

# Psychological Ownership and Habits for Long-Lasting Safe Water Infrastructure

Safe water technologies often become dysfunctional quickly after installation. This could be due to the technology or social and behavioural factors. Project PACT investigates how the sense of ownership impacts the longevity of rural piped water supply schemes. Benjamin Ambuehl<sup>1,2</sup>, Ashok K. Ghosh<sup>3</sup>, Bharat Kumar Singh<sup>4</sup>, Manoj Kumar<sup>4</sup>, Sara Marks<sup>1</sup>, Jennifer Inauen<sup>2</sup>

## Introduction

Safe water technologies often become dysfunctional quickly after installation. This could be attributed to the technology, as well as social and behavioural factors. Project PACT investigates how the sense of ownership and habit impact the longevity of rural piped water supply schemes.

In rural Bhagalpur, in the state of Bihar, India, drinking and cooking water are very often unsafe due to natural (e.g. arsenic) and anthropogenic contamination (e.g. faecal bacteria). These contaminants pose significant health risks. Affluent people have easy access to bottled water, but infrastructure for the whole community is the only safe mitigation option for low-income households. While water treatment options can effectively mitigate adverse health effects [1], their acceptance, use, maintenance, and functionality is often low [2] [3]. For decades, water sector professionals have assumed that well-defined “ownership” is a key ingredient for successful community-managed water projects. However, little evidence exists to support the assumption that increased ownership leads to the longevity of infrastructure, even though it has extensive implications for participatory planning.

## Psychological ownership and habit to improve infrastructure

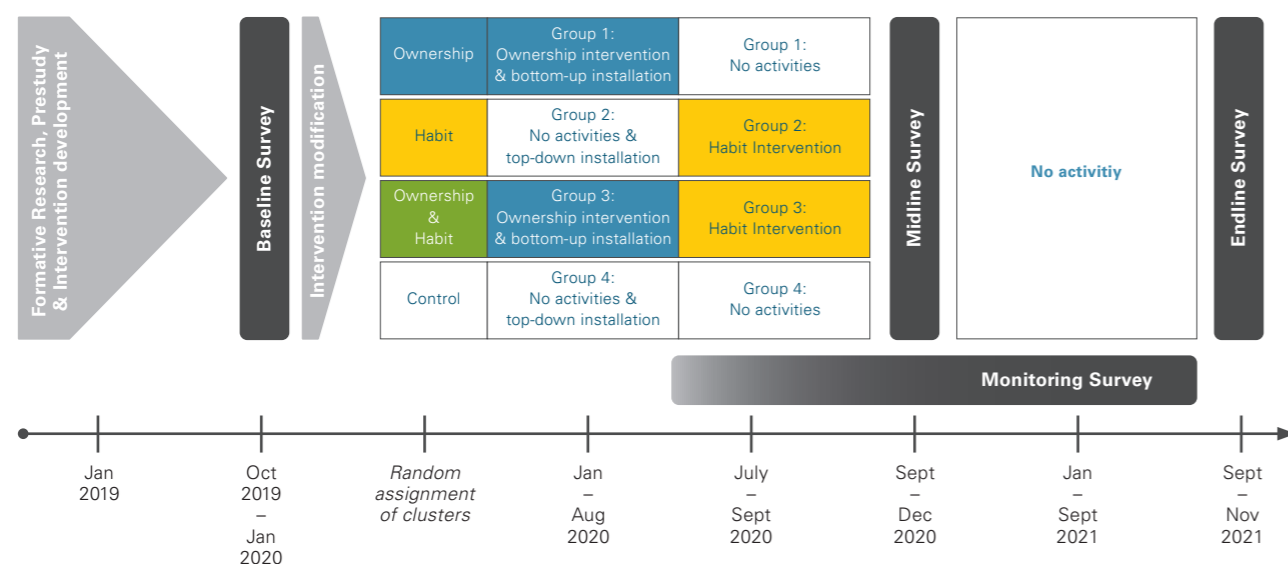
The feeling that something is mine or ours, without necessarily legally owning it, is known as ‘psychological ownership’ [4]. Psychological ownership has been examined as a key factor related to the acceptance, use and maintenance of safe drinking water infrastructure [5] [6]. These cross-sectional design studies investigated the role of psychological ownership among households using

piped supplies and safe water kiosks. The studies examined three routes through which community members’ psychological ownership could be fostered: control over, intimate knowledge of and investment of oneself in the target. However, it is unknown how psychological ownership of safe water infrastructure can best be promoted and whether increased psychological ownership, in turn, leads to better acceptance, maintenance and functionality in the long term.

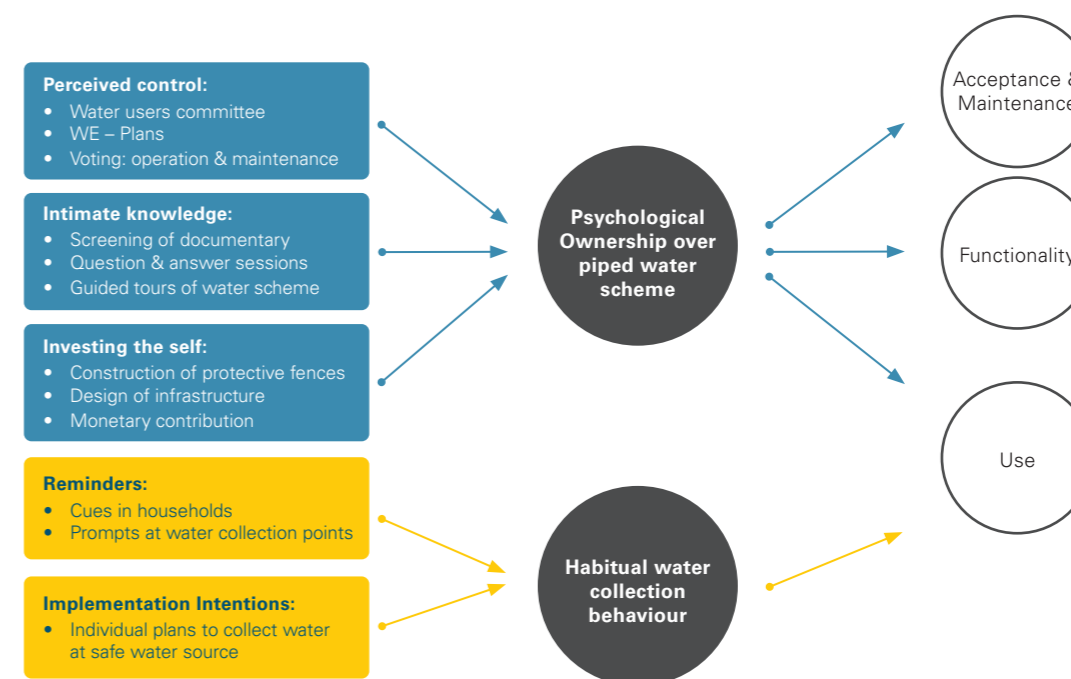
Additionally, the consistent use of a safe water source often requires a change in people’s individual routines in water collection behaviour [7]. Switching from an old unsafe source (e.g. water from an unsafe hand pump) to a newly installed safe source (e.g. a community-based piped water supply [8]) requires more than just breaking old habits. New habits would have to be established.

## Project PACT

The Public Health Engineering Department (PHED) of the State of Bihar – under the Jal Jeewan Mission of the Indian Central Government and the Mukhyamantri Gramin Peyajal Nishchayojana Mission by the Government of Bihar – is installing community-based water treatment units with piped water supply to every household in Bihar by 2024. The villagers in the rural communities have to accept, use and maintain the infrastructure to mitigate the risk of health-related consequences. Project PACT (Participatory Action For Long-Term Arsenic-Safe Water) will conduct a 2x2 factorial cluster-randomised controlled trial (c-RCT; Figure 1) to determine how important psychological ownership and habit are to the acceptance, use, and functionality of this safe water infrastructure.



**Figure 1:** Study design of PACT. Two levels of ownership intervention (yes/no) are combined with two levels of habit intervention (yes/no) to four intervention arms (Ownership; Habit; Ownership+Habit; Control).



**Figure 2:** Conceptual diagram showing how psychological ownership of the water scheme and habitual water collection are linked to theorised routes (and intervention activities) and expected consequences.

In a participatory process, the local NGO Paridhi, Tilka Manjhi Bhagalpur University, Bihar State Pollution Control Board (BSPCB), and the PHED, Eawag and University of Bern jointly developed and are performing community-based interventions (Figure 2). The community-based interventions will aim to ensure social embedding of the safe water supply schemes by promoting psychological ownership over the infrastructure in the communities. The household-based interventions to foster habitual use of the safe drinking water sources are based on previous successful interventions [9].

A total of 64 water schemes were randomly assigned to one of the three intervention arms or the control arm. In the control arm, the water scheme is installed by the Bihar PHED, according to their regular protocol, without any additional interventions. The intervention protocol is to be implemented over a period of eight months and is currently about to be completed. Hypotheses concerning the effects on water system functionality, acceptance and use will be evaluated in a survey immediately after the interventions in autumn 2020, and in the long-term in a follow-up survey in autumn 2021.

## Conclusion

The findings will contribute especially to Sustainable Development Goal (SDG) 6. Applicable recommendations will be made on how community members can be engaged to improve engineering efforts to achieve universal and equitable access to safe water in rural areas (SDG 6.1, 6.3 and 6.B.1). •

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