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One Way to (Cleanly) Lift Water, Many Ways to Deliver Smallholder Irrigation

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Publication date
2021

Document Version
Accepted author manuscript

Citation (APA)
Intriago Zambrano, J. C., Michavila, J., Diehl, J.-C., & Ertsen, M. (2021). *The Barsha Pump: One Way to (Cleanly) Lift Water, Many Ways to Deliver Smallholder Irrigation*. 216-217. Abstract from 12th IWA Eastern European Young Water Professionals Conference (postponed), Riga, Latvia.

The Barsha Pump: One Way to (Cleanly) Lift Water, Many Ways to Deliver Smallholder Irrigation

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INTRODUCTION

Enabling smallholders' access to irrigation water, and to its proper control and management, is one of the key interventions towards securing their production—hence potentially contributing to an increased food security—as well as to the improvement of their livelihoods (Burney and Naylor, 2012; Lowder et al., 2016; Tscharntke et al., 2012). A way to achieve this goal is by implementing pressurized irrigation systems driven by water pumping technologies (WPTs). Given that many irrigation systems worldwide still operate on (too) cost-intensive and polluting electricity- or diesel-based pumps (Aliyu et al., 2018; Chandel et al., 2015), there is the potential to introduce more environmentally sound, and at times more affordable, renewable energy-based WPTs (Gopal et al., 2013). Amongst these alternatives, hydro-powered pumps (HPP) present further advantages: more concentrated, continuous and predictable energy source; mechanically less complex and more robust; more cost-effective due to higher power-to-size ratio; and, typically more efficient. Nevertheless, their accessibility, successful implementation, and eventual scaling up lie much beyond their mere technical performance (Intriago Zambrano et al., 2019).

The so-called Barsha pump (BP)—a waterwheel-driven manometric HPP—has become the first ever mass-produced, commercially available spiral pump, mainly intended for smallholder irrigation (Intriago Zambrano et al., 2019). Though at the moment being used in a number of countries across five continents, the BP does not only still undergo many market challenges, as occurs to other WPTs (de Fraiture and Giordano, 2014; Namara et al., 2014), but also has to face several on-field interpretations on how it should function related to (different) smallholders' actions and farming practices. Constraints related to the pumping benefits / technical performance, supply chains, financial affairs, ease of use, local knowledge, and even the presence of other WPTs have a(n) (in)direct influence on the acceptance and adoption of the BP. From this perspective, the main question addressed here is: which interventions ensure a better smallholder use of the BP?

METHODOLOGY

A first part of the study was conducted face to face with smallholders between June and August 2019, in three and six different Nepali and Indonesian farming locations, respectively. Another part was carried out through online platforms with experts between April and August 2020. In total, the study included 43 individuals (19 smallholders and 24 experts).

Due to the nature of the study, which comprised several variables across a number of contexts and individuals, a triangulation of data collection techniques (e.g. direct observations, semi-structured interviews, surveys) was preferred, thereby allowing a better understanding of the integrated nature of farmers' attitudes towards the BP. The main research method was Q-methodology, an increasingly popular inverted technique of factor analysis that combines the strengths of qualitative and quantitative research (ten Klooster et al., 2008). One of its main advantages is that representativeness of the subjectivity does not depend on large samples of respondents, but rather on their diversity.

RESULTS

On the basis of the collected evidence and further data processing, it was possible to map the current strong and weak relations between the smallholders and the BPs under a set of different contexts. Moreover, it enabled the identification of improvement opportunities to strengthen those relations, thereby ensuring: 1) an improved smallholder's BP-supplied water access and control; 2) a more sustained use of a reliable, low-cost and environmentally sound WPT; and, 3) a more (financially) sustainable business model for the technology supplier.

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