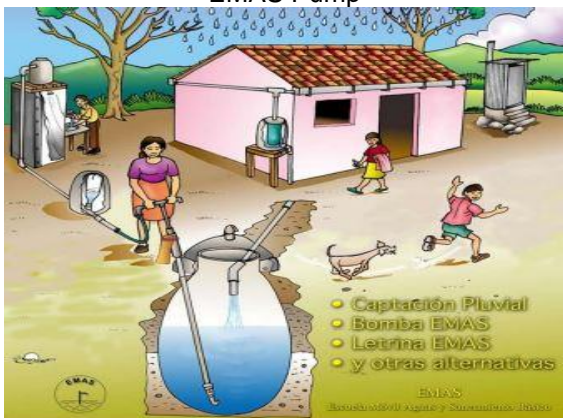
Mzuzu drilling



EMAS Pump



Rope pump model 4



EMAS underground tank



Solar pumps

Information on other affordable technologies, manuals for production and installation and a SMARTech catalogue see:

www.smartcentregroup.com