

## MSc. research on Shallow Groundwater Irrigation (bucket-irrigation) in Atankwidi catchment

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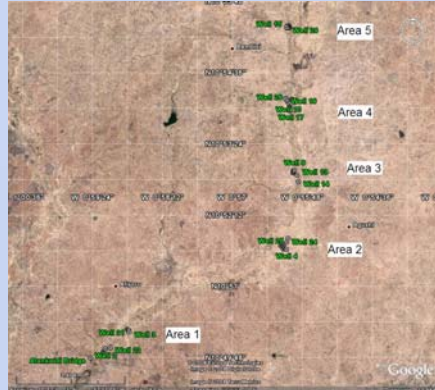
### Research question

*What is the link between the application of bucket-irrigation and the groundwater level in the alluvial aquifer?*

In answering this question I discuss the influences on the potential for extension and future application of bucket-irrigation.



Farmer digging his well



Study area with measured locations

### Methodology

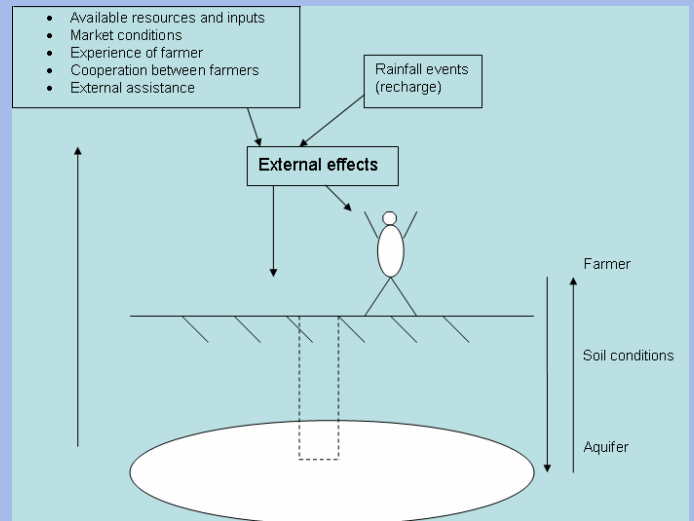
- Individual interviews with 30 farmers and observations
- Discussions with officials from MoFA and CSRC
- Soil experiments and groundwater level measurements as input for model tests
- Model tests with MicroFEM



### Observations and discussion

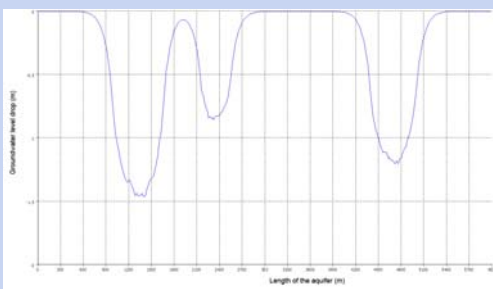
The arrows in the picture on the right show the direction of influences:

- The farmer who applies bucket-irrigation influences the groundwater level in the alluvial aquifer,
- The soil and water conditions influence the farmer's actions,
- The farmer is influenced by external factors
- External factors are influenced by, amongst others, the soil and water conditions.



### Conclusions groundwater model

- Use of wells has a significant influence (0.5-1.5 m) on groundwater level drop in alluvial aquifer (the graph shows the groundwater level drop for irrigated areas of respectively 20, 6 and 12 hectares)



- Thickness of the aquifer and impermeable layers have large influence on groundwater level drop
- River and gradient of the area have insignificant influence on groundwater flow in the alluvial aquifer
- Other influences because of loss to fractured zone or vegetation

### Suggestions for further research

Based on gathered data and model assumptions, it is considered advisable to extend this research in the followings fields:

- Data about geometry and soil properties alluvial layer:
  - Through Remote sensing
  - Electric Resistivity Tomography
  - Penetrometer
- Identify factors that determine recharge in alluvial aquifer
  - Analyse rainfall and available water in alluvial aquifer
- Other types of irrigation without governmental support
- Other catchment
- Analyse differences in dry seasons