

Literature Review and Expert Opinion

To prepare for the ASHWAS study, the research team reviewed literature already available in the broader area of public services including water, sanitation, health and education. The team consulted senior research experts (including survey experts) and knowledgeable authorities in the area of water and sanitation and sought their advice on available resources as well as various aspects of the study. This helped the team design a survey that would build on previous efforts instead of re-inventing the wheel.

Literature review: The literature review involved studying past surveys in the sphere. Mainly been conducted by the government, various citizen groups and non-governmental organizations (NGOs), these have involved different goals and adopted a variety of approaches. [See Annexure A: List of Surveys]

For example, surveys conducted by non-profit organizations such as Pratham's *Annual Status of Education Report (ASER)*¹ and *People's Audit on Health, Education and Livelihood (PAHELI)* tend to be people-centric efforts with limited themes, simple tools and few questions. They usually adopt an activity-based approach and generate reports that do not rate or score based on parameters.

On the other hand, Public Affairs Centre (PAC) follows a more traditional, rigorous survey method, which includes household questionnaires, interviews with Gram Panchayat (GP) members and focused group discussions. They rate public services against benchmarks and have pioneered the 'report card' concept for public services by terming their outputs 'Citizen Report Cards'.

The government or other agencies like the World Bank have conducted surveys aimed at understanding practical realities such as 'willingness to pay' or the success rate of specific schemes. In these cases, research design was more detailed and covered many households (HH) as well as the local service providers. Most were not people-centric or activity-based.

Careful examination of a variety of such surveys helped the team to arrive at the research design and approach suitable to the specific goals of this study.

Expert opinion: The ASHWAS team consulted experts from government agencies like the Rajiv Gandhi Drinking Water Mission (RGDWM), the Total Sanitation Campaign (TSC), and the Rural Development and Panchayat Raj (RDPR) department of the government of Karnataka to gain a deeper understanding about water, sanitation and related issues. The team also consulted NGOs such as Pratham and Akshara Foundation to understand different survey methodologies.



¹ <http://www.pratham.org>
<http://www.aksharafoundation.org>

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The team also consulted market research groups like Feedback Consultants for their advice on sample selection procedure, questionnaire design, analysis structure and research tools.

Partnerships, Team Structure and Training

Arghyam was keen on a people-centric, activity-based survey so the research design was primarily based on the PAHELI and ASER studies. However, to arrive at more measurable outcomes, the team also adopted elements from the Public Affairs Centre (PAC) report card approach. Many issues that concern the Rajiv Gandhi Drinking Water Mission (RGDWM) and the Total Sanitation Campaign (TSC) were incorporated in the research design.

Partnerships: Arghyam partnered with PAC to benefit from their vast experience in conducting similar studies. Instead of outsourcing the study to a market research organization, Arghyam partnered with 15 different NGOs and citizen groups across Karnataka to initiate a participatory survey.

The partner organizations co-ordinated the survey at the local level. Each local partner covered one-three districts depending on their sphere of influence and developed a districtwise plan including team details, dates, logistics and budgets to help smoothen the process.

Team structure: One of Argyham's main objectives was to work with people at the grassroots. With the help of local partners, we engaged surveyors from self help groups (SHGs), village level institutions and local citizen groups.

Each survey team consisted of one-two coordinators/trainers from the partner organization who were responsible for managing and implementing the survey at their level, and two-four teams of field surveyors. Each of these smaller teams, in turn, comprised one supervisor and four surveyors, two of whom were mandatorily women.

The entire ASHWAS team comprised approximately 30 coordinators, 45 supervisors and 200 surveyors working across Karnataka and the entire team at Arghyam.

Training: An initial series of trainings for the coordinators/trainers was followed by eight regional training sessions across Karnataka. Each session consisted of four days of intense, residential training and focused on improving the team's understanding of Water and Sanitation issues (WATSAN).

Special training modules were developed in partnership with Outreach, a Bangalore-based resource and training organization. The sessions were jointly conducted by Arghyam, PAC and Outreach and included extensive discussions on questionnaires, village mapping and household sample selection, practical demonstrations on photography and water quality testing, role plays, and field visits.



Sample Size: Selection and Reliability

The ASHWAS survey covered 28 of the 29 districts in Karnataka, with the exception of Bangalore urban. Based on advice from experts and the required survey outputs (report cards at the GP and state level), it was decided that the survey would cover 17,200 households across 86 talukas in 172 GPs across Karnataka. The population proportionate to size (PPS) technique was used to select households that would make up the sample size.

■ **Selection of talukas:** There are 172 talukas across 28 districts in Karnataka. Fifty percent of these (86 talukas) were selected for the survey using the systematic random sampling technique with a random start.

■ **Selection of GPs:** In each selected taluka, two GPs were chosen, again using the systematic random sampling technique with a random start.

■ **Selection of villages:** All villages (including hamlets) were selected in each GP.

■ **Allocation of households per village:** The household sample size covered 100 households per GP, spread across all villages and hamlets in that GP. The PPS technique was again used to distribute households across villages based on the size of each village's population and how much it contributed to the total population of the GP.

■ **Selection of households:** Households were selected by following the process of village transect² and making a map. This exercise helped list all households in a village based on locality. Households were then selected from all localities to ensure representation of all sections of society. The number of households per locality was proportional to the total number of households within the locality. The interval was determined on the basis of the number of households and the right hand rule was used to select individual houses. In case a selected household was unoccupied, the neighbouring household on either side was selected instead.

■ **Sources of data:** All data for the sample was taken from the Rural Development and Panchayat Raj Department, Government of Karnataka (RDPR) website³ for the financial year 2003-2004.

■ **Reliability of estimates:** The sample size was determined by keeping the error margin of estimates at 5% and at 95% confidence level. The sample size is adequate at state, district and GP levels. Overall, the confidence level was at 95% dipping to 90% in rare cases. [See Annexure 2: Sample Selection.] The team was careful to ensure that the sample size was a good representation of the population and the data could be extrapolated for the entire state.

ASHWAS covered 17,200 households across 28 districts. It included 172 gram panchayats in 86 talukas of Karnataka



² Transect is a process in which the team walks around the village and draws the map while doing so.

³ http://nitpu3.kar.nic.in/samanyamahiti/smenglish_0304/default.html



Research Design and Approach

The ASHWAS survey captured information through a combination of tools, instead of merely using the traditional household questionnaire. To generate comprehensive information and statistics, the survey used the following research tools:

- Questionnaires
 - Household questionnaire
 - GP questionnaire
 - Village information sheet
- Water quality tests
- Village transect and village map
- Observation sheet
- Photographs

Questionnaires: The questionnaires went through many iterations based on thorough research into areas most critical to people at the ground level. Preparatory research included focused group discussions, role plays and field trials of questions. This helped to create closed-ended queries with pre-coded response options. A few open-ended questions were also included to delve deeper into certain queries.

Three sets of questionnaires were developed keeping different respondents in mind.

a) The **household questionnaire** was designed to cover most aspects of water, sanitation, health, hygiene, finances and grievances including people's satisfaction with GP-level services.

b) The **GP questionnaire** consisted of two parts: the first part aimed at gathering information from official GP-level documents while the second part was a set of questions directed at GP members.

c) The **village information sheet** covered common village-level issues such as water sources or drainage. This information was gathered through group interviews.

Each questionnaire began with an introductory section on demographic details of the household, village or GP. Triangulation of different questionnaire types strengthened the findings with facts and testimonies that helped identify patterns and errors within data.

All interviews were conducted in Kannada and questionnaires were written in Kannada. *[See Annexure 3: Questionnaires.]*

Water quality tests: To make the survey people-centric and simultaneously create awareness about WATSAN issues, the team conducted water tests with field water quality test kits. Water was tested for fluoride / nitrate levels and

Bacterial contamination using methods approved by UNICEF and recommended by the National Rural Drinking Water Quality Surveillance and Monitoring Programme.

The water quality test kit for fluoride and nitrate gave immediate results based on change of colour. The results for bacteriological contamination used the H₂S strip technique and yielded results after 24-36 hours. The tests were indicative and in case of contaminant detection, people were directed to go for further testing to a water quality laboratory. This survey tool proved hugely successful in generating enthusiasm among villagers and surveyors and helped collect data on the quality of water. *[See Annexure 4: Water Quality Tests.]*

Village transect and map, observation sheets and photographs: Survey teams along with local people participated in the construction of a village map after a transect. The purpose was two- fold:

- a) Household listing was done via the transect to select houses for the survey and ensure that all localities were proportionally covered.
- b) A rudimentary village map was created to mark various WATSAN-related infrastructure and locations of houses and roads. This helped the team map water against sanitation and identify problems related to contamination, poor drainage or hygiene issues.

During the process, the team also noted other important observations in their observation sheets and these went into the final report cards as additional inputs. Photographs were taken of different WATSAN-related infrastructure such as public stand posts and hand pumps across the villages. These supplemented the data with visual evidence and improved analysis.

Field Survey

The field survey took place between December 2008 and January 2009. Forty five supervisors and 200 surveyors spent 4 days per GP carrying out all survey activities.

Supervisors were responsible for allocating households to each surveyor based on the sampling procedure, interviewing GP members, participating in village mapping and conducting water quality tests. Surveyors were mainly responsible for conducting the household interviews. They also had to participate in village mapping and water quality testing.

The entire process was managed by our local NGO partners through their survey coordinators.

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Quality Monitoring

The ASHWAS survey adopted rigorous quality monitoring mechanisms to ensure that data obtained was accurate and inclusive. These mechanisms aimed at ensuring that surveyors conducted surveys truthfully and without bias, all villages in assigned GPs were surveyed, the sampling process for household selection was followed strictly, and teams carried out all survey activities in each GP.

Quality monitoring helped keep survey teams alert and watchful about the quality of data they were collecting. At least 30% of the GPs undertaken by each partner NGO were monitored and all survey teams were checked using at least one of the quality mechanisms. This monitoring exercise was undertaken in three ways:

- Random telephone calls to supervisors and surveyors to check if they were adhering to the survey plan and following sample methodology.
- Field visits by Arghyam and PAC monitors to check questionnaires and talk to GP members. Skip questions and missing or wrong entries were specifically addressed.
- Back checks were conducted on 10% of GPs from the total sample by cross-checking responses with the individual householders. Apart from Arghyam and PAC's active participation in monitoring, the supervisors scrutinized 100% of the household questionnaires while survey coordinators randomly checked 20% of the questionnaires.

Data Entry and Error Tracking

Data entry: There were two main objectives with regard to gathering data for analysis: to modularize the data so that specific details could be extracted easily for analysis and to minimize errors during data entry.

Data included responses to questionnaires and results of water quality tests. Questionnaires were routed through a data entry vendor who returned raw data in spreadsheet format. All data entered could answer a certain query in isolation or different queries in combination.

To make sure that data entered in each section was accurate, column-level validations were established. Having anticipated a finite set of answers for a given question (and column), it was ensured that only data that matched certain criteria was entered. The process of setting validation for over 1000 columns helped immensely in reducing data entry errors.

Error tracking: Two techniques were used to track errors in data.

a) Error checking by using queries for all skip questions and a few compulsory questions, and by using codes. By running these queries, all mistakes were recorded according to questionnaire number.

b) Identifying the level at which errors had been committed. This was done by manually checking questionnaires and spreadsheets against the suspect data. If the error had taken place at the data entry operator's level, the soft copy in the spreadsheet was corrected before analysis. Such errors were minimal (less than 1%) so the vendor was not required to re-enter or correct the data at his end. If there was an error at the surveyor's level, then following the 5% margin of error, any data above that margin for the specific questions was discarded. Error levels were usually below the established 5% margin for each question.

Framework for Analysis

Analysis was carried out at the state, district and GP levels. Estimates were recorded at the state level to arrive at an overview of WATSAN issues in Karnataka. At the district level, the analysis provided an overview of each district and compared districts in terms of performance. At the lowest level, estimations were boiled down to each GP to give a clear picture of specific water, sanitation, infrastructure and other problems at that level.

The analysis was divided into sections on water, sustainability, sanitation, health, hygiene, equity, finances, grievances and satisfaction levels including demands of citizens. Each section was broken down to a set of indicators. For example, indicators like access to water, frequency of supply, quality of supply and quantity of supply were included in the section on water. Sectioning questions during data entry helped streamline this process. All indicators gave a direct answer but to understand how they fared, each indicator was clubbed under the specific section and then rated accordingly.

Selective regional groupings of districts were analyzed to understand how different regions within Karnataka differ in terms of water and sanitation issues. Data was also analyzed through the lens of equity to shine a light on how economically deprived, physically disadvantaged and minority communities fare in terms of WATSAN facilities. In addition, a comparative analysis was carried out with other reports on sustainability, public health and infrastructure.

Templates for GP, district and state

The GP report covers water situation, sanitation & hygiene, governance, grievance & finances, citizen demands, water quality test results and village map (with an identifiable issue within the map). GPs are also rated against their neighbours within the sample.

State- and district-level report cards look at WATSAN from the perspective of public infrastructure, equity, sustainability, public health, WATSAN administrative infrastructure and finances. Levels of satisfaction and citizen's demands are also covered.

Data was analyzed through the lens of equity to understand how economically deprived, physically disadvantaged and minority communities fare in terms of WATSAN facilities.





Data Collation and Scoring

The data flowed through a series of processes before analysis.

Collation: Data was entered into spreadsheets. This raw data was processed using an SQL database and a querying ability was built on it. The first set of queries resulted in quantitative analysis which was used to infer qualitative aspects as well. Then, queries based on the indicators mentioned above were developed for GP, district- and state-level outputs.

Scoring: The next step in the analysis was to develop a score based on the indicators. The score was determined for each indicator using the sum of the sub-indicators. Due to the lack of a benchmark, sub-indicators were converted to a percentage. The sub-indicator was computed by classifying potential answers as 'favourable' or 'unfavourable'. Favourable responses for questions were weighted against the total number of responses and summed up. The purpose of the score was to provide a basis for indication and comparison rather than to provide any kind of ranking⁴.

Outputs

After quantitative and qualitative analysis, all data resulted in three sets of outputs: GP report cards for all 172 sampled GPs [*See Annexure 5: The GP report card*]; 28 district report cards; and a state report card. The state and district report cards have been compiled in this document while the individual GP report cards have been sent to members of each GP. This document also contains an additional section on specific important issues.

⁴For details on how the score has been derived, please visit www.ashwas.indiawaterportal.org