

# To what extent does community management ensure good functionality of groundwater supplies in rural Africa?

Luke Whaley<sup>1</sup>, Donald John MacAllister<sup>2</sup>, Helen Fallas<sup>2</sup>, Evance Mwathunga<sup>3</sup>, Sembeyawo Banda<sup>3</sup>, Felece Katusiime<sup>4</sup>, Yehualaeshet Tadesse<sup>5</sup>, Frances Cleaver<sup>1</sup> and Alan MacDonald<sup>2</sup>

<sup>1</sup> The University of Sheffield, Sheffield, UK, S10 2TN <sup>2</sup> British Geological Survey, Nottingham, UK, NG12 5GG <sup>3</sup> Chancellor College, University of Malawi, Zomba, Malawi  
<sup>4</sup> Makerere University, Kampala, Uganda <sup>5</sup> Addis Ababa University, Addis Ababa, Ethiopia

## The need to improve functionality

Communal boreholes fitted with handpumps (HPBs) are likely to remain the main source of improved water supplies for decades to come in rural Africa. Understanding how the performance of these supplies can be improved will be central to achieving improved water security.

The functionality of community HPBs relies on a range of elements which include not only groundwater resource availability, correct siting and construction of the borehole and handpump mechanism, but also equitable and enabling management arrangements — **Figure 1**.

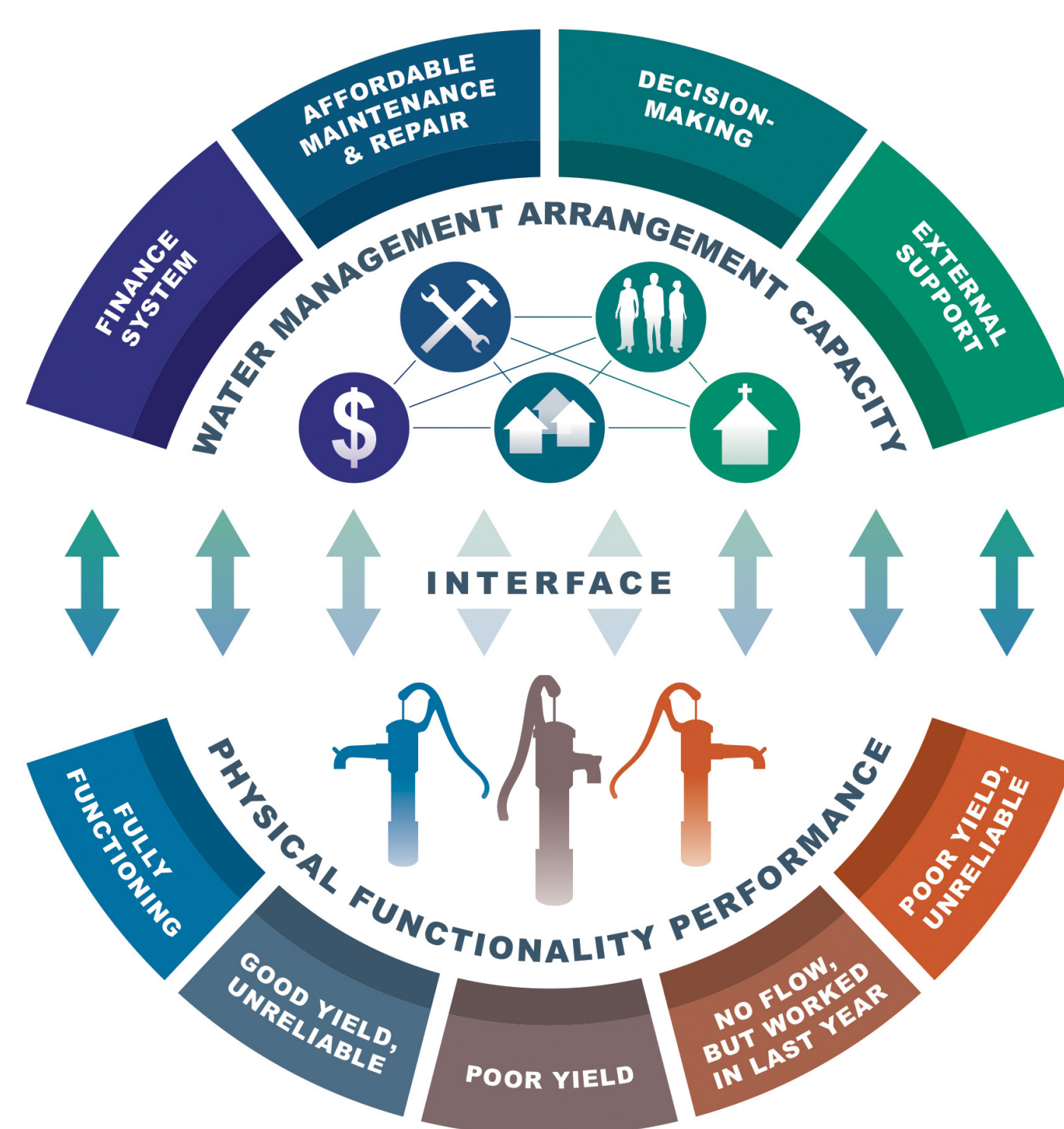


Figure 1

## The persistence of Community Based Management (CBM) policy

Since the 1980s — the first UN ‘Water Decade’ — Community Based Management (CBM) has been the policy prescription *par excellence* for operationalising participatory development in the rural water supply sector, and it remains central to many countries’ attempts to achieve the SDGs. The cornerstone of the CBM model is the creation of a local water point committee or similar community organisation, which is charged with the operation and maintenance of the borehole.

Despite its popularity and endurance, there is a relative lack of evidence on how the management capacity of communities relates to the functionality of their boreholes, and a growing recognition among development practitioners and academics that CBM of rural water supply has struggled to deliver on many of its promises.

## Method

This study uses a unique interdisciplinary dataset, collected from 600 sites, across Ethiopia, Uganda and Malawi to assess if there is evidence that CBM enables increased performance of community HPBs.

Data were collected on both the physical functionality performance of the water supplies (assessing yield and reliability), and the capacity of the community Water Management Arrangements (WMAs) according to four dimensions in a community survey: finance system; affordable maintenance and repair (M&R); decision making, rules, and leadership; and external support. A set of twenty-three questions assess the four WMA dimensions using a three-point scale.

The analysis investigated the:

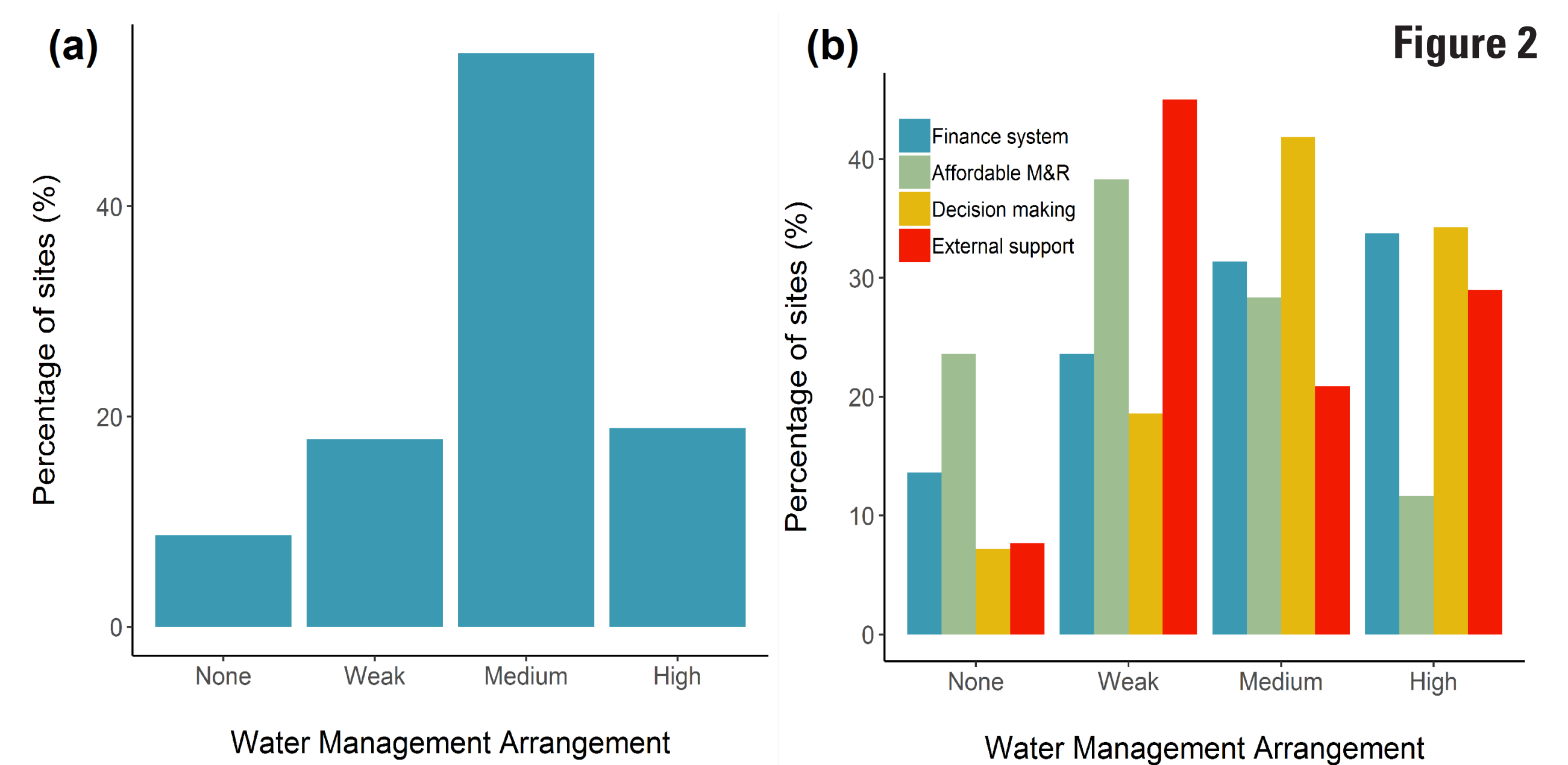
1. overall WMA capacity assessed within communities
2. the relationship between WMA capacity and the functionality of HPB water supplies
3. the influence of external factors on WMA capacity



## Results

### Overall WMA capacity assessed within communities

The majority of communities had medium capacity in WMAs (**Figure 2a**), however, when total WMA scores are broken down into the four WMA dimensions there is more variation than this aggregate picture suggests (**Figure 2b**). The strongest dimension of WMA is shown to be decision making, and the weakest dimension affordable M&R.



### Relationship between WMA capacity and HPB functionality

The results show the four WMA dimensions are a poor predictor of functionality, with no strong relationship between WMA capacity and functionality (**Figure 3a**). However, within this, affordable maintenance and repair is shown to be the most important factor (**Figure 3b**) — with knowledge of prices of spares and availability of technical skills being the best predictors of functionality within this dimension.

When examining the relationship, using length of downtime of the water point as a measure of the functionality (**Figure 3c**), the data indicate that finance system, affordable M&R, and decision making all contribute in a straightforward way to the speed at which a community repairs its borehole when it breaks down. External support becomes most relevant when the borehole has a more substantial fault that is not easily managed by the community.

### Influence of external factors on WMA

It is difficult to identify difficulty of identifying clear factors to understand the performance of CBM. Availability of alternative sources; handpump type; age of the HPB; poverty within the community; and size of population which the HPB serves, were all shown to have a weak relationship with WMA capacity.

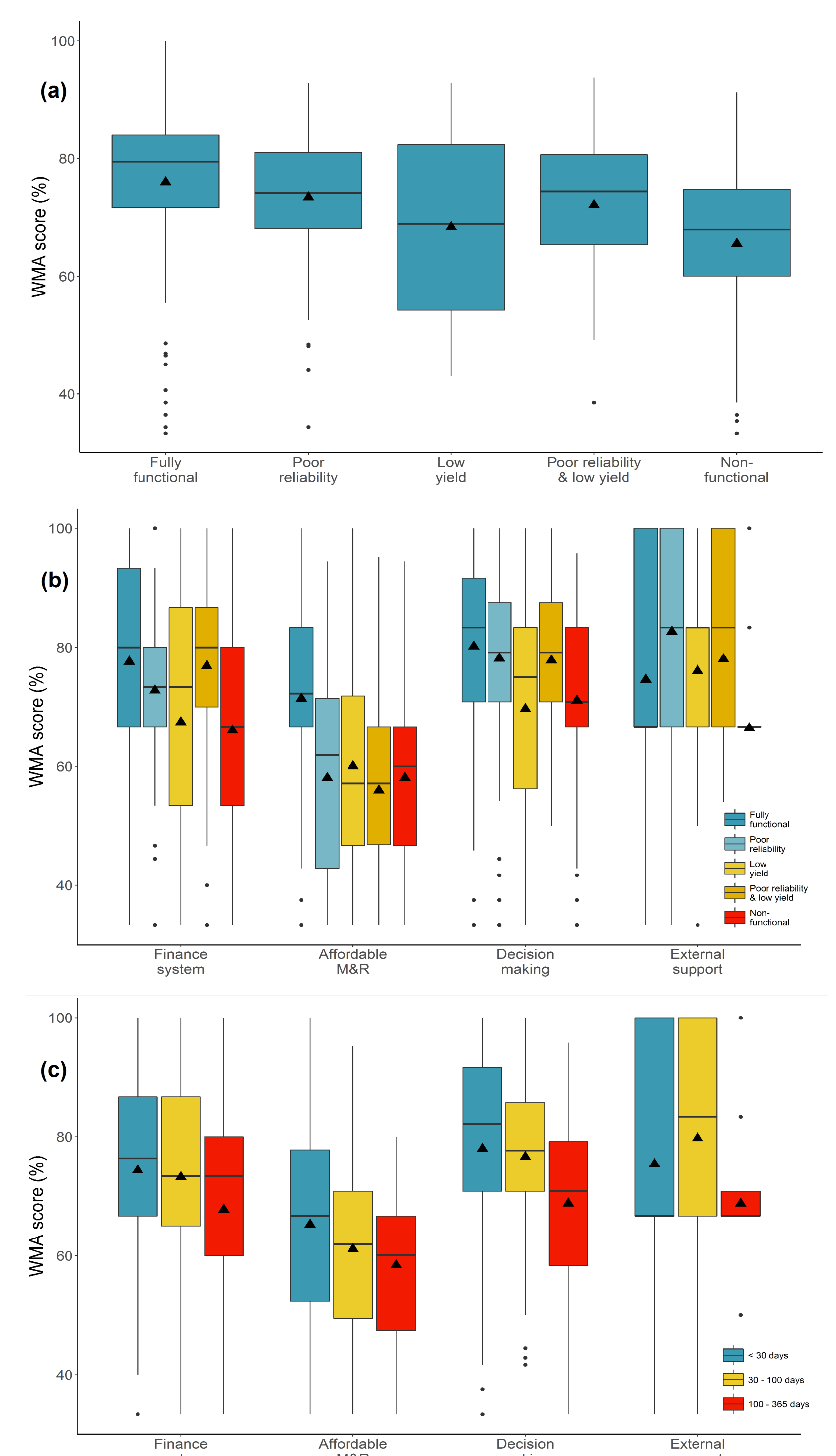


Figure 3

## Conclusions

Overall, our findings provide very limited evidence to support the policy of CBM for borehole management, whilst also revealing the nuanced and complex nature of the sociotechnical interface.

Of the four WMA dimensions examined, affordable M&R is the best predictor of borehole functionality. However, at the same time, we found affordable M&R to have the lowest capacity of all four WMA dimensions, with 61.9% of sites weak or non-existent. This suggests that in terms of achieving borehole functionality, management capacity is low where it counts the most.

The results emphasises the need for more in-depth understanding of HPB functionality, and for caution with overly simplistic and reductive approaches to understanding community borehole functionality.

## Contact information

Helen Fallas hfallas@bgs.ac.uk www.bgs.ac.uk