

## Abstract

The lack of access to safe water and improved sanitation and the associated health risks is a major issue in developing countries including Pakistan. Many national and international efforts have been made over the past few decades to improve the situation. However, the net outcome is reported to be not proportionate to the efforts made and money spent. The reason could be the misperception that water supply and sanitation is only a technical and engineering issue — that science and technology can solve the whole problem. Such a view ignores, however, the cultural, institutional and political aspects of the problem. This study presents a holistic view of water supply and sanitation — considering water supply and sanitation as an integrated issue and trying to understand the technical, cultural and institutional aspects by analysing people's practices and government policies and approaches.

The study was conducted in the North West Frontier Province (NWFP) of Pakistan where data was collected from three villages and one industrial estate. Relevant actors at national, provincial, district, tehsil and local levels were interviewed during more than one year of fieldwork. Both quantitative and qualitative research methods were used. In Machaki village, the process of introducing innovative sanitation technology and how the village people adopt/adapt it was studied (see Paper 1). In Kot and Takht-e-nasrati, the health risk associated with pit latrines and so-called improved water supply were studied by determining the design parameters of pits and wells and analysing groundwater/drinking water for coliform, nitrite and nitrate as an indicator of faecal contamination. Local people's perceptions were obtained during a survey and after presenting the technical results in a series of community meetings (see Paper 2). In Gadoon industrial estate, the viability of natural treatment systems for dye wastewater was studied. A wetland was purposely designed and constructed, and dye wastewater samples from influents, the wetland system and effluents were collected and analysed for the selected organic, inorganic, anions, pH and heavy metals for two consecutive years (2003-2004). The relevant actors' opinions were obtained through open-ended interviews (see Paper 3). Based on the above three studies, the current and proposed policy and institutions of the government of Pakistan were analysed and the interfaces between the actors and policy and practices were obtained (see Paper 4). The

study found that most of the rural water supply and sanitation practices, considered to be safe in theory, are actually a major health risk, without local people realizing it. However, people's attention to the issue was drawn and their practices and behaviour adapted by presenting and discussing the issues in their preferred tone and language. Once local people understood the issues, then adopted/adapted/developed technical solutions suitable to their cultural context. This study established, evaluated and proposed natural treatment systems and ecological sanitation as a cheap, effective and sustainable option for wastewater treatment and rural sanitation. The study from Gadoon confirmed nearly 90% retention of most of the industrial pollutants. Upon understanding this technology, the village people adapted it for purposes of rural ecological sanitation. However, the study found that the government's current and proposed policies and approaches are not in line with the local people's practices, perceptions, expectations and demands and the realities of the water supply and sanitation issues. The study also found a considerable gap between local people and other relevant actors in water supply and sanitation sectors, between people's practices and government approaches and options, between government policies and regulation on paper and their actual implementation, between government claims of performance and achievement and the realities on the ground. The study suggests an integrated and interdisciplinary approach for understanding the issue of water supply and sanitation and tailor-making technical solutions to cultural contexts through working closely with local institutions.