

38th WEDC International Conference, Loughborough University, UK, 2015

**WATER, SANITATION AND HYGIENE BEYOND 2015:
IMPROVING ACCESS AND SUSTAINABILITY**

Social and economic factors influencing the 'choice' of water supply in rural Karnataka, India

S. Linneck, A. H. Parker, P. Smeets, P. H. Cruddas & P. Jeffrey (UK)

BRIEFING PAPER 2136

India is an enormously diverse country, although the challenges of water scarcity and quality are almost ubiquitous. This paper focuses on two villages in Karnataka state where a mixed methods qualitative research approach was applied. This revealed that decision - making about water supplies was made in a top-down fashion and there was little opportunity for village members to contribute. The policies and tariff systems were extremely complex. Communities had their own social and religious beliefs about their water supplies as well. Together these may be contributing to their rejection of the government supplied water and their use of alternative, often unimproved sources and of water filters in their houses. These decisions and the reasons behind them will be further explored in an additional fieldwork campaign.

Introduction

India's demand for water is steadily increasing with its economic and demographic growth. At the same time, water scarcity is a challenge for India's industrial, agricultural and domestic sector. Poor water management, climate change and conflicts over shared water sources such as dams exacerbate the current situation (UNICEF et al., 2013). Decreasing groundwater levels and increasing groundwater and surface water contamination cause morbidity and mortality. Current approaches to the problem by government and especially para-statal organisations, NGOs and private companies are numerous, yet an overall and end-to-end solution on a large scale is still to be found (ibid./ Conin et al., 2014).

There are significant differences in water quality and availability throughout India, even within the same region of the same state. The same is the case for the population's ability to afford alternative water solutions. However, decisions about water supply are largely centralized at a state-level, following national policies. This can mean water is pumped over long distances from central dams and rivers to different regions (UNICEF and WHO, 2012). The poor maintenance of infrastructure causes discontinuous water supply. This forces people, especially in rural areas to collect and store water and resort to unprotected water sources as open wells. Water collection and hygiene education is usually executed by women in each household, at the same time they are the least involved in decision- making processes regarding water supply schemes. NGOs are supporting community groups of equally mixed gender or exclusively female groups to empower women (Argyam, 2009).

Most end-users in India are unaware of the treatment processes, infrastructures and delivery of potable water, as is the case in most countries in the world, and therefore rely on taste and appearance of water as quality indicators. Hence, trust in the safety of the water supplied relies on these indicators to a great extent. Social and traditional norms play a key role in influencing the hygiene behaviour, especially in rural areas. The government considered this in its campaigns to encourage behavioural changes towards the ambitious goal of a 'clean India' until 2019, by investing in the construction of toilets, and encouraging the population to keep their environment clean, displaying famous Indian citizens as role models engaging in the media (Ministry of Information and Broadcasting 2014). At the same time, NGOs have been trying to raise awareness through different public events and programmes to educate the rural population on aspects and

measures of hygiene and to improve their water and sanitation situation (Argyam, 2009/ UNICEF, WHO, 2012).

Research aims and objectives

Interdisciplinary research is critical in technology based projects in developing countries, and social sciences perspectives towards a multi-perspective approach are required. In this context, the aspect of bottom-up research, to emphasize the necessity of the consideration of the ‘human component’ is regarded to be a key aspect (Omar, 2013). People’s every day routines, daily habits and rituals are a key factor to be taken into account when thinking about sustainable water supply, especially as decisions on water supply schemes in India are usually made top-down (Chambers, 2007). This research aims to discover these social key factors to reveal the rural Indian population’s perceptions of their current water supply and treatment, as well as their needs and preferences for water supply and treatment, and to subsequently include their perspective in the water discourse.

Method

The fieldwork for this research was carried out from the 23th October to the 5th November 2014, in the south-Indian state Karnataka. The specific regions visited were Thirthahalli, Shimoga district and Yadgir and Gulbarga district. These regions were chosen due to their differences in climate, water problems, water supply and social structure. Thirthahalli, in west-Karnataka is a high rainfall area, the majority of the population are Hindus and the illiteracy rate amongst the population is low. Yadgir and Gulbarga, in north-east- Karnataka are facing larger problems providing safe and sufficient potable water for their populations, the illiteracy rate is high, compared to the Thirthahalli area, and amongst the local population, a significant part are Muslims. By including the different regions, a wider image of the complex water problems in India should be attained.

To gain access to the field, qualitative social research methods, including individual interviews, group discussions and participatory observation were carried out. In total, 19 interviews were conducted, of which three were group discussions and 16 individual interviews, including visits to local water sources, treatment plants and water tanks. Local NGO members functioned as gatekeepers and interpreters during the interviews where necessary (Photograph 1). They helped with the sampling of important stakeholders in the targeted regions’ water sectors. The participants included local political leaders on different administrative levels and carrying out different tasks, staff operating treatment plants, hospital staff, engineers and other technical staff working within the Indian water sector, pre-school teachers involved in the hygiene education of the local children, and private individuals residing in the areas visited.

Based on the previous review of the literature available on water problems in India and the visited areas, an interview script consisting of a set of open- ended questions was designed before-hand and used during the interviews.



Photograph 1. Interview with women group leader, interpreters on the right hand side

Source: Sandra Linneck

Results

In the Gulbarga region, local political leaders and engineers expressed their preference for the installation and use of Reverse Osmosis plants, without being able to explain this view.

In the area of Thirthahalli, a lack of willingness to charge the public for water supplied by the government was expressed during several conversations and interviews with elected officials, on one hand referring to the public perception of a right to water as a free public good, on the other hand emphasizing the personal fear of not being re-elected. A top-down structure in water-related decision-making was found and there was limited opportunity for public participation in Thirthahalli, Gulbarga and Yadgir. Similarly, there is a trend towards an increasingly centralised and technologically improved water supply. This development, from hand-dug wells, over hand pumps towards multi-village schemes with piped water supply, more and more denies the chance for the population to help maintaining their own water infrastructure. However, adoption of alternatives to government supplies was found ubiquitously and several households could be found in every village which had privately purchased water filters, especially in the Yadgir and Gulbarga area, to additionally treat their government- provided water. People in both areas reported they would boil or filter their drinking water during the monsoon period, using ceramic candle filters or sieves (Photograph 2), due to the mud content in the water and following instructions of pre-school teachers and doctors. Water filters could be found in nearly all research areas in pre-schools and government buildings and hospitals (UV, RO or ceramic candle filters) for the purification of drinking water. The alternative water sources used especially in Thirthahalli were private open wells - often using electric pumps - or rivers. In Gulbarga and Yadgir, private bore-holes and bottled water or in towns and cities the water from water tankers offer alternatives to the supply by the government to those who can afford it.



Photograph 2. Woman in village in Yadgir with privately purchased filter

Source: Patrick Smeets

It was notable that the community had different views on the minimum service level of water quality and supply to the government. In the villages of the area around Thirthahalli, the population is wealthier than in the Gulbarga and Yadgir district, which allows them to be able to support higher priced water systems and enables them to choose between different supplies. Additionally, Gulbarga's population is more severely struggling with water shortages especially in summer periods. The generally lower groundwater table in this area – in contrast to the Thirthahalli area - necessitates the drilling of bore-holes, instead of simple hand dug wells. Therefore Gulbarga's and Yadgir's population is left with fewer possibilities regarding the variety of different types of water supply available in the area than Thirthahalli, and residents consequently had more modest views on their minimum service level of water quality, quantity and water supply than in people residing in the area of Thirthahalli, as long as their water supply was overall reliable. Thus, these different views on the minimum service level of water quality and supply depend on factors such as region, climate, water availability and people's income. Furthermore, the views on water quality differed as the judgement is usually made based on subjective standards such as taste, colour and smell of the water.

Moreover, within the rural communities, cultural and religious factors, along with fear and assumptions, seem to largely influence the hygiene behaviour and preferences of water supply and treatment. In the villages visited in Thirthahalli, the importance of the visibility of water was underlined during interviews, so

open wells where the water is visible are preferred to taps where it is hidden. In this way, locals would know if there is still water left in the well simply by looking at it, whereas using public taps, people could not be sure if and how much further water could be obtained. Along with this, the leader of a local women's group emphasized the spiritual meaning and worshipping of open water sources, especially open wells, during the main Hindu festivals – as witnessed in form of palm leaves and candles which had been lowered onto the water surface of open wells during the festival 'Diwali' (Photograph 3). She also explained the spiritual value of water in general. In this way, the decision for a certain water supply also largely depends on customs, traditions and beliefs. Overall, in the rural area of Thirthahalli, open wells were the preferred water sources. However, in many villages, despite the area being relatively water-rich, some wells still regularly run dry during summer seasons. One of the villages visited in this area, has tackled this problem by groundwater recharge with rainwater harvesting through percolation pits which for the last three years has left this community with water available in their wells throughout the whole year, even during summer seasons.

Local saving-groups could be found in most of the villages visited. The money saved within the groups is often spent on the construction of new private infrastructure, such as new houses, open wells or toilets for their members.



Photograph 3. Open well with Palm leaves during the festival 'Diwali'

Source: Patrick Smeets

A risk for the already unstable power and water supply, as well as water safety is posed by animals which, for religious and traditional reasons, can be found in the streets of villages and cities. For example monkeys have been witnessed destroying infrastructure such as electric overhead wiring and the researchers observed a monkey drinking from a rooftop water storage tank, presenting a contamination risk (Photograph 4).



Photograph 4. Monkey in Hampi opening a rooftop water tank and drinking from it

Source: Patrick Smeets

Water supply lies within the responsibilities of the government, although contracts for the construction of water supply schemes and for private water supply itself, especially in Bangalore, are given to private contractors. In general, the involvement of public and private stakeholders in the water sector is complex, and the actors are reportedly often motivated by economic interests. The political administration is complex, and of a multi-layered and bureaucratic structure. The same was true for the water tariffs, which differed in the areas visited, and were sometimes even missing at all, in which case locals used the water for free. Tariffs depend on one hand on revenue costs, but have to be balanced with the population's ability to pay,

which leads to various different tariff systems. These tariffs consequently range from payment for a certain amount of treated water at public water points, over a monthly ‘flat rate’ for water, to free water supply for some people or some regions.

However, contradictions were observed between policy and practice which may impact the reliability of datasets, for example, interviewees cited a case where a water point in the region was still being used despite it having been tested as unsafe for consumption. For private open wells, no water quality testing is required from the state’s side. Contradictions of the same kind were encountered between people’s descriptions of their water related practices and them performing them, especially in terms of their hygiene behaviour. An example was observed by the researchers, when they asked one of the community members in a visited village to first explain and then show them how this person would pour and drink water. Pouring water from a water storage vessel was explained to the researchers - including processes of preceding hand-washing with soap and pouring water right from the storage vessel directly into a cup. Immediately afterwards, the same person was observed, pouring water from the storage vessel without hand-washing, reaching into the storage vessel with right hand and the entire right arm, followed by drinking the water not directly from the cup it had been poured into, but letting the water run from the cup over the right hand to direct it into the mouth.

It has been recognized by the researchers and underlined in interviews with NGOs and government workers that the Indian government as well as non-government organisations use TV adverts, TV campaigns and role-models like politicians or Bollywood stars to function as examples for advertising behavioural change and public health campaigns. This is accompanied by ‘low-threshold’ hygiene-, water- and nutrition-guidance for the whole family by pre-school teachers and accredited local health activists (ASHA) workers.

The factor encountered influencing the choice of water supply is first of all the reliability of the supply. Water quality, measured by subjective impressions of the water (smell, taste, colour) and the perception of the water as being safe are similarly important, along with the ease of use of the water points. Culture and traditions should not be underestimated in the planning of water infrastructure, as they might lead to its rejection, depending on the availability of alternative supplies. These factors should be considered and researched for the targeted region or community, especially for projects in countries with a different cultural context to those working on the project.

Conclusions

The lack of participation in decisions concerning water supply seems to lead to the adoption of individual alternatives by the rural population, such as the private purchase of filters for additional water treatment or the decision to revert back to traditional sources such as open wells. The next stages of the research need to investigate the full complexity of possible reasons for this phenomenon. These could include monetary reasons, lack of trust in the quality and safety of the water supplied by the government, water scarcity through discontinuous water supply, for example through seasons of drought, the perception of water as a free public good or the spiritual and religious value of water.

Lessons learnt

Overall, the interviewees in the Shimoga district were not concerned about the quality of their water. The same is the case for most of the interviewees in Gulbarga and Yadgir district, except for one village, where locals complained about potential fluoride contamination. This shows that the perception of the residents does not always reflect the actual water situation and that many of the visited people had only a limited or no knowledge about waterborne diseases, which again might reflect a lack of education and information on these issues, and therefore needs further attention.

Educating people on water practices and raising awareness for water-related problems through media (e.g. TV), has been suggested as more effective to reach out to the public by members of local organisations than government schemes. Especially the use of celebrities or politicians as role-models in media campaign has proved successful and this strategy is currently being used for the ‘clean India’ campaign.

Religious beliefs and preferences can influence the preferred water source and type of water point and this should be taken into account for sustainable planning of new water supply systems. This and the above mentioned aspect show that the local situation and the ways of gaining access to people with new information has to be adjusted to the local situation and to their needs and interests. To achieve this, the local and religious beliefs regarding water have to be taken into account, as people might reject a certain water supply or treatment because of these. Beliefs and preferences can differ from region to region and therefore need to be taken into account ideally during the planning process before new infrastructure is built.

Open wells can be a sufficient and adequate source of water, even in dry seasons, if groundwater recharge from rainwater is possible. Ways to preserve groundwater and a holistic water education has to be achieved on a sustainable level, which has proved to be possible in a village in Thirthahalli. Even though some wells run dry during summer season in the region, they still constitute the most reliable water points for the locals compared to the existing alternatives in the Thirthahalli area. This example could be exported, to other parts of the country or even beyond the Indian borders - especially to places with temporary high rainfall - to help with a better water management.

Next steps

Further fieldwork will investigate why the population in the rural areas visited, is reverting from improved water sources, back to traditional solutions, such as hand dug wells. This will involve the understanding of cultural and everyday life routines from the people's perspective. This research will use a qualitative social research approach, including participatory research and guided interviews using an interview script. The interviews include individual interviews and group discussions, which will be documented using a voice recorder and transcribed and analysed afterwards. The choice of this methodology has evolved from the first experiences in the field.

Acknowledgements

This research is funded under the EC FP7 programme; grant number 308496 "Water4India".

References

- Arghyam 2009 ASHWAS. *A Survey of Household Water and Sanitation. Karnataka – 2008- 2009*. Bangalore.
- Chambers, R. 2007 *Ideas for Development*. Earthscan: London.
- Conin A.A., Prakash A., Satya P, Coates S. 2014 *Water in India: situation and prospects*. Water Policy Vol. 16, pp. 425-441.
- Ministry of Information and Broadcasting: <http://inbministry.blogspot.co.uk/p/canvas.html> (viewed: 30/11/14).
- Omar, Y. Y. 2013 *Risk Management for Drinking Water Supplies in Developing Countries – The Influence of Culture on Water Safety Plans*. PhD thesis: Cranfield University, UK.
- UNICEF, FAO, SacriWATERs 2013 *Water in India: Situation and Prospects*. UNICEF, FAO, SacriWATERs, Delhi.
- UNICEF, WHO 2012 *Progress on drinking water and sanitation 2012 update*. UNICEF and World Health Organization, USA.

Contact details

Sandra Linneck
Cranfield Water Science Institute, Cranfield,
Bedfordshire. MK43 0AL. UK
Tel: +441234758120
Email: s.linneck@cranfield.ac.uk
www.cranfield.ac.uk

Alison Parker
Cranfield Water Science Institute, Cranfield
Bedfordshire. MK43 0AL. UK
Tel: +441234758120
Email: a.parker@cranfield.ac.uk
www.cranfield.ac.uk