

Evaluating groundwater management options in a semi-arid and rapidly urbanizing area using a socio-hydrological model J. Wegmann

Introduction

- Water resources under stress due to climate change, population growth, changing consumption patterns
- User behavior key driver of stressed water resources
- User behavior often neglected in water resources model
- Incorporation of actual user behavior into models can improve management

The model

Decision making

processes

Schedueld Irrigation?

Yes

No

Model Components

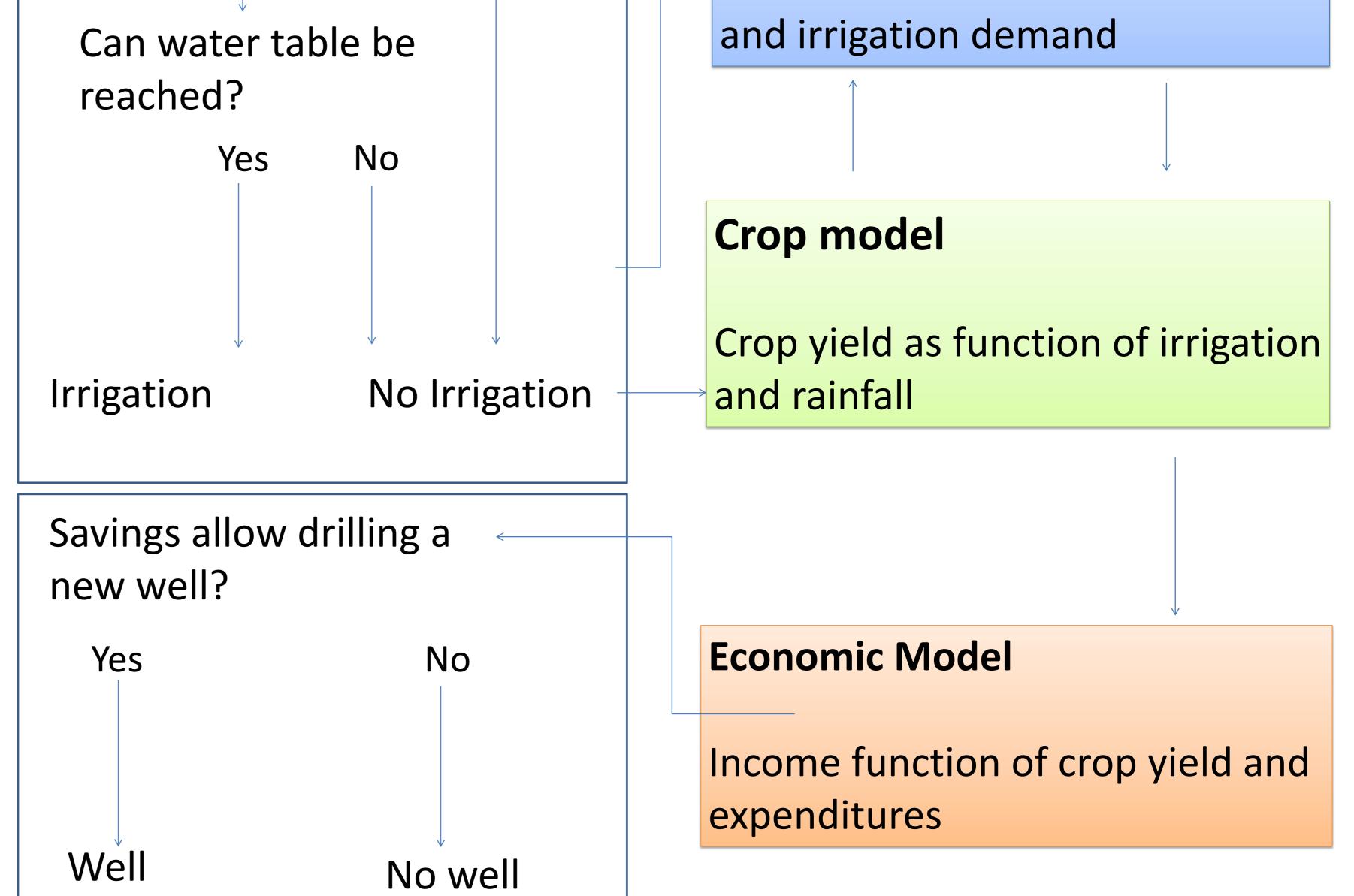
Hydrological model

Change in groundwater as function of soil water balance

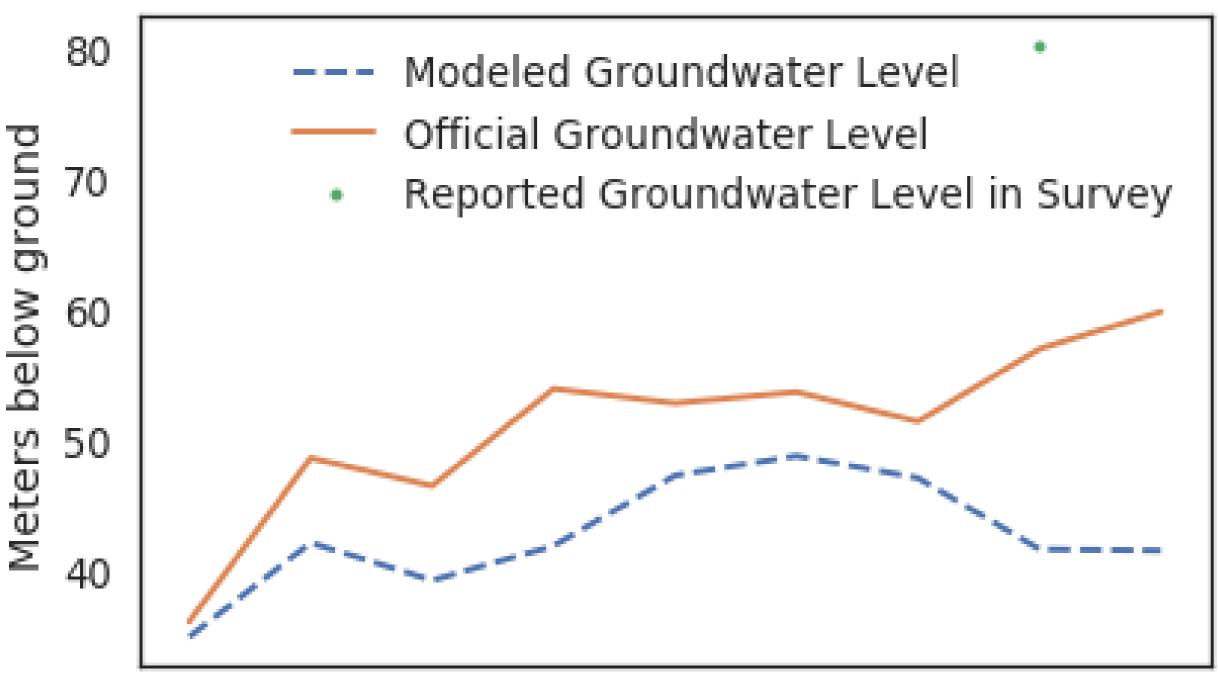
Data

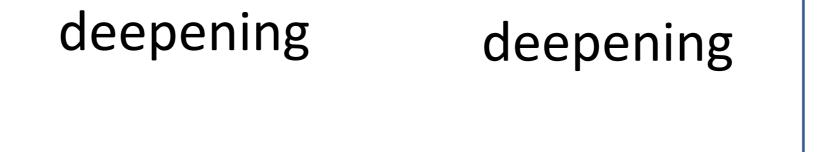
- Official groundwater levels at district level (pre-monsoon) 2011-2018
- Reported groundwater level 2018 (pre-monsoon)
- Rainfall and temperature at district level for 2011 - 2017
- Soil characteristics for 6 sites in two districts
- Daily meteorological data for 6 sites
- Socio-economic characteristics of 412 farmers in two districts
- Groundwater user behavior of a common pool resources experiment

Preliminary results



- Large discrepancy btw. official and reported data
- Modeled groundwater level has a clear upwards trend
- Irrigation driven by increased revenues





Outlook

- Refine economic model by including behavioral factors
 - Risk attitudes
 - Time preferences
 - Strategic behavior
- Policy scenario analysis
 - Quotas
 - Monitoring
 - Water saving technologies
- Evaluate changing climate conditions

2010 2014 2015 2016 2017 2018 2012 2013 2011 Years

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