In the whole study area, two main zones are suitable for manual drilling:

- The western part, up to 20 km east of Louga and Kebemere
- The zone NW of Linguere, along the Ferlo valley

The highest potential is expected along the coast (W of Louga), between Kebemer and Tamaka, and in the Ferlo valley.

In the framework of the program for the achievement of MDG (Millenium Development Goals) for water supply, UNICEF is promoting manual drilling throughout Africa.

Manual drilling refers to those techniques of drilling boreholes for groundwater exploitation using human or animal power (not mechanized equipment). These techniques are well known in countries with large alluvial deposits (India, Nepal, Bangladesh, etc). They are much cheaper than mechanized boreholes, easy to implement as the equipment is locally done, able to provide clean water if correctly applied. But they can be applied only in those areas with suitable hydrogeological conditions: thick layers of unconsolidated sediments and shallow groundwater level. Furthermore they require high hydraulic conductivity of aquifer layers. All these conditions are considered in the definition of suitable zones for manual drilling.

The research has been developed in the framework of the project "Use of remote sensing and terrain modeling to identify suitable zones for manual drilling in Africa and support low cost water supply", within the scientific cooperation between

- University of Milano-Bicocca
- University Cheikh Anta Diop (Dakar Senegal)
- SNAPE – Service Nationale de Points d'Eau (Conakry Guinea)
- UNICEF Senegal
- UNICEF Guinea.

The project is funded by NERC (National Environmental Research Council, UK) through the UPGro program (Unlocking the Potential of Groundwater for the Poor).

**OBJECTIVE OF THE RESEARCH**

Estimation of the suitability for manual drilling through semi-automatic interpretation of borehole stratigraphic logs and extraction of textural and hydraulic parameters of shallow aquifers.

**Study area**: North-Western Senegal, regions of Louga, Linguere et Kebemere.

- Geology: Quaternary sands and sandy clay overlaying a basement of limestone and marl
- Morphology: mainly flat, with small dunes along the coastal strip
- And climate, with yearly average rainfall 400 mm (Louga) concentrated between June and October.

**MANUAL CODIFICATION OF BOREHOLES LOGS FROM DATABASE OF DGPRE (NATIONAL WATER AUTHORITY, SENEGAL)**

**DATA PROCESSING**

It is the combination of semi-automatic analysis with a specific software (TANGAFRIC) developed at the University Milano Bicocca, followed by calibration of texture and hydraulic parameters through field measurements.

**RESULTS AND CONCLUSION**

In the whole study area, two main zones are suitable for manual drilling:

- The western part, up to 29 km east of Louga and Kebemer
- The zone NW of Linguere, along the Ferlo valley

The highest potential is expected along the coast (W of Louga), between Kebemer and Tamaka, and in the Ferlo valley.

Water depth is the main limiting factor for the use of manual drilling up (considering a maximum depth of 50 m).

Hard laterite is not representing an obstacle to manual drilling in this area, although it is likely that percussion techniques must be used when it is implemented in some localities south of Linguere.

**CONCLUSIONS**