RWSN Webinars - 2014

Rainwater Harvesting – Groundwater Research – Water Point Mapping

Every Tuesday from 23rd Sept to 9th Dec 2014

Register on: http://www.rural-water-supply.net/en/projekts/details/79

RWSN uses Cisco Webex webinar software please contact us at ruralwater@skat.ch address above if you need help on getting connected

15:30 – 17:00 (Central European Summer Time)
09:30 – 11:00 (Eastern Daylight Time, US)
19:00 – 20:30 (India Standard Time)
Webinar 5 – Groundwater Research
21st October 2014

Groundwater Recharge

- **African groundwater recharge: will the pumps run dry?** - Alan MacDonald, British Geological Survey, UK

- **Rural Roads for Groundwater Recharge** - Kifle Woldearegay, Mekelle University, Ethiopia & Frank Steenbergen – MetaMeta, Netherlands

- **Discussant** — Richard Taylor, University College London, UK
Groundwater Recharge: will the pumps run dry?

Alan MacDonald, Tamiru Abiye, Helen Bonsor, George Darling, Mike Edmunds, Guillame Favreau, Ibrahim Goni, Seifu Kebede, Bridget Scanlon, Richard Taylor, Moshood Tijani, Roger Calow, Vinny Casey
Why worry about recharge?
Recharge measurement methods

Physical methods – changes in the water table

stable isotopes, CFC, SF6, tritium

Chloride – diffuse recharge

Modelling methods – measure rainfall etc..

Penman

Direct soil physics measurements

Water balance methods, base flow analysis
Rainfall – highly variable

Annual rainfall (mm)
mean 1951 - 2000

- < 100
- 100 - 250
- 250 - 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2500

Sahel Rainfall

© NERC All rights reserved
Continental recharge models...

WaterGap (Döll et al. 2008)
ZOODRM (Mackay et al. 2014)
Collation of recharge studies

- > 200 studies
- Systematic review of studies
- different techniques and methods
Overview

- General direct relationship
- Non linear below approximately 750 mm
- Importance of intensity and episodic recharge
- Critical role of land use – natural & agriculture
- Hand pumps generally sustainable (<10 mm)

BUT – need to be careful of bias in techniques
Makutapora wellfield

Recharge is indirect and episodic
West African transect

Shallow GW 30 – 60 years
In Mali rainfall 400 mm
Mean annual Recharge 20 - 40 mm
other examples with negligible recharge
Potential recharge – humid Nigeria

High permeable laterite intercepts recharge
Rainfall infiltrates 3 m, then flows laterally
Some evidence from satellites: GRACE

Source Bonsor et al. - submitted
Summary

Hand pumps generally OK – but quickly unsustainable with higher yields

We need observations of gw recharge to validate models, understand processes

Collated >200 studies across Africa

Evidence of non-linearity < 700 mm

Must be careful of bias of methodologies

Now proposing a network of observatories to better measure groundwater recharge
Unlocking the Potential of Groundwater for the poor

RWSN’s Groundwater Community: https://dgroups.org/RWSN/groundwater

upgro.org