The DARE-TU project

Co-creation of clean and affordable smallholder pumped irrigation

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Publication date
2019

Document Version
Final published version

Citation (APA)
Intriago Zambrano, J. C., Michavila, J., Arenas, E., Diehl, J.-C., & Ertsen, M. (2019). *The DARE-TU project: Co-creation of clean and affordable smallholder pumped irrigation*. Poster session presented at IRI THESys Summer School 2019, Berlin, Germany.

The DARE-TU project:
Co-creation of clean and affordable smallholder pumped irrigation

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Introduction

Intensification of smallholder production is key for local and global food security. Amongst many challenges smallholders that face, proper water management is one of the most crucial in achieving such objective [1]. One way to enable / improve access and control to irrigation water is by the use of water pumping technologies.

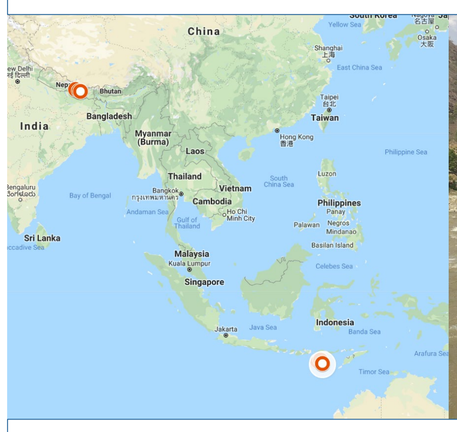
Most of these technologies, however, run on grid-electricity or fossil fuels, thus becoming (too) cost-intensive or even inaccessible for many smallholders. More environmentally sound and at times less expensive alternatives are renewable energy (RE)-based pumping technologies [2]. From these, hydro-powered pumping (HPP) technologies—i.e. those hydro-mechanically driven by the water they lift—pose even further advantages over their other RE counterparts [3].The Barsha pump, and the novel Integrated Turbine Pump (ITP), developed by the Dutch company aQysta, are amongst these. Nowadays, nevertheless, they are largely ignored / neglected due to technical, social and financial constraints [4].

In this context, a business model that can deal with such limitations is the "Product-Service System" (PSS) [5]. In addition, a PSS co-creation / co-design process [6], especially while identifying and addressing contextual tensions at an early stage—in line with the so-called Context Variation by Design (CVD) approach [7]—will substantially enrich the outputs to meet the user's needs. However, these have not been studied within the agricultural sector, nor specifically addressed the case of water pumping technologies for smallholder farming.

Research question

What factors must be influenced, by means of the implementation of a co-created PSS, to foster the acceptance of the ITP within smallholder irrigation schemes?

Places of research



The case studies of the project are focused on smallholder communities within low-income countries. Specific cases in Nepal and Indonesia were selected due to the already-existing market penetration of aQysta, manufacturer of the HPP technologies mentioned above.

Topic of research

The topic of research can be disaggregated in the following lines of study:

- Physical and socioeconomic factors that influence the acceptance of HPP water pumping technologies (Barsha pump, ITP) within smallholder irrigation scheme
- Iterative co-creation of a PSS capable to steer those factors and cope with implicit constraints
- Contextual differences between the case studies and their respective feedbacks, to enrich the co-created solution, in line with the CVD approach

Stakeholders

- Smallholders from the farming communities
- aQysta, as the private partner
- NGO(s) in charge of the service provision
- Governmental organisations / financial institutions

Methodologies

Several methodologies are carried out:

- Structured questionnaires
- Q-methodology
- Unstructured interviews
- Direct observations

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