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Smallholder:

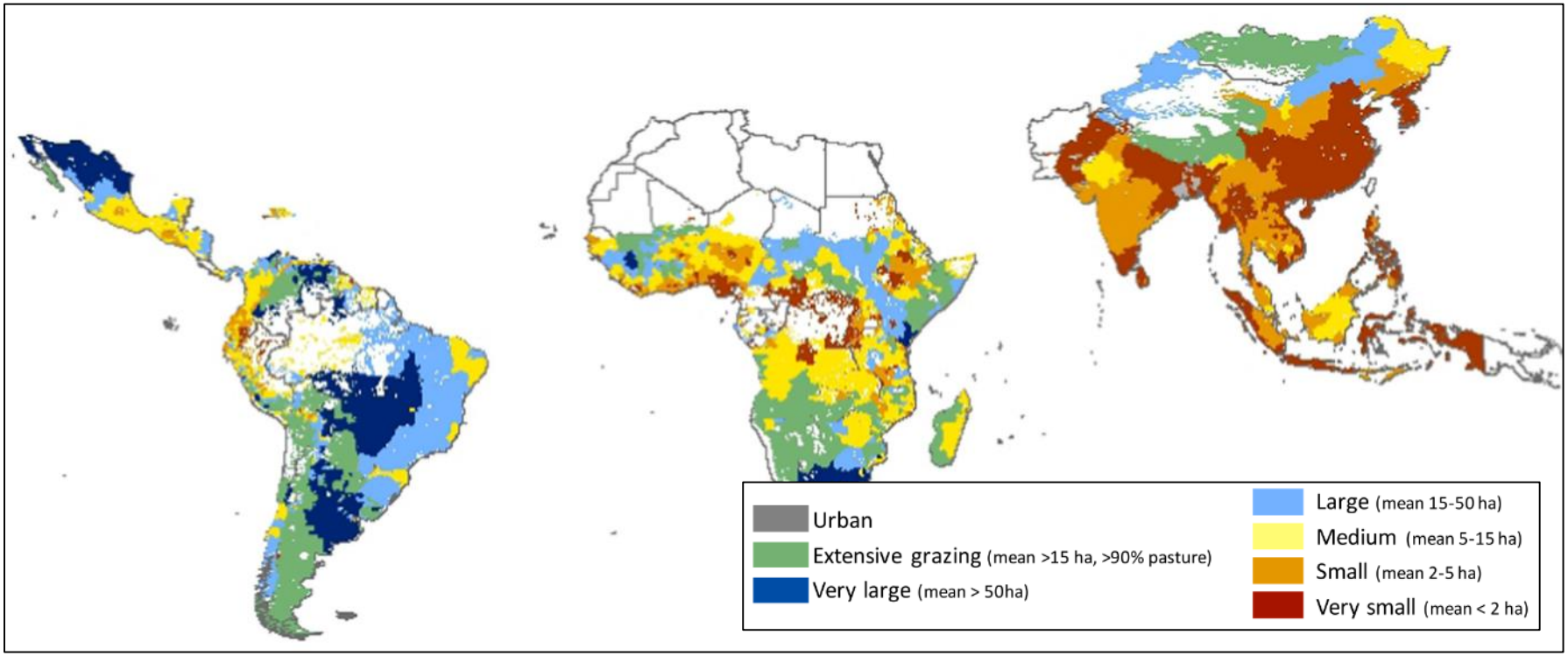
An inconvenient label in the adoption of water pumping technologies?

Using Q-methodology to unveil smallholders' decision making

Juan Carlo Intriago Zambrano
* J.C.IntriagoZambrano@tudelft.nl
Ruben van Dijk
Martin van Beusekom
Jan-Carel Diehl
Maurits W. Ertsen

https://www.tudelft.nl/en/ceg/research/stories-of-science/the-self-reliant-irrigation-pump-a-fine-mess/

- High clustering of smallholders in South / Southeast Asia
- Smaller clusters in Sub-Saharan Africa



Samberg, L. H., Gerber, J. S., Ramankutty, N., Herrero, M., & West, P. C. (2016). Subnational distribution of average farm size and smallholder contributions to global food production. *Environmental Research Letters, 11*(12), 124010. https://doi.org/10.1088/1748-9326/11/12/124010

Smallholder farming: Potential

- Significant contribution to food production
- Higher impact in poverty alleviation than other sectors
- Investment accelerates economic growth

Giordano, M., Barron, J., & Ünver, O. (2019). Water Scarcity and Challenges for Smallholder Agriculture. In *Sustainable Food and Agriculture* (pp. 75–94). https://doi.org/10.1016/B978-0-12-812134-4.00005-4

Smallholder farming: Challenges

- Water resources (management) limitation
- Limited access to (water pumping) technologies (**WPTs**)
- Gender inequality – less access to resources
- Market inefficiencies

Giordano, M., Barron, J., & Ünver, O. (2019). Water Scarcity and Challenges for Smallholder Agriculture. In *Sustainable Food and Agriculture* (pp. 75–94). https://doi.org/10.1016/B978-0-12-812134-4.00005-4

Which WPT to adopt?

Electric

https://pixabay.com/photos/pump-centrifugal-pump-industry-2338716/

Petrol-based

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Solar

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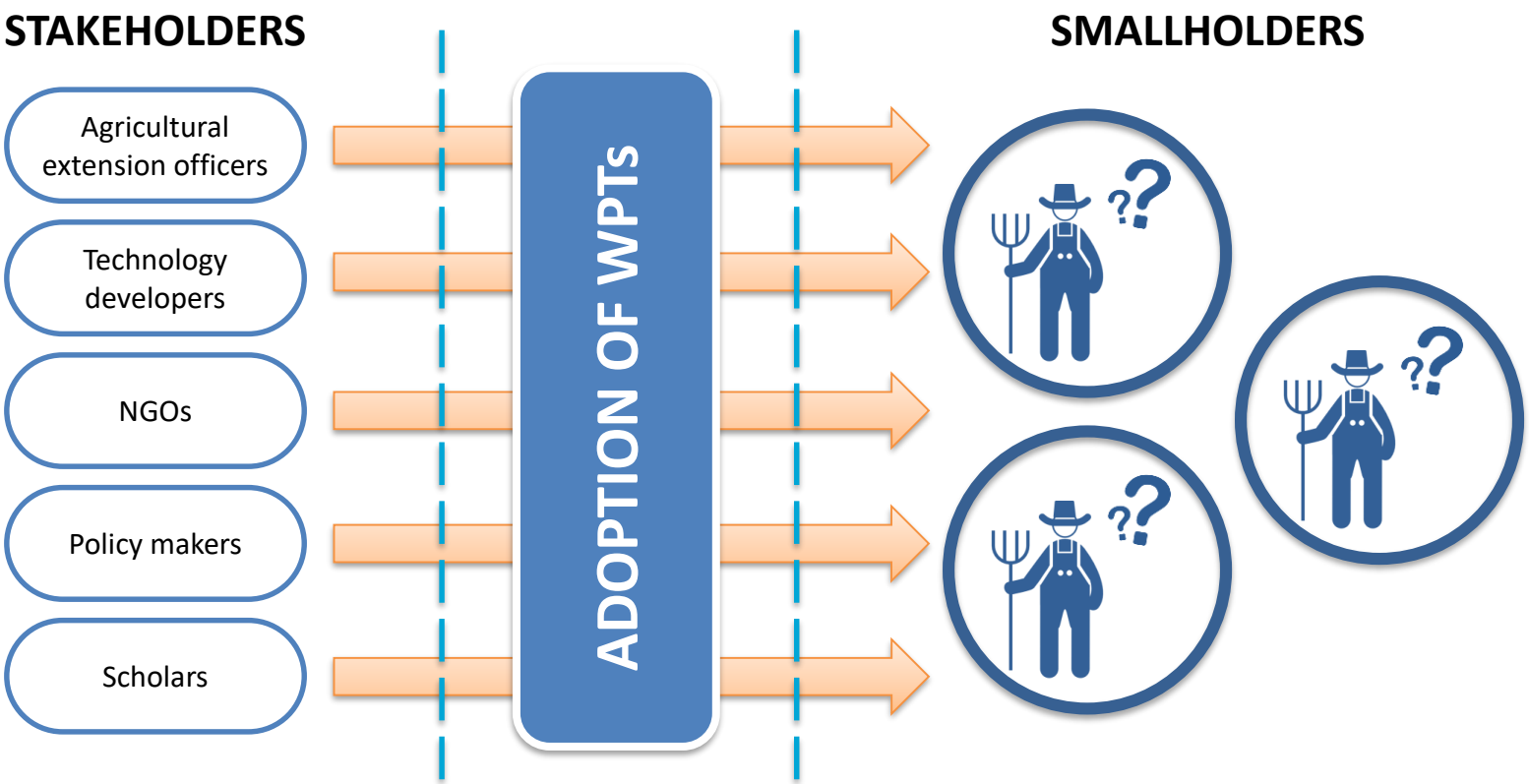
Hydro-powered

© Ignas Kunda / CC BY-SA 4.0 (https://commons.wikimedia.org/wiki/File:Barsha_Pump_and_Pratap_Thapa.jpg)

- Different **stakeholder strategies** on WPTs adoption
- Different smallholders **deciding how to adopt** WPTs



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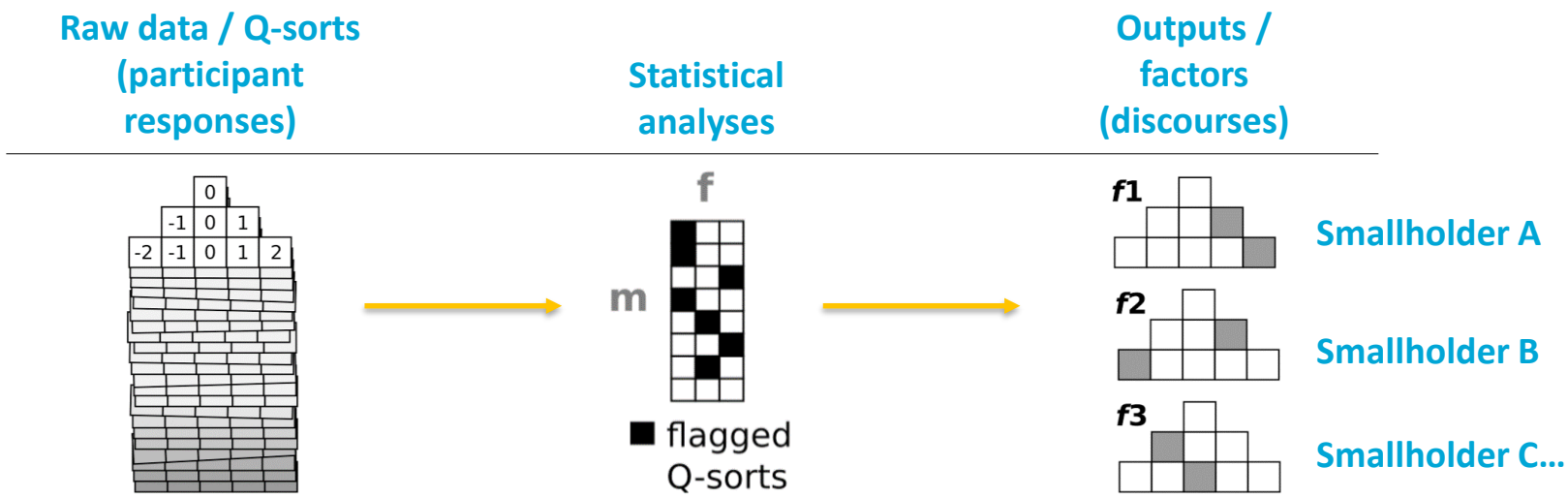
WPT adoption

How to understand the (mis)match of different strategies towards (heterogeneous) smallholders?

Q-methodology

- Quali-quantitative technique to **measure subjectivity**
- Identification of **discourses** (smallholder typologies) on WPTs
- Identification of split and consensus points



Adapted from: Zabala, A., & Pascual, U. (2016). Bootstrapping Q Methodology to Improve the Understanding of Human Perspectives. *PLOS ONE*, 11(2), e0148087. https://doi.org/10.1371/journal.pone.0148087

Findings

- Some smallholders pose commercial mind-sets
- Other ones are willing to invest in more expensive, yet risk-free WPTs
- Some WPTs are frowned on due to lack of training / information
- Gender-friendliness is not usually a WPT design requirement

Implications

- *Technology developers*: broaden design requirements to culture-wise values
- *NGOs*: Farmers wish to farm, not (necessarily) to become WPT systems managers
- *Policy makers*: Farmers are much more than a mere holding size

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