Developing and Using Groundwater

Richard C Carter, Abidjan 2nd Dec 2016
Out of all the liquid fresh water on earth, what percentage is groundwater?

About 96%
A game with clear goals, a game of two halves…
Today’s goals

Helping you develop more sustainable groundwater-based water supply services

• **In the first half** you will better understand what information you need, where to find it, what it can tell you, and how to contribute to it

• **In the second half** you will better appreciate how to use groundwater information in the design and implementation of borehole and pumping solutions
Water supply services must be

• accessible
• convenient
• sufficient in quantity
• of adequate quality
• affordable
• manageable
<table>
<thead>
<tr>
<th>Groundwater information must be useful too</th>
</tr>
</thead>
<tbody>
<tr>
<td>accessible</td>
</tr>
<tr>
<td>convenient</td>
</tr>
<tr>
<td>sufficient in quantity</td>
</tr>
<tr>
<td>of adequate quality</td>
</tr>
<tr>
<td>affordable</td>
</tr>
<tr>
<td>manageable</td>
</tr>
</tbody>
</table>
Siting, designing and constructing boreholes – data requirements

Siting

• Geology and hydrogeology of the area
• Effective siting procedures used in the past
• Likelihood of drilling success with and without scientific siting
Siting, designing and constructing boreholes – data requirements

**Design**

- Likely thickness / depth of formations
- Depth to first and subsequent water strikes
- Rest water level
- Aquifer properties
- Recharge seasons and rates of recharge
Siting, designing and constructing boreholes – data requirements

Construction (supervision)

• Drilling equipment and consumables
• Rates of drilling
• Depths of formation changes
• Water strikes
• Completion details
• Test pumping records
• Water quality tests and samples
The ‘beautiful game’ is played at many levels
... as with groundwater data and information
National archives of maps and borehole records assist in siting and design.

Reports of siting, drilling, test pumping and water quality inform national databases.

Local

International

National
Locally acquired data may directly feed international databases and information archives.

Internationally published maps, summaries and databases help fill gaps in national information sources.
International cooperation supports creation of national databases

National archives of groundwater data feed international databases
Locally acquired data may directly feed international databases and information archives. Reports of siting, drilling, test pumping and water quality inform national databases. National archives of maps and borehole records assist in siting and design. Internationally published maps, summaries and databases help fill gaps in national information sources. International cooperation supports creation of national databases. Research programmes such as Unlocking the Potential of Groundwater for the Poor.
Today’s “beautiful game” is about helping you “do” groundwater better
Asking the right questions

- What data and information do I need?
- Where can I find data and information?
- If there are gaps in the available data, what is my role in helping to fill those gaps?

This morning’s “first half” focuses on data and information
Asking the right questions

How can I best use the available data and information, especially in regard to borehole design and solar pump specification?

This afternoon’s “second half” focuses on the use of data to improve designs and specifications
But before we go on ... who are you?

What kind of job do you have?

• in national Government?
• in local Government?
• in academia or training institution?
• in an NGO?
• in the private sector?
• other?
Do you work in groundwater development?

- Do you site boreholes?
- Do you design boreholes?
- Do you supervise construction?
- Do you specify pumps?
And finally ...

When you seek groundwater information, are you satisfied with what you are able to find?

• Yes, I find almost everything I need
• I sometimes find some of what I need
• I almost always fail to find what I need
• I’ve given up looking as I know it’s not there