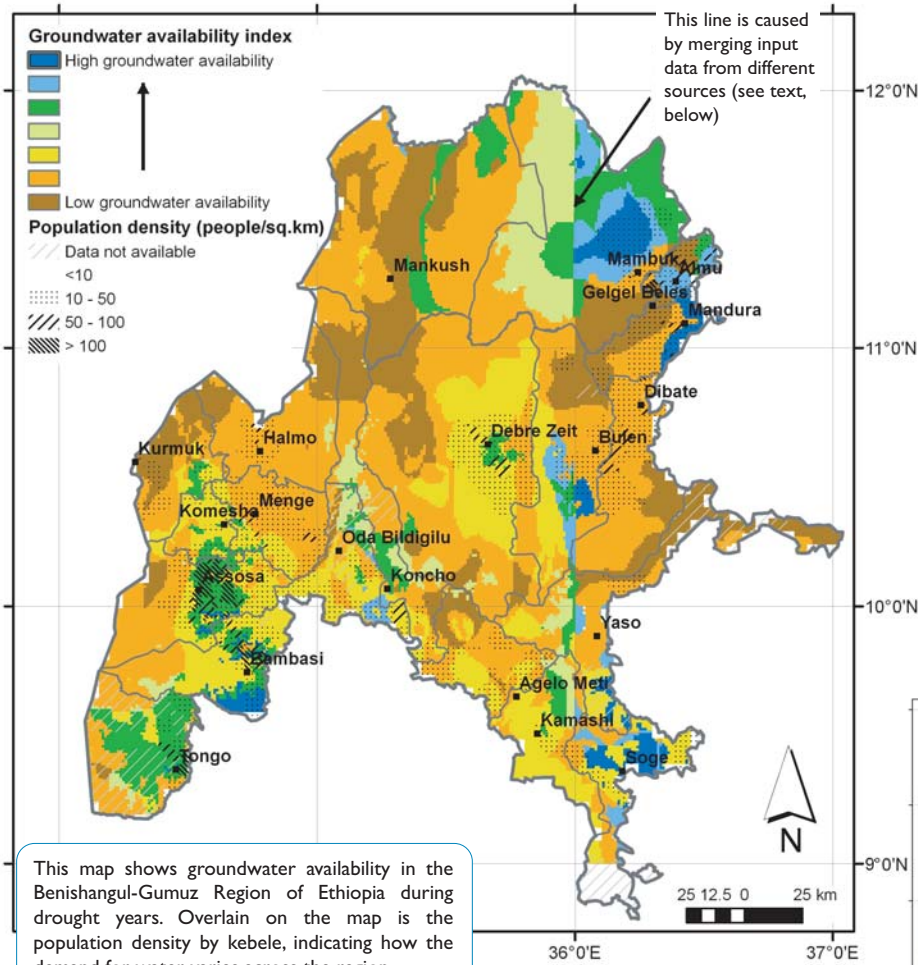


Groundwater availability in Benishangul-Gumuz region, Ethiopia



This map shows groundwater availability in the Benishangul-Gumuz Region of Ethiopia during drought years. Overlain on the map is the population density by kebele, indicating how the demand for water varies across the region.

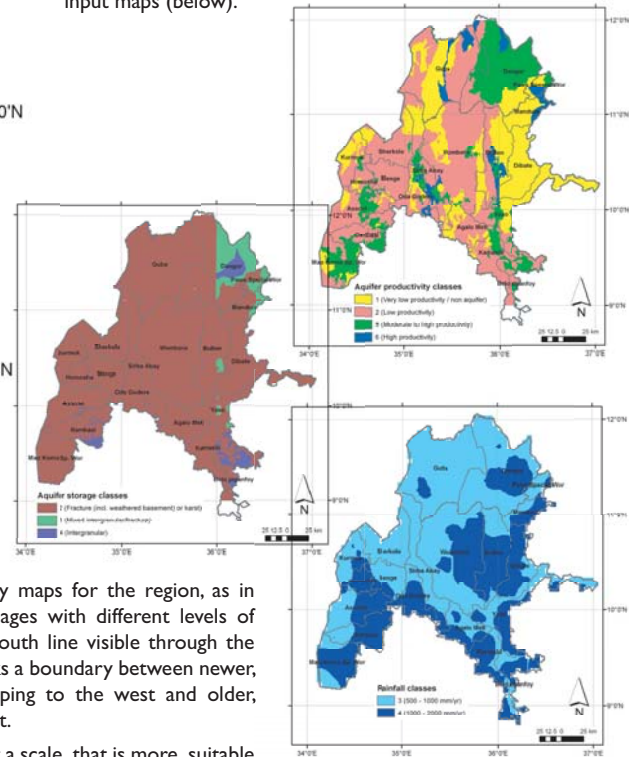
Groundwater availability is ranked from low to high, based on the combined weighting of three input factors.

Creating the map

The groundwater availability map combines three factors: aquifer productivity and aquifer storage capacity (from published Ethiopian hydrogeological and geological maps), and rainfall, used as a proxy for groundwater recharge (from a 3 minute monthly climate grid for Africa for 1951–1995). The rainfall data were weighted to take account of annual variability and to represent drought years, by calculating the average rainfall for 1951–95 and subtracting the coefficient of variance of rainfall over this time.

Aquifers with high productivity, high storage and high recharge have most groundwater available during dry seasons and drought.

Each of the three factors was divided into classes and the classes weighted according to their relevant importance in controlling groundwater availability. The classes and weights are shown in the input maps (below).



Input data

The geology and hydrogeology maps for the region, as in many places, are of different ages with different levels of detail. Particularly, the north-south line visible through the map at the 36°E meridian marks a boundary between newer, more detailed geological mapping to the west and older, poorer quality maps to the east.

The available rainfall data are at a scale that is more suitable for describing spatial variability nationally than across the relatively small Benishangul-Gumuz region. Because of this, only two classes of rainfall are defined for the whole region. However, higher resolution data might need new rainfall data collection and would definitely need detailed rainfall modelling across the region.

Using the map

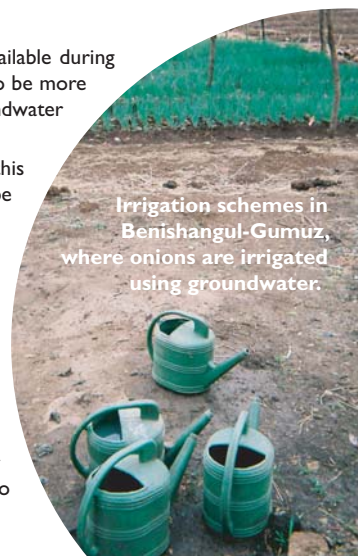
The map highlights where groundwater is more likely to be available during dry seasons and longer drought periods, and where it is likely to be more difficult to find and develop sustainable year-round groundwater supplies.

It therefore indicates areas where deeper drilled wells, such as this one developed by UNICEF in Kurmuk (photo, left corner), may be more appropriate than hand dug wells.

It also indicates where more detailed and careful investigations may be needed to site sustainable water points, by showing areas of high water demand and increased hydrogeological difficulty. It could be used to indicate where alternative solutions may be needed — such as reducing the number of households served per well, developing sand dams, or rainfall harvesting and by this help choose appropriate technologies for water supply interventions. It could also help to identify areas which might support groundwater development for community-scale irrigation schemes to improve food security.

This map is an output of the RiPPLE programme, funded by the UK Department for International Development (DFID) for the benefit of developing countries. It is part of an overall mapping component under RiPPLE. For more information:

- The RiPPLE website at <http://www.rippleethiopia.org/>
- Calow R, MacDonald A, Nicol A, Robins N and Kebede S. 2006. The struggle for water: drought, water security and rural livelihoods. British Geological Survey Commissioned Report CRJ/02/226N. NERC, Keyworth, Nottingham.
- Brigid Ó Dochartaigh at beod@bgs.ac.uk



Irrigation schemes in Benishangul-Gumuz, where onions are irrigated using groundwater.