



**CCAP SMART Centre**



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**SMART Centre**  
**Malawi**  
Member of the SMART Centre Group

## **Short course on Self-supply Technologies**

**When: Monday 8 June – Friday 12 June 2020**

**Where: SMART Centre, Luwinga, Mzuzu**

The CCAP SMART Centre Malawi, in collaboration with the SMART Centre Group, is organizing a short course for low-cost Water and Sanitation technologies with a focus on self-supply. The training is for WASH advisors of NGOs, Government Officials and those with general interest in learning more about technologies and approaches that can help to reach SDG 6 and other water related SDGs like poverty, food security & employment. The focus will be on solutions for households, farmers and small communities.

The objectives of the training are:

1. Create awareness on **SMARTechs**.  
Simple, Market-based, Affordable, Repairable Technologies for Water and Sanitation.
2. Create awareness on the existence and experiences of innovative approaches like **supported Self-supply, Well clubs & Faith & water** that can help in rural development.
3. Discuss ideas on how to **scale supply chains** of low-cost water technologies, which are applicable for families, small scale irrigation and communal supply in remote rural communities.

### **Context**

In many areas within Malawi there are shallow water layers of 35 meters or less where it is possible to drill wells and pump up water with SMARTechs. Examples are manual drilling like SHIPO drill (a combination of sludging, jetting and percussion), the Mzuzu drill, (combination of augering and bailing) or the EMAS drill (manual jetting). Other options are Rope, EMAS, Canzee or Mark 5 pumps, wire brick and EMAS underground storage tanks, tube recharge systems to recharge groundwater and avoid that wells run dry, household water filters, SaTo latrines and more. Most options can be produced with materials available within Malawi so knowledge and spares are available and affordable to maintain the pumps.



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SMART Centres train artisans and technicians in production of drill sets and production and maintenance of pumps and other technologies. They provide entrepreneurs with business skills to start selling SMARTechs. SMART Centres in countries like Tanzania, Zambia, Malawi and Mozambique resulted in 5000+ wells drilled manually and over 13.000 Rope pumps installed. Costs of a tube well and hand pump with these options range from 150 US\$ to 1500 US\$ depending on depth, soil, and diameter of casing. Over 50% of the Rope pumps are paid for by families (Self-supply) For examples, see [www.smartcentrezambia.com](http://www.smartcentrezambia.com).

## Training

The training will be given by specialists with 5 to 30 years of experience in rural water supply including Mr. Mzumala who has drilled over 300 wells and Henk Holtslag, senior advisor of the SMART Centre Group. The training will include the demonstration of the technologies like the SHIPO, Mzuzu and EMAS drilling, a range of 8 different hand pumps and solar pumps, household water filters, latrines and the production of the some parts.

### The training contains 5 Modules:

- |               |   |
|---------------|---|
| 1. Wells      | Hydro geology, Hand dug, Hand drilled wells.                    |
| 2. Pumps      | Rope and EMAS pump, Canzee and Mark 5 Pump, solar pumps.        |
| 3. Storage    | Recharging groundwater, Aquifers, Tube recharge, Storage tanks. |
| 4. Treatment  | Household level, Chlorine, Filters (Table top, Membrane).       |
| 5. Sanitation | Corbelled latrines, Satopan.                                    |

*\*More information see annex 1*

### Training fees

180.000 MK per person.

Fees include :

- Training by international trainers.
- Manuals, hard and soft copy.
- Small tools like trumpet tool and socket tool.
- Tea breaks and lunch.
- Transport from training centre to eventual drilling site and field trip.

*\*Participants are responsible for their own accommodation and transport*

Please note that the number of trainees is limited to 15.



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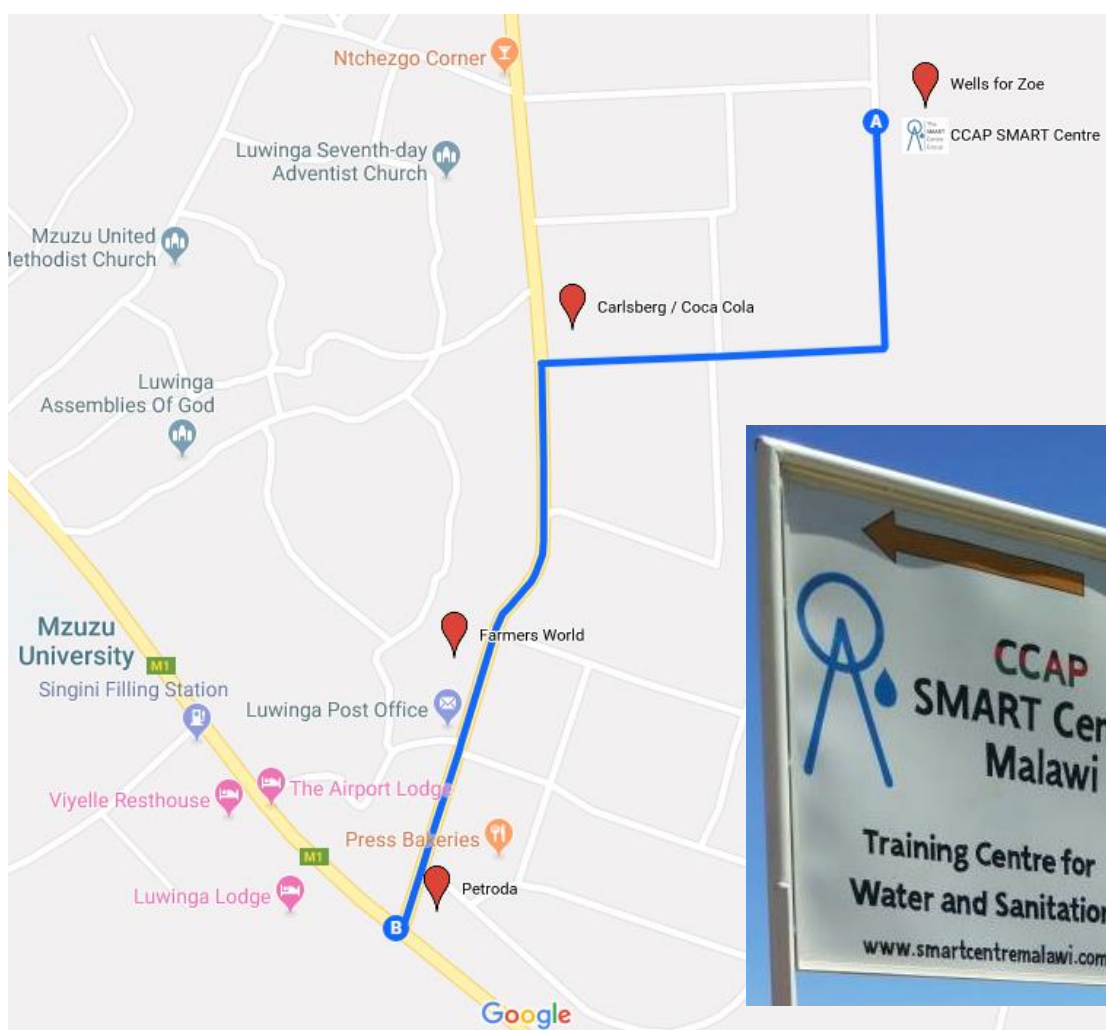
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### Location CCAP SMART Centre, Mzuzu

**Coming from Mzuzu city:** take the M1 passing the airport, turn right at the Petroda towards Luwinga/Area 1B. Just before the Carlsberg site, take the dirt road to the right. At the T-junction, go to the left and you will find the SMART Centre at the right side of the road after  $\pm 300$  meter.

**Coming from Ekwendeni:** turn left at the Petroda towards Luwinga/Area 1B. Just before the Carlsberg site, take the dirt road to the right. At the T-junction, go to the left and you will find the SMART Centre at the right side of the road after  $\pm 300$  meter.

*From Petroda onwards you can also follow the sign-posts.*





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## Information

Please address all questions or remarks to:

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Information on SMARTechs: [www.smartcentremalawi.com](http://www.smartcentremalawi.com) [www.smartcentregroup.com](http://www.smartcentregroup.com)

# Annex 1. Content short course

## Introduction

Objective of the course

Introduction of participants, organizations

What are your WaSH experiences? What do you expect?

## SMARTechs modules

**Module 1 Wells**      Hand dug, Hand drilled.

**Module 2 Pumps**      Rope and EMAS pumps, Canzee and Mark 5 pumps, treadle pump, several medium and small solar pumps.

**Module 3 Storage**      Wire brick cement tank, EMAS Underground tank, Storing in the ground with tube recharge direct and indirect version.

**Module 4 Treatment**      Household level. Boiling, Chlorine, Filters (Table top, Membrane)

**Module 5 Sanitation**      Corbelled latrines, Satopan, pedestals (equal access).



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## **Module 1 WELLS**

### **Hydrogeology / Site selections**

Basic information on water cycle, rain infiltration, geology, aquifers confined, unconfined, artesian well.

Site selection. Water depth. Distance from latrines.

### **Hand-dug wells & upgrading existing wells**

Top: well ring for soft soils, hard soils.

Bottom: to make a well deeper with underlining / bailer.

Finish well, pump installation, well cover, well slab, soak pit.

### **Hand drilled wells**

Differences, pros and cons of options like Rotary Jetting, SHIPO Drill, Mzuzu Drill, Village Drill.

### **Fabrication: Mzuzu drill**

1. Basic workshop knowledge. Workbench height, how to mount a vice, cutting, filing, drilling, grind a drill, weld mild steel, weld cast steel. Different types of materials, PVC pipes, steel pipes, galvanized sheet steel.
2. Fabrication of Mzuzu drill set – stone punch, core auger, spiral auger, drill pipes, couplings.

### **Drilling. SHIPO drill. Mzuzu drill, EMAS drill**

Installation of tripod, start hole, settling pits, preparing of drilling fluid.

1. Drilling and keep drilling log
2. Preparing casing, installing casing, backwashing
3. Test of well, Installation of Pump, well sealing, well slab, soak pit
4. Prepare site etc. see manual



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## Module 2 PUMPS

### Introduction to pumps

Rope pumps, piston pumps like Afridev, EMAS pumps & solar pumps.

### Rope pumps Theory

1. Differences between Piston pumps and Rope pumps, (Scale model).
2. Basic information on history and actual situation Rope pumps.
3. Explication different Rope pump SHIPO model 2 (for handdug wells and boreholes), SHIPO Rope pump model 4 (for boreholes).

### Rope pumps. EMAS pumps. Fabrication Depending on available time

1. Construction of PVC parts of the EMAS pump
2. Construction of parts for Rope pump Wheel, bushings, pump structure, guidebox
3. Construction of **socket tool** and **trumpet tool** for different pipe diameters, punch for pistons different sizes, exercise, guide boxes
4. Most frequent problems
5. Checklist quality control

### Installation

1. Pump structure, alignment, Wheel, tubing, guide box, making of slab or well cover
2. Most frequent problems

### Operation/ maintenance / repairs

1. Daily maintenance, weekly maintenance aspects
2. Most frequent problems



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### Module 3 STORAGE

1. Information on wire-brick cement and EMAS storage tanks
2. Practical training on how to make a Tube recharge system. A system that can avoid that wells dry up. Vertical and horizontal model

### Module 4 SANITATION

1. Corbelled latrine. Zero cement latrine (Information on construction)
2. Satopan. Demonstration and information on building it into a Concrete latrine slab

### Module 5 HWTS (Household Water Treatment and Safe storage)

1. Different types of contamination
2. Treatment options; Boiling, Chlorine, Filters
3. Demonstration of use and maintenance of Table top water filters

### DAILY SCHEDULE

Days	Activities
<u>Monday</u> 08.00- 12.30 13.30- 16.30	Expectations and getting to know each other. Introduction of the organising organisations. Introduction to SMARTechs. Practice.
<u>Tuesday to Friday</u> 08.00 – 08.30	Experiences former day, lessons learned, questions
8.30- 9.15	Theory on topics (For example: hydrogeology, drilling, pumps, HWTS)
9.15 - 12.30	Practice (For example: fabrication of SMARTechs, drilling)
12.30 - 13.30	Lunch.
13.30 - 16.30	Practice. Fabrication / use of SMARTechs, Drilling, pumps etc.