

Bedrock - innovative low-cost well siting kit

A smartphone-based geophysical sounding kit to select the best location to drill for water

TROUBLE FINDING WATER

Manual well drilling has enabled hundreds of African enterprises to drill high quality drinking water wells for a fraction of the conventional borehole cost. Though successful in alluvial plains, failure rates are high in areas with shallow bedrock layers. Geophysical instruments to locate such layers are available but the cost and required skills are too high to make this accessible for local enterprises. To increase the scope for manual drilling in geologically challenging zones and reduce the associated financial risk for local drilling enterprises, an innovative and affordable well siting kit has been developed. It is called Bedrock.

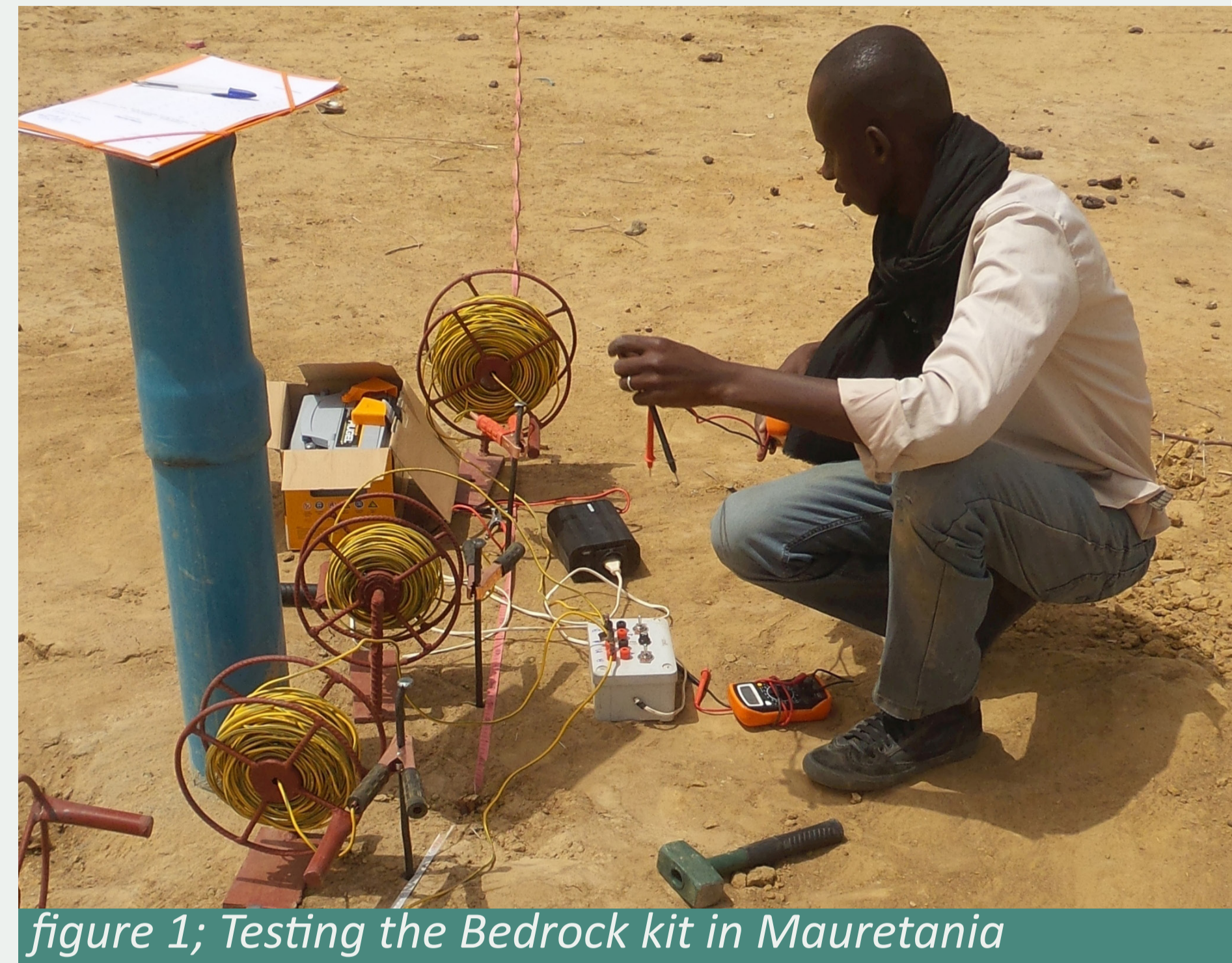


figure 1; Testing the Bedrock kit in Mauretania

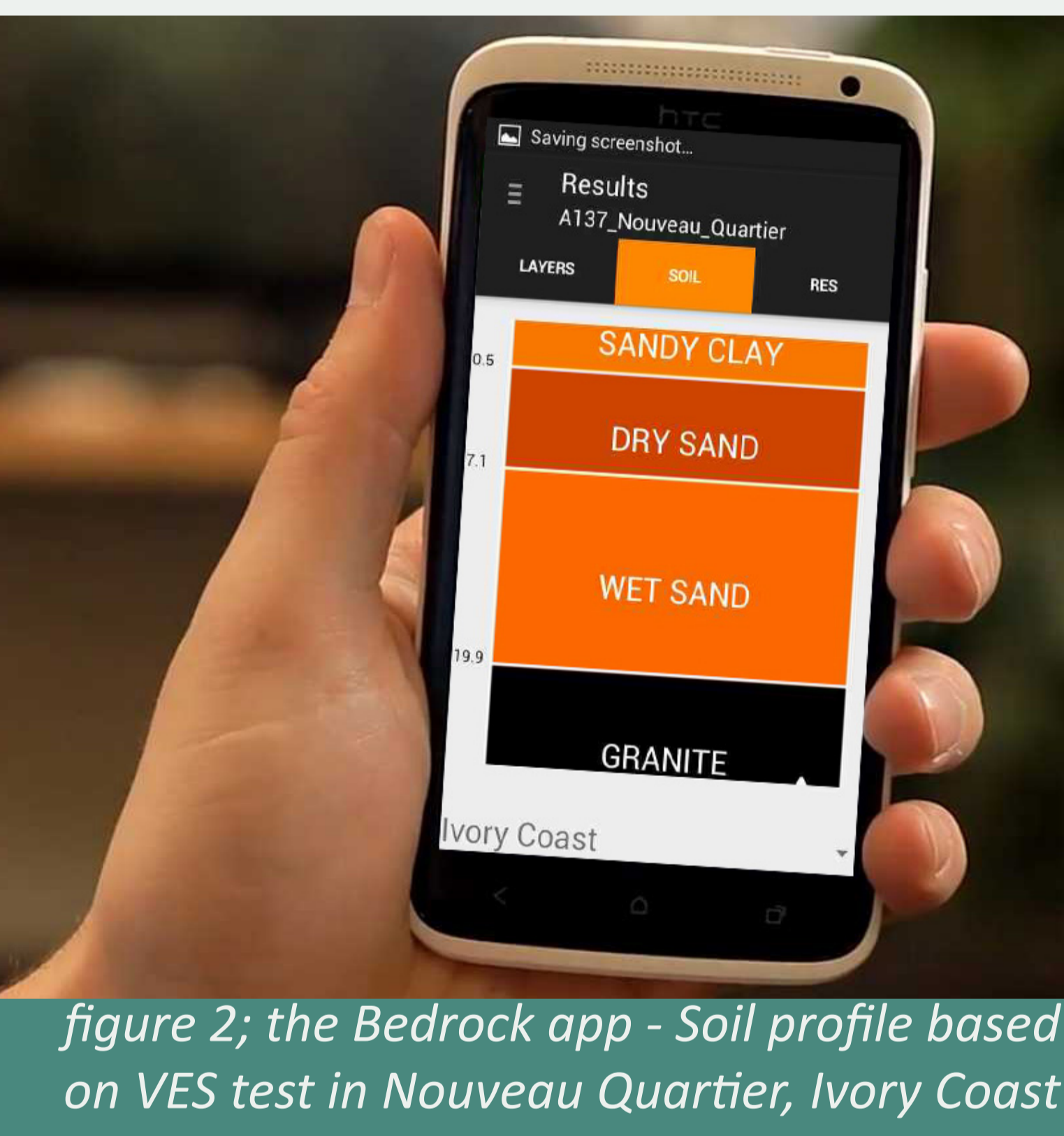


figure 2; the Bedrock app - Soil profile based on VES test in Nouveau Quartier, Ivory Coast

BEDROCK

The Bedrock kit uses a Vertical Electrical Sounding (VES) principle to assess soil resistivity at various depths and generate a corresponding soil profile. The hardware is based on a design by Clark and Page (2011) and further developed by PRACTICA. Field experiments in 4 countries were used to improve the design and operation and solve technical problems (figure 1). An open-source Android application facilitates collection, interpretation and storage of the data.

The visual output is presented as a profile of different soil layers, which forms the basis for evaluation of suitable drilling sites (figure 2). Field data including GPS location can be uploaded to a central database, adding to local knowledge of geology and hydrology.

The Bedrock kit consists of a small control box, which is currently produced by PRACTICA for less than €100. The kit needs to be completed with other parts including an inverter, multi-meters, copper wire, a 12V car battery and a basic Android smartphone, which can be shipped with the kit or sourced locally. The total cost of the kit comes down to €600 to €800, which is significantly lower than the conventional VES equipment, selling for over €10.000.

RESULTS FROM THE FIELD

Test soundings have been done in 8 villages in Ivory Coast to compare the Bedrock kit with a conventional resistivity meter (Syscal). The data from the Bedrock kit proved to be very reliable, which is illustrated by the Nouveau Quartier case in figure 3.

The test soundings preceded a campaign of 100 soundings using the Bedrock kit to select the most feasible locations for boreholes under the UNICEF manual drilling programme in Ivory Coast.

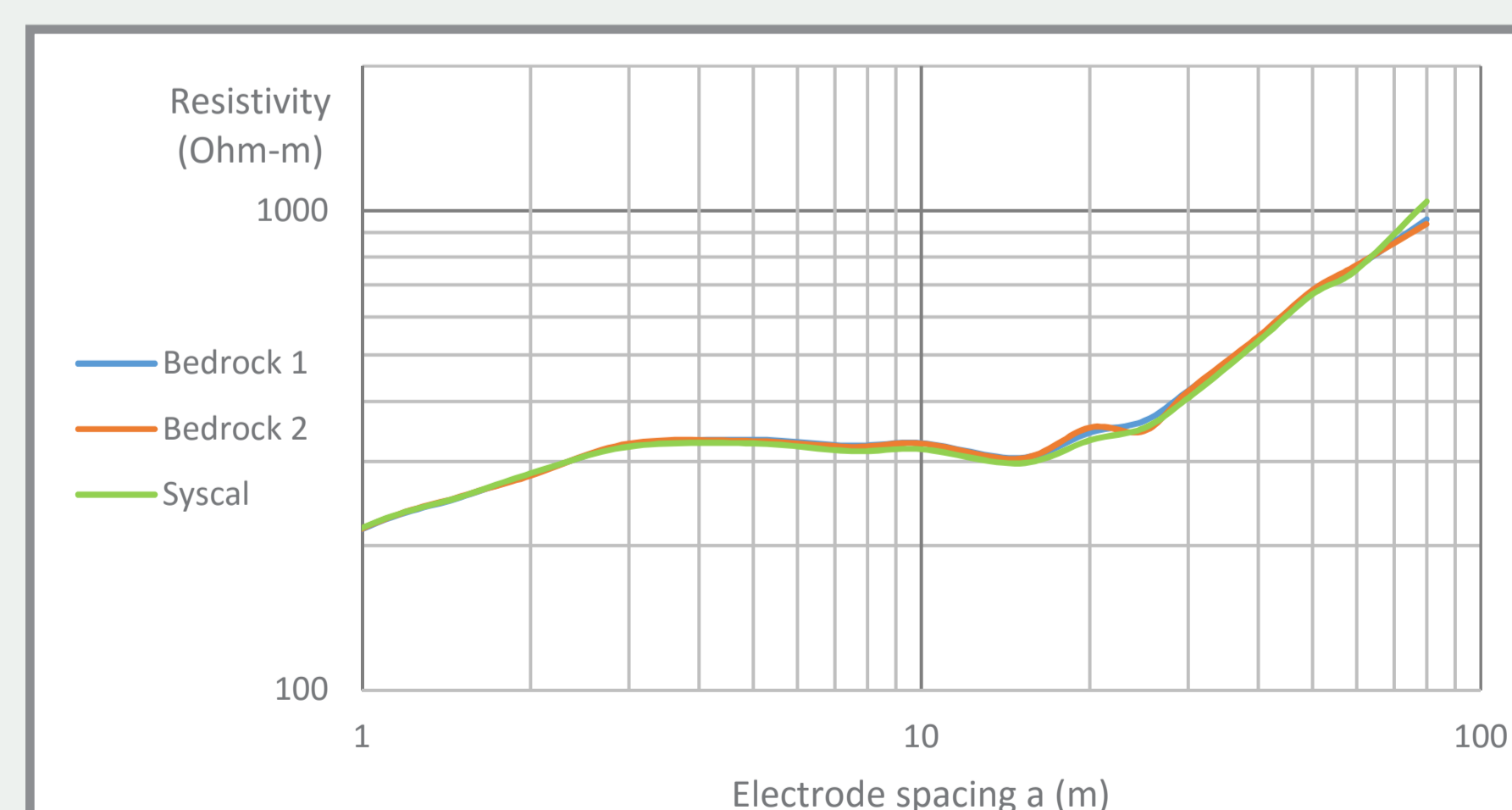


figure 3; Comparative VES test, Nouveau Quartier, IC

LOOKING FOR PARTNERS

PRACTICA is looking for partners to bring this innovation to scale. The kit can be introduced in countries or programmes that work on professionalization of the local well drilling sector, working with manual drilling techniques and local drilling enterprises.

For more information contact Berry van den Pol: berry.vandenpol@practica.org.