

# Defining the most suitable source of irrigation water for farmers and communities A socio-agricultural model

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Research papers

Designing on-farm irrigation ponds for high and stable yield for different climates and risk-coping attitudes



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<https://www.sciencedirect.com/science/article/pii/S0022169420300949>

2.

Tamburino L, Di Baldassarre G, Vico G

Water management for irrigation, crop yields and social attitudes: a socio-agricultural agent-based model to explore a collective action problem

To appear on

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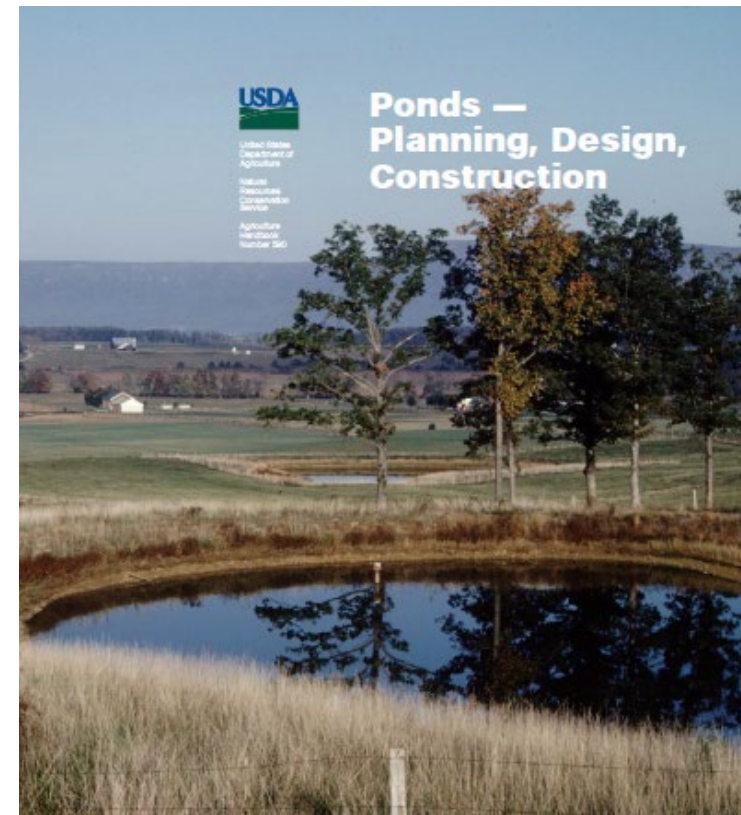
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# BACKGROUND

Supplemental irrigation can sustain high and stable crop yields, but often leads to unsustainable use of groundwater:

Can on-farm ponds be a more sustainable source of water?



# QUESTIONS

What is the most suitable pond size for high and stable yields, for the single farmer?

How does such size change with the attitude to long-term sustainable solutions of the farmers in the community?

And what is the role of climatic conditions?

# APPROACH

(Agent-based) dynamic model to simulate smallholder farming system, coupling

- crop development,
- soil water availability,
- water storage in the pond and in the aquifer,
- short-/long-view orientation of each farmer in the community



Identifying size of pond leading to maximum or most stable production,  
for single farmers and whole communities,  
under current and future climates

Application to the Lower Mississippi River Basin, USA

# TAKE HOME MESSAGES

- For a single farmer, maximization of production and minimization of the risk of low yield are often irreconcilable criteria when designing on-farm ponds

Vico, Tamburino, Rigby (2020), *Journal of Hydrology*

<https://www.sciencedirect.com/science/article/pii/S0022169420300949>

- On farm ponds can be more advantageous as source of water for the community than for the individual farmer, leading to a higher and more stable income

- The individual farmer benefits from the on-farm pond only under extreme climates and in communities where the use of on-farm ponds is widespread

Tamburino, Di Baldassarre, Vico, *Hydrological Sciences Journal*, to appear

<https://www.tandfonline.com/toc/thsj20/current>