Use of remote sensing and terrain modeling to identify suitable zones for manual drilling in Africa and support low cost water supply

UPGro Unlocking the Potential of Groundwater for the Poor

NERC SCIENCE OF THE ENVIRONMENT | E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL | UKaid from the British people

UPGro Knowledge Broker:
skat Swiss Resource Centre and Consultancies for Development

PARTNERS

University Milano Bicocca (Italy)

SNAPE (Guinea)

University Cheik Anta Diop (Senegal)

UNICEF (Guinea and Senegal)

MANUAL DRILLING

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)

High quality hand drilled wells can provide sustainable and clean water supply

Advantages of manual drilling

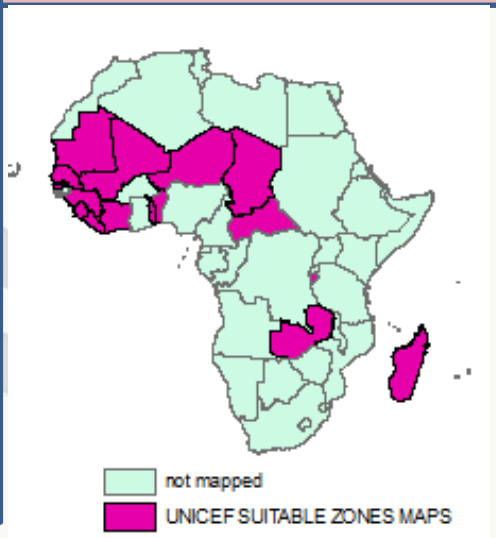
- Cheaper than mechanized boreholes
- Easy to implement with locally made equipment
- "manual work intensive" and not "capital intensive" ; source of income for local groups

Limitations of manual drilling

Manual drilling is feasible only under hydrogeological suitable conditions

- Soft unconsolidated shallow geological layers
- Water level not too deep
- Good hydraulic conductivity of shallow porous aquifers

IT IS IMPORTANT TO IDENTIFY THOSE ZONES WHERE HYDROGEOLOGICAL CONDITIONS ARE SUITABLE FOR MANUAL DRILLING.
MAPS OF SUITABLE ZONES HAVE BEEN COMPLETED IN 15 COUNTRIES SINCE 2008



OBJECTIVE OF THE RESEARCH

Integration of direct hydrogeological information from existing database with indirect parameters from Remote Sensing and terrain modeling to characterize shallow aquifers and identify suitable zones for manual drilling

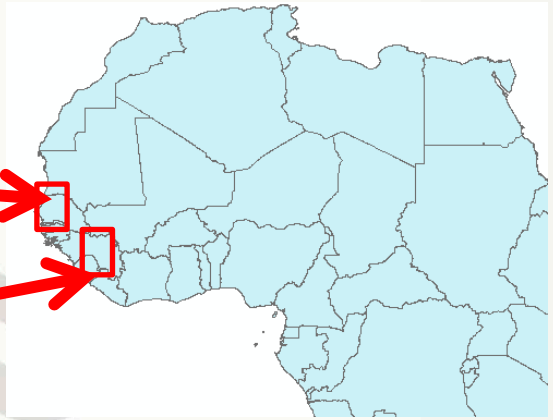
DURATION

November 2013 – April 2015

STUDY AREA

REGION OF LOUGA – KEBEMER (NORTH WEST SENEGAL

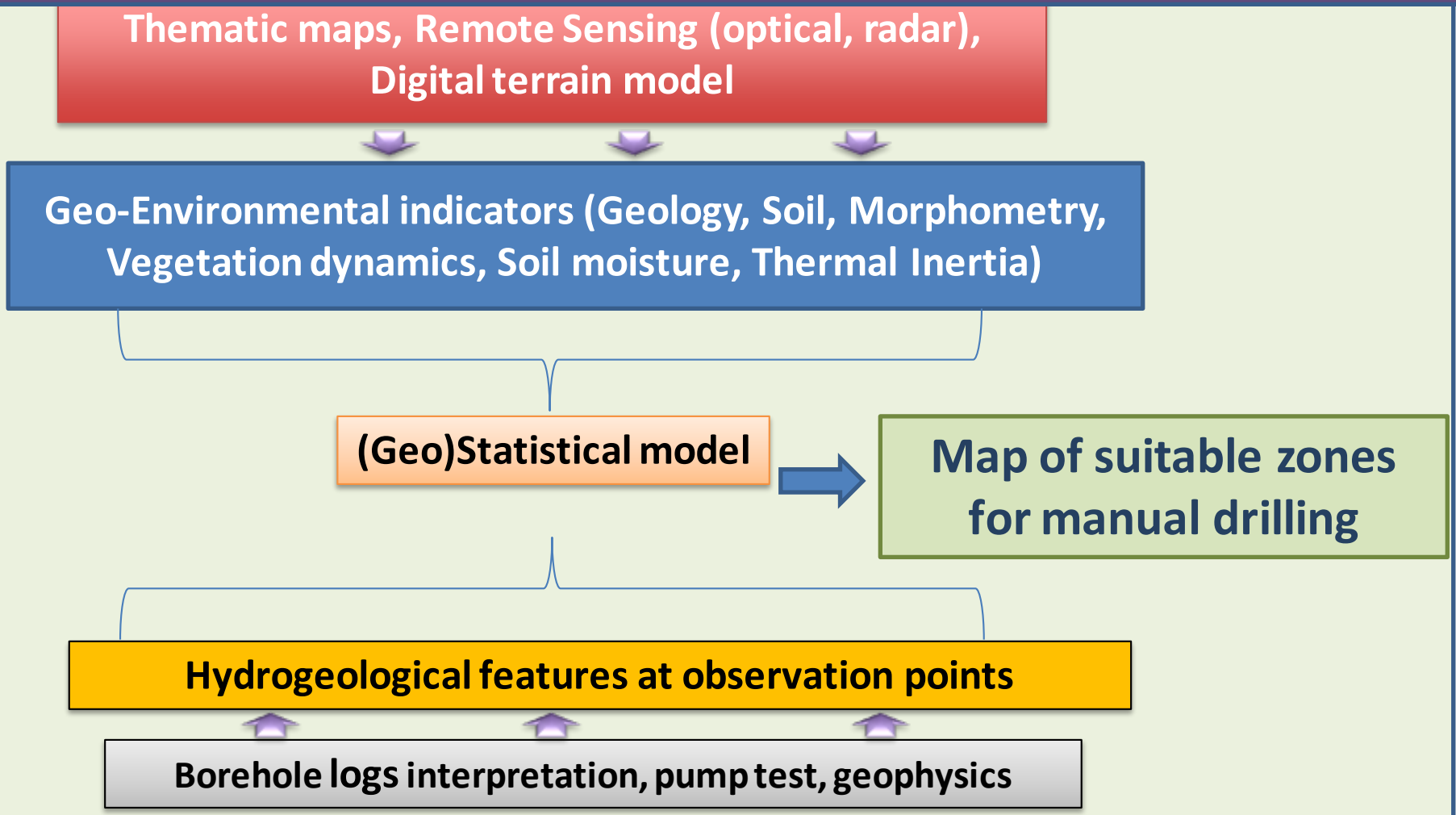
REGION OF KANKAN AND FARANAH (EAST GUINEA)



Role of partners and external stakeholders

ACTIVITY	ACADEMIA	NATIONAL INSTITUTIONS	INTERNATIONAL ORGANISATIONS
SCIENTIFIC RESEARCH AND CAPACITY BUILDING	-UNIVERSITY MILANO BICOCCA (IT) -UNIVERSITY CHEIK ANTA DIOP (SEN) -University of Thies (SEN)		
DISSEMINATION	As above		-UNICEF
INTEGRATION RESEARCH INTO NATIONAL STRATEGY FOR WATER SUPPLY		-SNAPE (Guinea) - DGPRE (Sen)	
COORDINATION WITH MANUAL DRILLING PROGRAM	-UNIVERSITY MILANO BICOCCA (IT)	-SNAPE (Guinea)	- UNICEF - Practica
FUNDING	NERC (UK) - scientific research UNICEF (with external donors) for manual drilling in Guinea		

Scientific approach



Source of data

THE RESEARCH IS BASED ON AVAILABLE AND FREE OF COST DATA AND WITH LIMITED COST FOR FIELD DATA COLLECTION.

THIS FACILITATE THE EXTENSION OF THIS METHOD TO OTHER REGIONS,

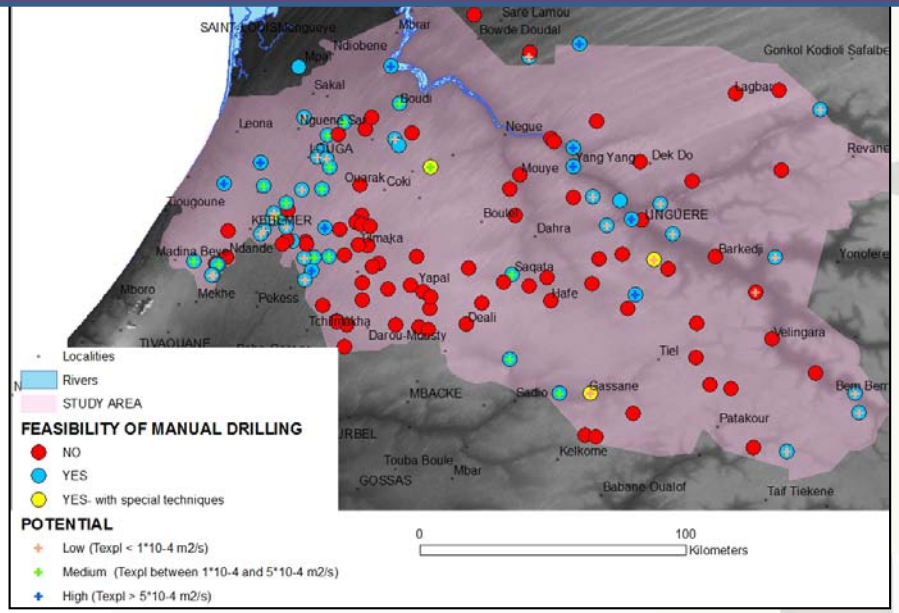
NATIONAL DATABASE OF WATER POINT

THEMATIC MAPS

Free satellite images (MODIS)

Radar images (obtained from European Space Agency free of cost)

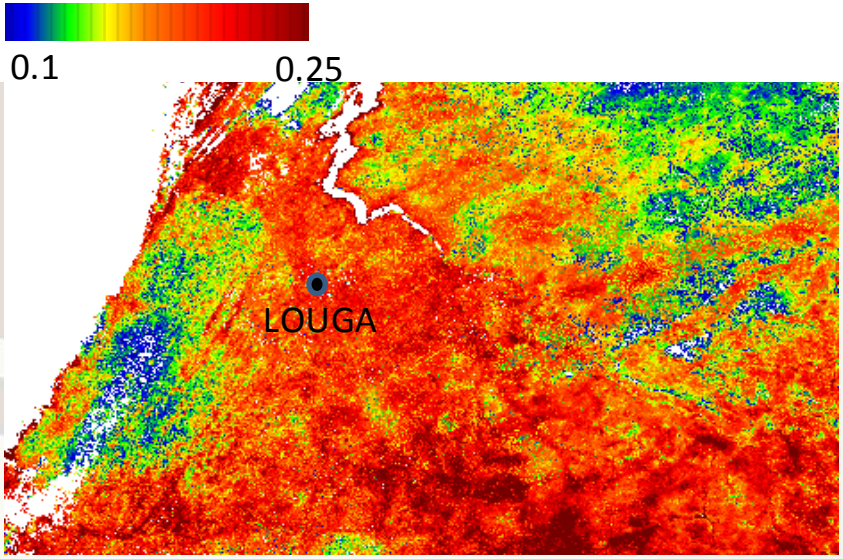
Preliminary results achieved



Estimating feasibility and potential for manual drilling at borehole positions

Extraction of environmental parameters from remote sensing

VEGETATION DYNAMICS - DRY SEASON MEAN NDVI



Expected final outputs

- Definition and validation of structured method to infer shallow hydrogeology and suitability for manual drilling from indirect data

- Generation of maps of suitability for manual drilling in 2 study area

Factor of success

-Collaboration between partners

-Coordination between scientific research, training of drilling teams, implementation of hand drilled wells in target zones, advocacy

- Deep Involvement by national institution (SNAPE)

-Active role of UNICEF in support and fund raising

Thanks very much for the attention