A Framework for Rural Drinking Water Quality Management (WQM)

Collating Experiences from the Voluntary Sector

Arghyam
Safe, sustainable water for all

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First published by Arghyam, Bengaluru, 2012

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India is in all respects a remarkable country. Home to almost one fifth of humanity, it is one of the emerging economic powerhouses of the world. Actually it would be safer to say it is a re-emerging power house as India was traditionally the economic global leader, holding approximately one third of global GDP in the year 0 AD. Recent rapid GDP growth is a real reason of pride for India, but behind there are two stories – how it can be sustained within the current challenges of water safety and security and also how to spread the benefits to all segments of the population. Water is without a doubt central to the sustained and equitable growth (economic and social) of India.

Water quality remains a significant challenge. A recent UNICEF study conducted across 60 districts in 12 states found almost half the samples taken were non-compliant for either bacteriological or chemical parameters. The Ministry of Drinking Water and Sanitation has recently taken the very positive step to substantially increase the water quality budget component of the National Rural Drinking Water programme. These extra funds will help to better map and respond to the water quality challenges in India. However, to do this effectively a structure of response is required. Monitoring is only one part of such a structure and indeed, overall, technology alone is not even half of the solution.

Community engagement at all stages is crucial and they are the key stakeholders to ensure quality, impact, sustainability and equity in rural water supply. A detailed understanding of this process and its relationship with hardware, human resource requirements and costing is essential to optimise interventions. This Water Quality Management Framework developed by Argyham and its partners builds up such a structure. It is based on detailed feedback from NGOs across India to map out what is required at all stages of a water intervention to ensure that it succeeds. The structure identifies five key stages in the process, from baseline assessment, to participatory planning, to water quality monitoring and data management to implementation and finally operation and maintenance. A first interesting reflection is that implementation is actually at step 4; also interesting is that hardware costs are in total only about half of the project costs. Also interesting is the importance of building up social capital (and in all other senses) in villages as part of the process. This framework may now be used as a starting template for future water interventions to comprehensively plan out timelines and resource needs.

I wish the document all success in its objective to provide a structure for rural water interventions that ultimately lead to an improvement in water quality and lead to better quality of life for villagers.

Aidan Cronin
Water, Sanitation and Hygiene Specialist
UNICEF India

The recent creation of a separate Ministry for Drinking Water and Sanitation by the Government of India as well as the rising budgetary allocations indicate an increased commitment to this sector. The situation on the ground demands it. However, water quality problems are increasing in intensity and across geographies with every passing year and the statistics indicate that this is a struggle that will engage us all for several more years. The rural landscape is dotted with dysfunctional water quality technologies, even as efforts continue towards finding more effective solutions. Clearly, the complexities of the problem with its tight linkages to other issues like sanitation, agricultural water extraction, weak governance and low awareness of stakeholders require a relook in the way the problem is approached. There is recognition now that if outcomes are to sustain, end-to-end solutions rather than technological fixes need to be evolved. This document suggests a framework for an integrated approach to total water quality management.

There are many good examples of small-scale water quality management from across the country that are inclusive and practical and that have sustained communities for several years. These models implemented by organisations, several of which Arghyam has supported and many from outside our network, are the basis for this document.

This framework is the second in a series developed by Arghyam after the first one on sanitation — "Step by Step – Achieving Sustainable Sanitation". The objective of such frameworks is to extract patterns and lessons from successful projects of grassroots NGOs and develop them into a set of guidelines for other organisations or the Government looking to implement similar solutions.

Through this document, we have attempted to decode and structure existing field knowledge drawn from 12 NGOs working on water quality management. The framework explains the process of water quality management as a progression through five distinct phases from the baseline assessment phase to the final operations and maintenance phase. Each phase spells out the activities to be carried out, with a range of resources (time, human and financial) that would be required. These responses were validated and calibrated following a series of discussions with the respondent NGOs. Quality checks are also listed out for each phase to help practitioners avoid the common pitfalls.

The current thinking in the government is focused toward water safety plans within the larger goal of providing water security. Government agencies should find this document useful to their exercise of developing water safety plans. This framework could also be used as a screening, planning and budgeting tool by both the donor agencies and the NGOs.

Far from being the last word on the subject, this document presents an opportunity for further discussions and debates around the framework approach. We are hopeful that the wider water community will enrich the framework by sharing their experiences.

Sunita Nadhamuni
CEO
Arghyam

Background

Extending access to safe drinking water is one of the major developmental concerns for India. Till the 11th Five Year Plan, about Rs.1,56,000 crores (including Central and State government contributions) has been spent on providing safe drinking water in rural areas. Yet, as of 1st April 2011, about 1.2 lakh rural habitations in the country remain affected by chemical contamination of drinking water. The range of water quality (WQ) problems varies from one location to another, reflecting social, economic and physical factors. Village institutions also lack of capability to manage WQ issues.

Solutions to these WQ problems are equally varied in nature. Experiences across the country have shown that interventions like different types of filters, rainwater harvesting, groundwater protection and recharge and treated piped water supply effectively address WQ problems. At the same time, it is also observed that the process followed in implementing these interventions is as important as the interventions in achieving sustainable outcomes. Where the process is not followed, systems have broken down frequently.

NGO models in WQM

Over the years, various non-government organisations (NGOs) in India have played an important role in water quality management (WQM). NGOs have a rich and diverse pool of human resources for a wide range of activities under WQM. These professionals come with region-specific experience, deep commitment and domain expertise, which are essential ingredients for long-term sustainability of developmental programmes, including water quality. Understanding the NGO projects on WQ is therefore likely to yield useful lessons for future work.

About the framework

Our research has shown that there is no "one-size-fits-all" solution to WQ problems. There are, however, a common set of actions that are required for sustainable WQM. This document attempts to put this common set of actions in a coherent and realistic framework based on the practical experiences of 12 prominent NGOs across the country. The strategies adopted to tackle WQ problems can be guided by this framework while customising for the local context.

The WQM framework consists of five phases. The first three phases of the framework focus on education and capacity building of the local community, planning finances, sourcing data and building/strengthening the village institutions. These institutions are then actively involved in the last two phases, which are implementation and

Operations & Maintenance. The framework is based on a mix of education and capacity building on the software side, and monitoring and technology on the hardware side, mainstreamed through existing institutions. Completing each phase leads to incremental improvements in WQM and a step closer to the end-goal of providing safe drinking water. It is essential that each phase be completed to reap the full benefits of the framework. Different phases under this WQM framework and the key activities within each phase are described below:

Phase 1

Assessment of baseline situation: Key activities during this phase include (a) assessing existing village institutions, technical capabilities, training and IEC needs, (b) raising general awareness on WQ and demand generation and (c) generating baseline information. Time taken to complete this phase varied between 3-12 months, a staff of about 4-12 was involved and about Rs.0.85-8.27 lakh were spent by different NGOs responding to the framework.

Phase 2

Participatory planning: Key activities during this phase included (a) participatory planning, identifying and prioritising WQ monitoring, mitigation and O&M options, (b) assigning roles and responsibilities, developing social audit systems, focused IEC efforts and (c) tapping funding sources, government schemes and exploring supply-chain linkages. Time taken to complete this phase varied between 3-12 months, a staff of about 4-12 was involved and about Rs.0.2-9 lakh were spent by different NGOs responding to the framework.

Phase 3

WQ monitoring-training and data management: Key activities during this phase included (a) training on WQ monitoring, data generation and dissemination, (b) identification of local para-professionals (masons, plumbers and hand pump mechanics) and (c) IEC campaigns on safe water use, hygiene and mobilising community contributions. Time taken to complete this phase varied between 5-10 months, about 4-12 staff persons were involved and about Rs.1.45-6.74 lakh were spent by different NGOs responding to the framework.

Phase 4

Implementation: Key activities during this phase include (a) training of local para-professionals on implementation and O&M, (b) implementation of physical works and (c) social audits. Time taken to complete this phase varied between 20-24 months, about 4-10 staff persons were involved and about Rs.45-160 lakh were spent by different NGOs responding to the framework.

Phase 5

Operation and maintenance: Key activities during this phase include (a) proactive maintenance – ensuring smooth day-to-day functioning, (b) reactive maintenance -

addressing system breakdowns (c) ensuring long-term sustainability and (d) sustained IEC campaigns on maintaining WQ at the source; safe water use and improving hygiene at the users' end. Time taken to complete this phase varied between 1.5-2 months, a staff of about 4-10 was involved and about Rs. 2-4.5 lakh were spent by different NGOs responding to the framework.

All NGOs contributing to the framework conducted a set of quality checks (QCs) to assess whether the activities in a particular phase conformed to plans and how well they were carried out adhering to the core values of sustainability – equity, inclusion, transparency and accountability.

Methodology

The framework analyses data from the best WQM project of each respondent NGO. Criteria for selecting the WQM projects included: whether the project interventions have led to improved and sustained access to safe water, was there a substantial reduction of waterborne diseases and whether strong village institutions were developed. The WQ issues addressed in different projects were fluoride, iron, salinity and microbes. Responses to the framework were normalised over 20 villages, considering 200 households per village. In most cases, the responses were verified by visiting the NGO offices and meeting their functionaries. The visits included discussions with senior functionaries of the NGOs as well as with the field workers.

Resource summary

- The overall resource summary from the normalised responses is presented below:
- The project duration varied between 3-5 years
- The project budget varied between Rs.0.5-1.9 crores
- About 45-55% of the total funds was spent on hardware activities, around 12-20% was spent on software and about 25-40 % was spent on salary and administrative expenses. Cost per beneficiary for the overall WQM project varied between Rs. 500-1000
- About 6-12 staff persons (at different administrative levels) were involved in WQM across all projects
- The projects were mostly funded by donors, community and the State government. Community contributions varied between 5-15% of the overall budget. Some of the NGOs leveraged NREGA and NRDWP-WQ funds parked with the State governments for implementing the safe water interventions

These numbers provide a useful benchmark for future NGO projects as well as government interventions in WQ.

Influencing factors

Several factors influenced the resource figures during the different phases of WQM. 'State of Development' was an important common factor. 'State of development' is a measure of social, physical, human and economic capital built up in an area prior

to the project through natural resource management (watershed development/ source protection/catchment area treatment) based livelihood interventions. It is found to provide a headstart to the project. We also found that 'State of development' in a particular project location provided a significant leverage to project effectiveness and sustainability.

There were other factors (phase-specific) which also influenced the resource figures in the individual phases. For example:

▸ Awareness on WQ issues and availability of secondary data influenced the resource figures in Phase 1 (assessment of baseline situation)

▸ Geographical spread of habitations in a project location and seasonal factors influenced the resource figures in Phase 2 (participatory planning)

▸ Training pedagogy and number of sources and their geographical distribution were the influencing factors in Phase 3 (WQ monitoring: training and data management).

This provides the explanation for the wide range in resource requirements of projects across the country.

Target audience

This document serves three main constituencies of readers/sector players - donors, government agencies, and NGOs. The framework will help donors to screen proposals of prospective partner organisations and work with them to improve the project design. NGOs should be able to use this document as a planning and budgeting tool for their future work on WQM and identify the financial leveraging possibilities. Government agencies will find it helpful to understand and adopt the best practices in WQM from the NGOs, and modify their schemes and projects accordingly.

Exploring future possibilities

Current thinking on WQM has been focused towards water safety plans (WSPs). Though WSPs are an internationally accepted practice for managing WQ, it is still in formative stages in India and much remains to be done. At this point, pilots are being rolled out.

This WQM framework could be considered a starting point for structured rural domestic water quality management leading to a WSP. The WQM approach described in this document analyses the work carried out by prominent NGOs across different locations in rural India. It does not represent a departure from current thinking on WQM - rather, it puts diverse experiences into a framework. Hence, it will be important to look at this document prior to pilot-testing the WSPs in rural areas. It will help the government agencies to understand the key challenges (institutional, social, financial and technical) faced by the NGOs and how far they were able to address them. Accordingly, the Central and the State governments may seek to incorporate these NGO experiences, pilot-test the framework or its variant before operationalising the WSPs on a large-scale.

Tables and Figures

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Acronyms and Abbreviations

ANM
Auxiliary Nurse Midwife

APL
Above Poverty Level

ARWSP
Accelerated Rural Water Supply Programme

ASHA
Accredited Social Health Activist

BIS
Bureau of Indian Standards

BPL
Below Poverty Level

BRGF
Backward Region Grant Fund

CBO
Community Based Organisation

CSO
Civil Society Organisation

DWSM
District Water Sanitation Mission

GP
Gram Panchayat

IEC
Information Education and Communication

LPCD
Litres Per Capita Daily

M&E
Monitoring & Evaluation

MDWS
Ministry of Drinking Water & Sanitation

MGNREGS
Mahatma Gandhi National Rural Employment Guarantee Scheme

MLALADS
Member of Legislative Assembly Local Area Development Scheme

MMD
Mahila Mangal Dal

MPLADS
Member of Parliament Local Area Development Scheme

NGO
Non-Governmental Organisation

NRDWP
National Rural Drinking Water Programme

NRDWQM&S
National Rural Drinking Quality Monitoring & Surveillance

NRHM
National Rural Health Mission

NRM
Natural Resources Management

QC
Quality Check

NSS
National Sample Survey

OBC
Other Backward Classes

PHED
Public Health Engineering Department

PRA
Participatory Rural appraisal

PRED
Panchayati Raj Engineering Department

PRI
Panchayati Raj Institution

RDPR
Rural Development & Panchayati Raj

RGNDWM
Rajiv Gandhi National Drinking Water Mission

SC
Scheduled Caste

SHG
Self-Help Group

ST
Scheduled Tribe

TSC
Total Sanitation Campaign

VHSC
Village Health & Sanitation Committee

VLI
Village level Institution

VWSC
Village Water Sanitation Committee

WASH
Water, Sanitation, Health & Hygiene

WHO
World Health Organisation

WQM
Water Quality Management

ZP
Zilla Panchayat
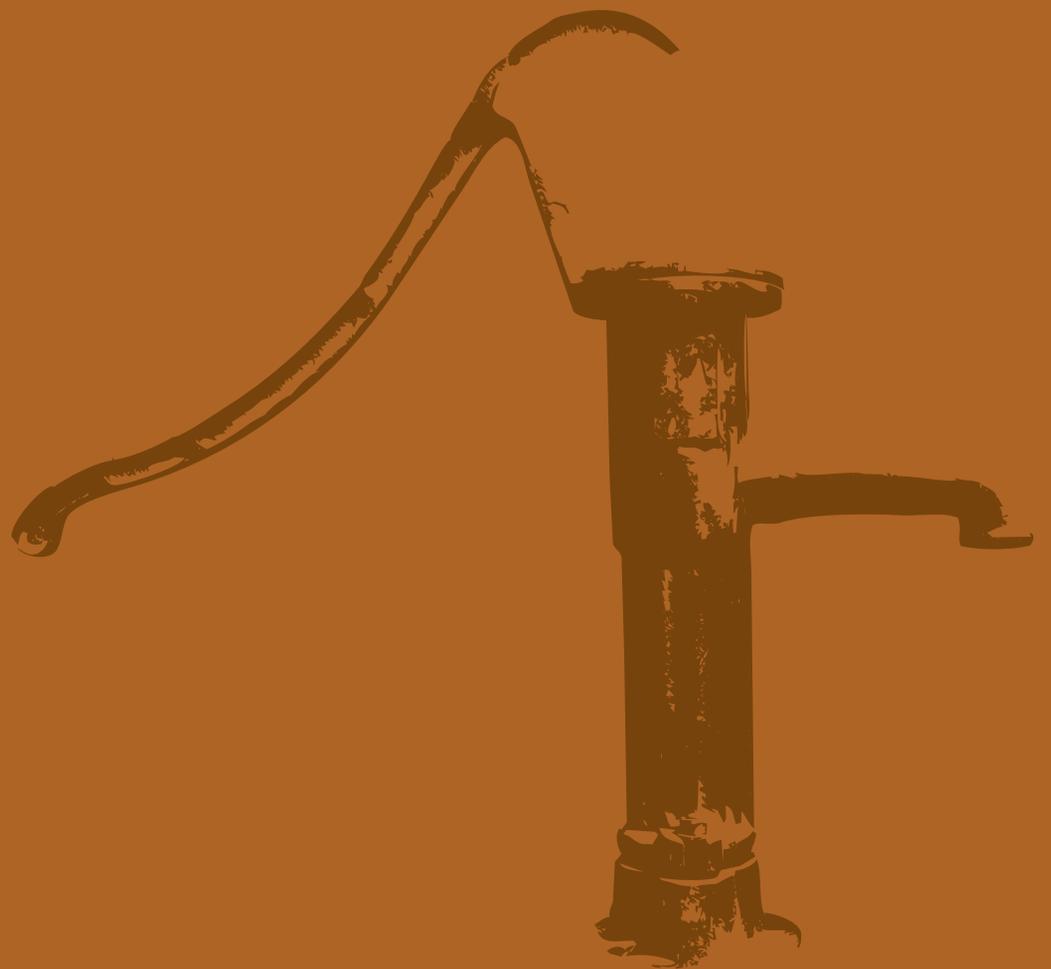
INTRODUCTION

A
Water quality scenario in rural India

Extending access to safe drinking water is one of the major developmental concerns for India. As of October 2011, there were about 1.2 lakh water quality (WQ) affected rural habitations in the country[1]. The availability of safe water in rural areas is strongly linked with development and growth and it has direct, positive results on human health and well-being.

Rural drinking water supply in India is to a large extent dependent on groundwater (about 85%). Data collected in 2008-09 for the 65th round of the National Sample Survey[2] (NSS, July 2009) showed that 55 percent of rural households were served by a tubewell/hand pump, 12 percent by a well, and 30 percent by a tap.

Though groundwater is less susceptible to pollution than surface water, the quality problem in groundwater arises because of:

(i) Contamination caused by the very nature of geological formation, (e.g. excess fluoride, arsenic, brackishness, iron, etc.)

(ii) Contamination from domestic, agricultural and industrial sources (e.g. Nitrate, heavy metals, organic pollutants etc.)

About 15 percent of the rural water supply comes from surface water sources. The major quality problem for surface water is seasonal turbidity. Surface water also suffers from microbial contamination, which is mainly anthropogenic in origin.

In India, ensuring access to safe drinking water is being interpreted as a constitutional mandate[3]. In the recent past, both the Supreme Court of India and the High Courts around the country have recognised this right[4]. Both Central and State governments have undertaken various programmes since Independence to provide safe drinking water to rural communities.

1
Integrated Management Information System (IMIS), Ministry of Drinking Water and Sanitation (MDWS), Government of India. Only includes habitations affected by chemical contamination

2
National Sample Survey, 65th round, National Sample Survey Organisation, Ministry of Statistics & Programme Implementation, Government of India, 2009

3
Under fundamental rights provided by the Constitution of India, Article 21 entitles 'protection of life and personal liberty'. Article 21 has been interpreted by the Supreme Court of India to include all facets of life, including right to safe drinking water

4
State of Karnataka vs State of Andhra Pradesh (2000) & Narmada Bachao Andolan vs Union of India (2000)

Till the 11th Five Year Plan, an estimated total of Rs.156,000 crores[5] (including Central and State Government contributions) has been spent on providing safe drinking water in rural areas. Yet, according to government estimates, more than 1.2 lakh rural habitations in India are still beset with different WQ problems (see Figure 1).

3%

19%

20%

5%

53%

- ● Iron
- ● Salinity
- ● Nitrate
- ● Fluoride
- ● Arsenic
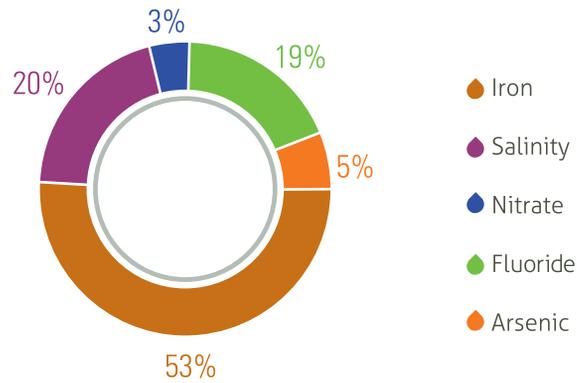
Figure 1: Percentage break-up of habitations affected by chemical contamination

5
Mid-term assessment of the
11th Five Year Plan

6
Central Bureau of Health Investigation, National Health Profile, 2010

7
Khurana, I. and Sen, R.; Rural water supply in India: Issues & Approaches, WaterAid India, 2008

8
The economic impacts of inadequate sanitation in India: Inadequate sanitation costs India Rs.2.4 trillion (US $ 53.8 billion), Water and Sanitation Programme-South Asia (WSP-SA), The World Bank, Asian Development Bank, AusAid, UKAid, 2010

There is also evidence of an increase[6] (see Figure 2) in waterborne diseases in India over the last decade, specifically acute diarrhoeal cases. It will be fair to deduce that the health benefits - in terms of reduction in waterborne diseases - have not been commensurate with the investments made in rural water supply. In addition, these diseases result in loss of work days, estimated at 180 million person days annually. According to various estimates, this expenditure on health adds up to Rs.6,700 crore annually[7] (approximately Rs.60 per person per year). A more recent study[8] by the Water and Sanitation Programme (WSP) of the World Bank calculates Rs.2.4 trillion (approximately Rs.2150 per person per year) as total economic impacts of inadequate sanitation in India.

Acute diarrhoeal cases
(per lakh of population)

1050

1002

1000

989

972

974

995

1018

950

903

903

918

900

850

Year

2001 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

Figure 2: Acute diarrhoeal cases (per lakh of population) during the last decade

B
Government policies and programmes

Government policies and programmes related to provision of safe drinking water in rural India have undergone several transitions since Independence. Initially, the emphasis was on setting up physical infrastructure in the form of handpumps. Thereafter, there was a transition from technological measures to a socio-technological approach seeking close participation of people. A National Water Policy was drafted in 1987 and subsequently revised in 2002. During 1999, a Sector Reforms Pilot Project initiated steps to institutionalise community participation for implementing rural drinking water supply schemes. This signaled a transformation from a 'Government oriented supply driven approach' to 'People oriented demand responsive approach'. The idea of safe drinking water/WQ also evolved during the course of time. This section attempts to capture the transformation (see Table 1), discusses the key WQ focused government programmes and their increasing focus on community based approaches.

9
Adapted from Khurana, I. and Sen, R.; Rural water supply in India: Issues & Approaches, WaterAid India, 2008

Table 1: Key government policies/programmes/notifications related to rural water supply: trajectory and timelines[9]

Phases of transition	Policies/programmes/notifications	Year
Phase I Technology to social transition	Accelerated Rural Water Supply Programme (ARWSP)	1972
	National Drinking Water Mission (NDWM) set up	1986
	First National Water Policy	1987
Phase II Restructuring	NDWM renamed as Rajiv Gandhi National Drinking Water Mission (RGNDWM)	1991
	Bureau of Indian Standards; IS 10500:1991 notification on drinking water standards	1991
	73rd Constitutional Amendment devolves the responsibility of providing drinking water to Panchayati Raj Institutions (PRIs)	1992
	Sector reform pilot projects	1999
Phase III Consolidation	Total Sanitation Campaign (TSC) launched	1999
	Scaling up of sector reform projects - *Swajaldhara*	2002
	Revised National Water Policy	2002
	All drinking water programmes brought under the RGNDWM umbrella	2004
	Bharat Nirman Programme launched - development of rural infrastructure with drinking water as one of the priority areas	2005
	National Rural Drinking Water Quality Monitoring & Surveillance (NRDWQMS) launched	2006
	Swajaldhara scheme revised- Funding provisions altered (50:50 Central and State funding share), community contribution becomes optional	2007
Phase IV Current paradigm	National Rural Drinking Water Programme (revised ARWSP) launched	2009
	Revised TSC guidelines	2010
	Ministry for Drinking Water and Sanitation set up (MDWS)	2011

B1
Key WQ focused government programmes

Accelerated Rural Water Supply Programme (ARWSP) – 1972

Launched in 1972-73, the aim of this programme was to provide all rural habitations, with population of 100 persons and above, with a supply of safe drinking water, largely through the provision of boreholes, hand pumps and managed water schemes. An adequate supply was defined as 40 litres per capita per day (lpcd). Although the aims clearly stated that the drinking water should be 'safe', there was no specification of parameters to define what 'safe' drinking water was, or how this should be measured/monitored. Rather, it was implied that providing access to 'improved' (as per the WHO definition) sources invariably meant access to safe water.

National Rural Drinking Water Quality Monitoring and Surveillance Programme (NRDWQM&SP) – 2006

This programme envisaged institutionalisation of community participation for monitoring and surveillance of drinking water sources at the grassroots through *Gram Panchayats* (GPs) and Village Water and Sanitation Committees (VWSCs). It also mentioned verification testing of all samples (at the district and State level laboratories) that exceeded standards[10] for any contaminant in GP or VWSC tests. The idea was to develop working models of community based WQ monitoring, especially in villages affected by fluoride, arsenic, microbial contamination; and address the issue holistically in terms of monitoring, data management and interventions on a sustainable basis working with other stakeholders.

National Rural Drinking Water Programme (NRDWP) – 2009

The renamed and revised ARWSP, which maintained the aim of providing rural habitations with safe drinking water along with WQ monitoring, also focused on the reduction of the disease burden at the household level. It recognised the importance of maintaining drinking WQ both at the treatment plant and at the point of consumption (household level). The implementation guidelines mentioned water safety plans (WSPs), using water quality testing together with sanitary inspection to assess risk and then determining an appropriate response.

B2
Increasing focus on community based approaches in rural areas

During the period of transition, government policies and programmes became more focused towards applying community based approaches in addressing rural water problems. The 73rd Constitutional Amendment (1992) devolved responsibility of water supply in rural areas to Panchayati Raj Institutions (PRIs). The Sector Reform Project (1999) explicitly stressed the importance of involving communities in planning, implementation and management of drinking water sources, later scaled as *Swajaldhara.* The regulator's role remained with the state and district level governments. Responsibility for WQ testing and responding appropriately to positive tests for microbial contamination rested with the GP. Subsequent programmes on rural water supply (NRDWQMS etc.), specifically dealing with WQ, also focused on the increasing importance of community based approaches WQ. In fact, the fourth phase (see Table 1) of rural water supply programmes (NRDWP) promoted

10
Bureau of Indian Standards, Specifications for drinking water (IS 10500:1991).

the adoption of a decentralised, demand-driven, community based approach involving PRIs and community based organisations (CBOs). It also mentioned incentives for states to decentralise and hand over (including management, operation and maintenance) rural water supply systems to GPs.

C
Present status of WQ Management (WQM)

Despite substantial investments in rural water supply and increased focus on community based approaches, the ground situation has not improved significantly. WQ remains a key concern till today. About 1.2 lakh habitations are affected by chemical contamination and approximately 1 out of a 100 people are affected by acute diarrhoeal diseases (see Figure 2). In addition, the recent Parliamentary Standing Committee[11] on rural development noted a "near absence of community participation in all stages (of rural water supply) from planning to implementation". Devolution of functions to the PRIs, in keeping with the spirit of the 73rd Constitutional Amendment, has also not been satisfactory. At present, some states have transferred the full range of functions to GPs; others have transferred only a few functions. Only 44,000 (about 8% of 5.96 lakhs villages in India) VWSCs, which were meant to be in charge of village water and sanitation as a standing committee of the GP, had been formed till 31st March, 2011. At the same time, village institutions with limited technical capabilities have also found it hard to deal with an expanding range of water quality problems. Many of the GPs and VWSCs, which have had facilities handed over to them, lack the technical skills to independently manage and operate new sources and systems. Lack of understanding of WQ issues at the community level has also added to the problem.

D
Need for a framework

WQ, in itself, is a 'wicked problem'[12]. The WQ situation in India is highly variable reflecting social, economic and physical factors as well as the local developmental status. The range of WQ problems is also variable from one location to another, and the nature of environmental and socio-economic impacts is equally variable.

Solutions to these WQ problems are equally varied in nature. Experiences across the country have shown that interventions like different types of filters, rainwater harvesting (RWH), groundwater protection and recharge and treated piped water supply do effectively address WQ problems. But these interventions are quite context specific. It is also observed that the process followed in implementing these interventions is instrumental in achieving sustainable outcomes. Where the process is not followed, systems have broken down frequently.

The MDWS strategic plan[13] (2011-2022) identified water safety planning (WSP)[14] as one of the key strategic objectives to address the challenges of WQM in rural areas. At this stage, WSP pilots are being rolled out in various parts of the country. The experience with WSP to date has primarily been within urban utilities; particularly those in developed countries. There have also been some initiatives applying WSPs to urban utilities in developing countries and the experience is emerging. However, there is limited documented experience of WSPs with respect to rural drinking water systems in either developed or developing countries, despite a sustained global interest.

11
Standing Committee on Rural Development, 2010-11, Fifteenth Lok Sabha, Demands for Grants- Department of Drinking Water Supply, Ministry of Rural Development, Eighth Report, Lok Sabha Secretariat, New Delhi

12
A phrase originally used in social planning to describe a problem that is difficult or impossible to solve due to its incomplete, contradictory, and changing requirements that are often difficult to recognise. Moreover, because of complex interdependencies, the effort to solve one aspect of a 'wicked problem' may reveal or create other problems. There are no 'one-shot' solutions to 'wicked problems'. They need to be solved with a holistic approach. An in-depth understanding of the context helps to identify appropriate solutions to the problems

13
Ensuring drinking water security in rural India, Ministry of Drinking Water & Sanitation, Strategic Plan for Rural Drinking Water (2011-2022), 2010

14
Water safety plans are systematic approaches to WQM covering all stages of water supply, production and distribution from catchment to consumer. WQ testing is mainly used for periodic verification of water safety

There is no 'one-size-fits-all' solution. However, while studying the interventions, our research showed that a common set of actions under a broad, generic framework are necessary for sustainable WQM in rural areas. Based on the practical experiences of prominent NGOs working in WQM, this document attempts to identify these common set of actions under a broad framework. The strategies adopted to tackle WQ problems could be guided by this framework while customising for the local context.

E
Rationale for a NGO based framework

Over the years, a number of NGOs have been building successful and sustainable WQM models in diverse conditions across the country. There is a large knowledge base (domain knowledge) among some of the prominent NGOs on WQ issues which, when supplemented by local knowledge from the community, can greatly facilitate decisions on WQM. A rich and diverse pool of human resources is also available with NGOs for a wide range of activities under WQM. These professionals come with region-specific experience, deep commitment and local language skills, which are essential ingredients for long-term sustainability of developmental programmes, including water quality.

The NRDWP implementation framework[15] on rural drinking water stresses on the role of NGOs in community mobilisation, information dissemination, institution building, planning and technical support and monitoring. The MDWS strategic plan (2011-12) for rural drinking water also cites evidence across the country that highlights the importance of a well-defined partnership between the state governments, NGOs, para-statals and GPs.

In light of the above, this document attempts to develop a framework based on successful experiments on WQM of 12 prominent NGOs.

F
Elements of the WQM framework

The WQM framework has five phases. Completing each phase leads to incremental improvements in WQM and brings a step closer to the end-goal of providing safe drinking water. It is essential that each phase be completed to reap the full benefits of the framework. The framework is based on a mix of education and capacity building on the software side, and monitoring and technology on the hardware side, both mainstreamed through existing institutions.

The first three phases of the framework focus on education and capacity building of the local community, planning finances, sourcing data and building/strengthening the village institutions. These institutions are then actively involved in the last two phases of selection, design, implementation of safe water interventions and post-implementation O&M. Figure 3 presents a schematic expression of the framework. It is important to note that some of these phases overlap in reality. The framework with a detailed set of activities in each phase is presented in Chapter 6 (see Table 15).

Figure 3: Elements of the basic WQM framework

Pre-Project Period

Project Period

Post-Project Period

State of Development

REGULAR, ONGOING ACTIVITIES

PHASE 5 : O&M PHASE
Example: Addressing system breakdowns and ensuring sustainability

PHASE 4 : SOLUTION PHASE IMPLEMENTATION
Example: Training, developing physical interventions, conducting social audits

PHASE 3 : SOLUTION PHASE WQ MONITORING
Example: Training, WQ data generation and dissemination

PHASE 2 : PREPARATORY PHASE
Example: Planning for WQ monitoring, mitigation and O&M options

PHASE 1 : ASSESSMENT OF BASELINE
Example: Generating baseline data, generating demand through IEC

Figure 4: Geographical distribution of the respondent NGOs

G
Methodology for selection of respondents, projects and analysis of responses

As mentioned in the previous section, the framework is based on responses received from 12 NGOs. It draws upon their rich body of work and showcases one of their important WQM projects. Criteria for project selection were: improved access to safe water, substantial improvement in reduction in waterborne diseases, strong village institutions, customised training and IEC materials based on local needs, and a sense of community ownership following the project interventions.

These NGOs were selected for the effectiveness of their micro activities as well as their impact at a macro-level. Most of the NGOs have been working for more than a decade addressing different aspects of WQ with a cross-section of population in a particular location. They operate in varied geographical settings. (Figure 4 shows the geographical distribution of the respondent NGOs).

The selection of the NGOs is, however, not based on any sampling method. But, we are confident to have captured the most prominent NGOs working in WQM. To realise how the respondent NGOs were selected one needs to understand the chronology of events leading up to this document.

Arghyam researched on the NGOs working in WQM and screened about 40 NGOs. Following several rounds of internal brainstorming sessions, Arghyam prepared a draft WQM framework and shared it with these 40 NGOs. A total of 17 NGOs responded to the framework. Based on their responses, the WQM framework was further refined. Finally, 12 of these 17 NGOs were selected based on their focus on WQM and quality of responses. These NGOs[16] are as follows:

- Himalaya Seva Sansthan (HSS), Uttarakhand
- Institute for Rural Research & Development (IRRAD), Haryana
- Gramonnati Sansthan (GUS), Uttar Pradesh
- People's Science Institute (PSI), Uttarakhand
- Development Alternatives (DA) , Madhya Pradesh & Uttar Pradesh
- Parhit Samaj Sevi Sanstha (PSS), Madhya Pradesh
- Vasudha Vikas Sansthan (VASUDHA), Madhya Pradesh
- BAIF Institute for Rural Development (BIRD-K), Karnataka
- Swami Vivekananda Youth Movement (SVYM), Karnataka
- Megh Pyne Abhiyan (MPA), Bihar
- SATHEE, Jharkhand
- SAMERTH Trust, Gujarat

As mentioned in the earlier section, the WQM framework consists of five phases. Each of the respondent NGOs was requested to provide details of resource requirements (time, cost and human resources) for all the five phases. The respondent NGOs were also requested to provide general project descriptions along with the resource requirements for individual phases. Responses to the framework (in particular the data on resource estimates for

1

Normalisation

For the sake of simplicity, the time and staff numbers for each phase were normalised over 20 villages (considering about 200 households covered in each village) and presented as a range of values. In line with the time and human resource estimates, figures indicating the amount of money spent were also normalised and presented as a range of values.

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For the sake of simplicity, these NGOs have been referred to as 'respondent NGOs' in most parts of the document

State of Development

State of Development is a measure of social, physical, human and economic capital built up in an area through different (e.g. natural resource management projects etc.) development interventions by government agencies, NGOs etc. There are no easy ways of measuring/quantifying State of development – it can only be qualitatively assessed through external manifestations. Various capitals developed under the aegis of 'State of development' are defined as follows,

Social capital: refers to strong institutions (SHGs, CBOs, VWSCs etc.), formal and informal village networks and norms.

Physical capital: refers to water related physical infrastructure and assets.

Human capital: refers to formally trained informally experienced personnel with technical capabilities, skills and knowledge.

Economic capital: refers to capital assets (cash, credit, debt, savings etc.) that are essential for livelihood

17
For most of the projects under different respondent NGOs, coverage varied between 15-20 villages. Most of these project villages were distributed across 1-2 districts, comprising of 2-3 talukas. Average population size in each of these project villages was about 200 households

18
Murali K.S., Microfinance, social capital and natural resource management systems: Conceptual issues and empirical evidences, Int. J. Agricultural Resources Governance and Ecology, Vol. 5, No. 4, 2006

individual phases) were verified by visiting the NGO offices and meeting their functionaries. At least two visits were made to most NGOs. To ensure quality of the responses, more intensive inquiries were conducted as needed. The visits included discussions with senior functionaries of the NGOs as well as with field workers. Most of these NGOs had worked in a number of villages with a varying number of households[17]. Hence, it was important to fix these variables (number of villages and number of households within a single village) and create a uniform reference point to understand the resource figures in the context of different influencing factors (see Sec. H). Normalisation (see Box 1 on previous page) helped to create that uniform point of reference and allowed analysis of resource figures based on different factors of influence.

H
Factors influencing resource figures

An important part of the succeeding analysis in this document is about the resource requirements in each phase. Hence it will be important to understand the factors influencing the resource figures in each phase. Mainly two types of factors influenced the resource figures:

H1
Common factor – 'State of development'

It is important to reiterate that some of the prominent NGOs working on WQM have contributed to this document. They have had a long presence in their respective project locations. The WQM project is not a stand-alone effort for them. It is either a part/ culmination of a larger programme on natural resource management (NRM) or domestic water security (often including sanitation). So they had a prior understanding of the location and were able to build a rapport with the community. During the course of earlier developmental interventions, they were also able to build up social, physical, economic and human capital in their respective project locations. In the development lexicon, this is often referred to as the 'State of development' (see Box 2).

'State of Development' was a common factor which influenced the resource figures in all the phases. When enhanced in a positive manner prior to the WQM project, 'State of development' provided a significant headstart to project effectiveness and sustainability, by building the community's capacity to work together to address their common needs, fostering greater inclusion and cohesion, and increasing transparency and accountability.[18] But one needs to understand that the 'State of development' does not exist in a political vacuum and the local political situation will also determine the future development prospects of a particular location.

H2
Phase-specific factors

An analysis in retrospect revealed some phase-specific influencing factors (over and above the common factor) that played a key role in influencing the resource estimates

for individual phases. For example during Phase 1, these factors were identified as i) availability of recent secondary data, ii) community perceptions on WQ etc. The role played by each of these phase-specific factors is explained, with examples, in the respective chapters.

I

About the document

The document contains seven chapters – including this introductory chapter. Beginning with the next chapter (Phase1), each chapter deals with an activity phase of the WQM framework. Each chapter begins with definitions of main activities pertaining to that phase, followed by an-depth analysis of the most important activity and details about the other activities. For instance – sourcing/generating baseline data was the most important activity during Phase 1 (assessment of baseline situation). Following the details about the activities, resource estimates (time, cost and human resources) for that particular phase are provided. At the end of each chapter, a set of quality checks and key messages, have also been listed out. Finally, Chapter 6 sums up the entire document and suggests ways forward.

1
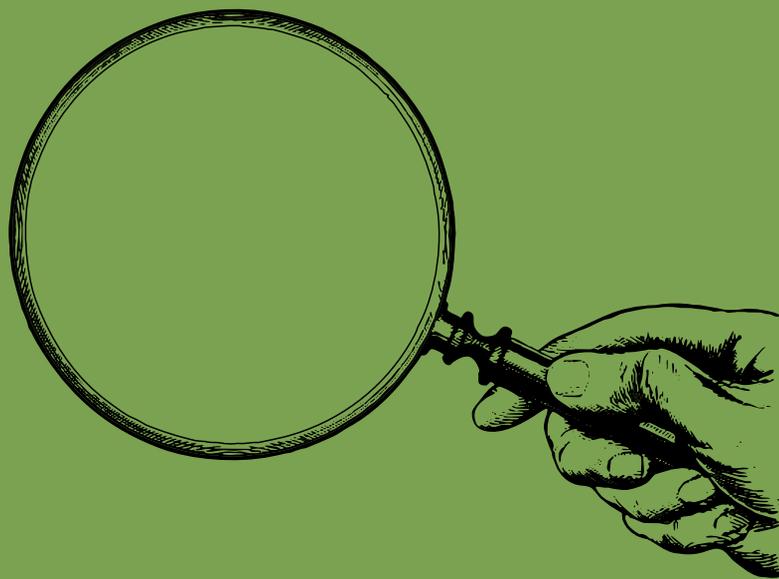
Assessment
of baseline
situation

1.0
Background

Chapter 1 showcases Phase 1 of the WQM framework. Main activities during this phase include:

1. Sourcing/generating baseline data
2. Community interaction
3. Institutional activities

These activities are defined as follows:

1. **Sourcing/generating baseline data**
   This mainly refers to collating/developing project related baseline data through background studies and/or literature surveys. It also involves generating primary data on the baseline situation of water sources, WASH (water, sanitation and hygiene) situation at the households and identifying the major WQ contaminants.

2. **Community interaction**
   This mainly deals with initiating social mobilisation at the project location. It involves sensitising the community during entry-point activities. It also involves more focused efforts towards building general community awareness on WQ.

3. **Institutional activities**
   It refers to identifying existing institutional structures at the village/GP level, gauging capabilities and assessing the training and IEC needs thereof. It also involves mapping human resource requirements of the NGOs after listing out all the activities under WQM.

Each of these activities is discussed in detail in the following section.

1.1
Activities

1.1.1
Sourcing/generating baseline data

Data sourcing/generation forms the core of entry-point activities under the WQM projects. The respondent NGOs used a variety of well-known and established tools (literature review, transect walks, village and water source mapping, stakeholder mapping, household survey etc.) to source/generate the baseline project status. Figure 5 (see next page) presents these tools along with their purpose of use. It also broadly describes the nature of activities involved while using each of these tools.

Figure 5: Tools used for collecting baseline data

Secondary literature review/ primary data generation

Review of secondary literature helped to gain an understanding of the project location and identify the key WQ issues. It involved reviewing the area-specific literature on WQ, looking at the epidemiological data and corroborating it with the WQ data. In case the secondary data was not available or was dated, water samples were collected and sent to the district PHED laboratory. All the general WQ parameters were tested in the laboratory, screened, and the key contaminants (fluoride, iron, arsenic, salinity and microbial contamination) were identified.

Transect analysis

Transect analysis provided situational assessment of a location and identification of habitats by using a synoptic survey. It helped to ascertain the configuration of hamlets and the distribution of the drinking water sources with respect to the different communities in a village. After a formal introduction to the village head and other villagers, the project staff undertook a transect walk to familiarise themselves with the villagers and also get an overview of the village set-up.

Village and water sources mapping

Community involvement in the preparation of a village map and marking the water sources form the essence of this activity. It helped to understand the general topography and settlement pattern of a village and map the drinking water sources. Participatory Rural Appraisal (PRA) technique was used in this exercise to map the village landmarks (school, temple, GP building etc.), different sources of water based on use (irrigation, drinking and cooking, inferior domestic use etc.) and the village boundary. Representatives from all sections of the community participated in this exercise.

Village meetings and stakeholder mapping

Stakeholder mapping helped to identify individuals/groups that are likely to affect or get affected by the WQM project. Village meetings were used to identify different stakeholders (including their socio-economics) in the village and to understand their charecteristics and features. These stakeholder groups were classified based on their influence on the entire village community. During the course of mapping, different vulnerable groups (women, children, socio-economically weaker sections, the old and the physically disabled etc.) were also identified. The analysis helped to assess the cultural issues and understand the status of women in the village.

Focus group discussions (FGDs)

FGDs offered a rapid and semi-structured data gathering method in which a purposively selected group of villagers discussed WQ issues and raised their general WQM cocerns. FGDs involved understanding the popular perceptions of WQ among different stakeholder groups and their perceived expectations from the project. The discussions also helped to assess the training and IEC needs of these different groups related to WQM. Existing village/GP level institutions were mapped and their performance was assessed based on people's feedback.

Household WASH survey

A household survey was conducted in every village using a structured questionnaire covering all the stakeholder groups in a village. This questionnaire was field-tested prior to the actual survey. The questionnaire broadly covered water, sanitation, health (with a focus on waterborne diseases) and hygiene issues at the household level. It focused on some of the key areas related to water use at the household – access, quantity, quality, storage and general use practices. The survey was usually administerd to an adult woman member of the household and was conducted in the local langauge.

1.1.2
Community interaction

During the baseline data generation, the respondent NGOs engaged the community on several occasions. These occasions also served as ice-breakers in terms of orienting the community towards WQM. Community interaction built on this orientation and led to more focused social mobilisation. The mobilisation objectives were to increase the general awareness on WQ. In order to make this effort more effective and grounded, the respondent NGOs shared the data gathered during the baseline data generation to draw up health linkages and generate demand for safe water. Multiple communication channels were used (puppet shows, *sandesh yatras, nukkad nataks*[19], wall painting, display of posters, distribution of leaflets etc.) to achieve the mobilisation objectives. The communication materials were mainly pictorial and used local language. Care was taken to ensure that these different modes of communication were culturally appropriate and in consonance with the local ethos and customs.

1.1.3
Institutional activities

Institutional activities include assessing the existing institutional frameworks and processes at the GP and village levels. Activities during this sub-phase include formal consultations/ interviews with key discussants like GPs, VWSCs, Village Health and Sanitation Committees (VHSCs), Self-help Groups (SHGs), *Mahila Mangal Dals* (MMDs), Youth clubs, *Gram Samitis* and other community based organisations (CBOs). Opinions regarding the quality of local institutions and challenges of service provision were also sought from the *Zilla Panchayat* office, Block Development office and representatives of local research/academic institutions. The objectives were: to identify the different service providers, gauge their functioning, understand institutional dynamics in the backdrop of local politics, broadly inform the service providers about the WQM project and its scope within the overall implementation arrangements, and to pre-empt any major implementation barriers/challenges which may adversely impact the project outcomes.

The respondent NGOs also used this opportunity to put together a range of options for safe water provision, technology and economics involved in each of these options and the corresponding O&M requirements. These options were discussed in-depth with the community during the planning phase (see Chapter 2 for details). In light of these prospective safe water options, existing institutional knowledge and capacity for WQM were assessed and institutional strengthening requirements were identified. Accordingly, the NGOs also refined their human resource requirements for the subsequent WQM phases with clearly defined roles and responsibilities.

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Local art and theatre forms used for social mobilisation.

1.2
Resource estimates

As mentioned in the introductory chapter, the resource figures during this phase were affected by a number of factors and local conditions. Foremost was the 'State of development', a common factor affecting resource figures in all the phases. The phase-specific factors were:

◗ Awareness on WQ issues
◗ Availability of secondary data

Impact of the common and phase-specific factors on the resources required for Phase 1 of the WQM project are described in the following sections.

1.2.1
Time

The time taken to complete Phase 1 varied between 3-12 months across the respondent NGOs. Organisations which had built up substantial social, physical, economic and human capital in their project locations through their prior work on NRM spent relatively less time during Phase 1. Prominent examples include - HSS in Uttarakhand, BIRD-K in Karnataka and SAMERTH in Gujarat.

On the flip side, organisations like MPA (North Bihar) and IRRAD (Mewat, Haryana) had no development interventions (NRM or otherwise) in their project locations prior to this specific WQM project and hence invested a longer time in this phase. The low 'State of development' in project locations of MPA and IRRAD were reflected in a general lack of understanding about WQ at the community level. While responding to the WQM framework, some of the NGOs (IRRAD, SVYM in Mysore, Karnataka) cited lack of relevant secondary data related to WQM as one of the major hindrances in completing Phase 1.

An analysis of time spent by the respondent NGOs during Phase 1 suggests that most of the time (35-50%) during this phase was spent on sourcing/generating baseline data related to WQ. About 20-40% of time was spent on community interaction and 10-35% was spent on institutional activities.

1.2.2
Human resources

During the first phase, about 4-12 staff was involved across the respondent NGOs. Organisations which spent relatively less time completing this phase also employed fewer people. As mentioned in the earlier section (see 1.2.1) on time requirements, sourcing/generating baseline data accounted for the maximum amount of time spent during this phase. Organisations working on NRM or watershed development in their specific project locations had already collected a substantial amount of this baseline information. They had also done a fair amount of community interactions and institutional assessment/strengthening as part of their NRM programme. Hence, they needed fewer staff on payroll during this phase. In fact, some of these organisations (e.g. SAMERTH) used local volunteers to complete a majority of the field based activities. The profile of staff involved during this phase and their respective responsibilities are presented in Table 2.

Table 2: Profile of staff and their responsibilities during Phase 1

Staff Profile	Responsibilities
PC/PM Project Coordinator/ Project Manager	The PC/PM – was overall in charge of the phase, periodically reviewed the progress with CC/DC, WQS, TA and met the FS as and when required.
FS (CO, HE/HP, VC) Field Staff (community organiser, hygiene educator/ hygiene promoter, village champion)	FS – played a pivotal role in awareness generation on WASH issues, household health survey, sample collection and spot-testing of sources. They were also involved in organising community interactions for village meetings or FGDs
TA (P/T) Technical Advisor	The TA (part-time) – advised the PC/PM from time to time, guided/advised the WQS during the analysis of WQ data. S/he also helped the WQS to analyse the health and WATSAN survey data, and critically reviewed the baseline status report prepared by WQS and the documentation coordinator.
WQS Water Quality Specialist	The WQS – reviewed the secondary literature and trained the CC/DC and FS to collect/generate WQ data and conduct health and WATSAN surveys. S/he analysed the data and guided the preparation of a baseline status report.
CC/DC Cluster/District Coordinator	The CC/DC – supervised the FS and reported directly to the PC/PM, coordinated the data collection from the health and WATSAN surveys. S/he coordinated the community interactions and institutional assessment.
Doc. coord. (P/T) Documentation Coordinator	The Doc. coord. (part-time) – some organisations involved a documentation coordinator on a part-time basis for reviewing the secondary literature, collating background studies and preparing the baseline status report.
Volunteers	Volunteers – were predominantly picked from the local community to facilitate awareness generation and improve understanding about village institutions.

It is important to note that Table 2 only presents staff profiles and their respective responsibilities during Phase 1 across the respondent NGOs. Staff responsibilities vary over different phases of WQM. The concluding chapter (Chapter 6) in this document summarises the skills, experience, responsibilities and the average range of staff salaries over the entire WQM project.

1.2.3
Finances

The amount of money spent during Phase 1 varied between Rs.0.85-8.27 lakhs. A substantial portion of the money spent during this phase went into salaries. The investment in salaries during this phase, varied between 63-100% across all respondent NGOs. Software activities accounted for the rest of the amount spent during this phase.

A post-facto analysis of the cost figures suggests that it was the number and duration of staff involvement in Phase 1 that mainly contributed to the differences in overall spending. As mentioned earlier (see Sec. 1.2.2), SAMERTH (based in Kutch, Gujarat) mainly used local volunteers and a few project staff during this phase, which probably led to low monetary investment. Similarly HSS (based in Tehri, Uttarakhand) also used few staff and for a small period of time (see Sec. 1.2.1), leading to low cost figures. Respondent NGOs like MPA and IRRAD reported higher monetary investment during this phase, which could be attributed to involvement of more staff for a longer duration (see Sections 1.2.1 & 1.2.2 for details).

1.3
Quality Checks (QCs)

In order to check whether the activities undertaken during Phase 1 were in accordance with the plan and whether they conformed to certain quality benchmarks set for this phase, most NGOs used a set of QCs. These QCs were for specific activities taken up during this phase. Table 3 presents broad areas of the QCs and the details of the activities involved:

Table 3: QCs during Phase 1

Broad Areas	Activity Details
Mapping of water sources	PRA based water source maps were created by community participation involving representatives from all the stakeholders (including women and other vulnerable groups). The PRA maps were signed by those involved in the exercise.
Household health survey	A household health survey format was prepared, field-tested and refined based on the feedback received. Surveyors were selected from the community and trained to conduct the baseline survey.
	Household survey forms were filled and signed by the surveyor. Random cross-checks over telephone were carried out by calling about 5% of the people surveyed. Accredited Social Health Activites (ASHAs) and Auxiliary Nurse and Mid-wives (ANMs) were involved in the survey design and during the survey.

Broad Areas	Activity Details
WQ testing, awareness generation & data validation	The community was involved during sampling and spot-testing of domestic water sources. About 30% of the contaminated samples in a GP were validated by laboratory analysis. Test results were readily accessible and communicated back to the community.
Meetings/discussions to decide on the training/IEC materials, possible mitigation options	Village meetings/FGDs were convened with all sections of the stakeholders (including VWSC and VHSC members, and ASHA workers). Resolutions of the meetings were available in writing. Training and IEC materials were prepared based on the outcomes of these meetings. Mitigation options were discussed with the entire cross-section of the village community (representing all stakeholders) in depth. The NGOs addressed the concerns raised during the meeting. Photographic evidence and lists of attendees of these meetings were maintained for project documentation.
Staff requirements & training	NGOs submitted a staff requirement form (different designations with clearly delineated responsibilities) to the donor agency as part of the project proposal. The project staff underwent training prior to taking up activities.

Key messages from Phase 1

Activities

- Generating baseline information
- General awareness raising on WQ, demand generation
- Assessing existing village institutions, technical capabilities, training & IEC needs

Resource estimates

- 3-12 months
- 4-12 staff
- Rs.0.85-8.27 lakhs

Phase-specific influencing factors

- Awareness of WQ issues
- Availability of secondary data

2

Participatory planning

2.0
Background

This is the phase where participatory planning begins. Key activities during this phase include:

1. Participatory planning
2. Community action
3. Institutional activities

Participatory planning is the core activity during this phase, while community action and institutional activities are the supporting activities concurrent with planning. The activities are defined below and the details are discussed in the following section.

1. Participatory planning

    The respondent NGO, based on its assessment of the baseline situation, facilitates a planning exercise involving all sections of the beneficiary community. The exercise usually involves a series of village level meetings to discuss a list of priority WQM actions. Once finalised, plans are shared at GP/*Gram Sabha* meetings and legitimised with institutional and financial support, embracing the principles of social, technical, institutional, financial and environmental sustainability.

2. Community action

    It refers to focused IEC campaigns on the origin of WQ contaminants, various routes of exposure and its linkages with human health and productivity. The campaigns also highlight the importance of good sanitary and hygiene practices, the importance of WQ monitoring and a variety of safe water options available.

3. Institutional activities

    This refers to assigning roles and responsibilities to village level institutions (VLIs) for the subsequent phases of WQM. It also involves exploring convergence among institutions to avoid duplication of efforts and setting up systems for smooth project implementation.

2.1
Activities

2.1.1
Participatory planning

During participatory planning meetings, WQ monitoring and safe water options were prioritised in light of the baseline data from Phase 1, and funding sources (government, donor, banks, SHG linkages and community contribution) were tapped to ensure smooth implementation. Table 4 discusses key activities in participatory planning and maps the core process through high-level and low-level details.

Table 4: Key activities and mapping of the core process during participatory planning

Key Activities	Core Process Mapping	
	High-level process map	Low-level details
Early expression of intent and stakeholder notification	Discussed tentative dates for planning meetings early in the project.	Early intimation and discussion about tentative dates during community meetings (Phase 1) that preceded this phase.
	Notified the stakeholders and passed on the information during interpersonal/community interactions.	Notices at the GP building, schools and community halls. All sections of the community and key stakeholders from the government (ZP, DWSM, district PRED/PHED representatives) were notified. Timeframe and range of opportunities for involvement were also discussed.
Preparation of a draft plan	All stakeholders provided with adequate opportunities to participate in defining the problems, setting the vision and targets and deciding on a set of priority actions.	Facilitated discussion on identifying the WQ problem(s), WQ monitoring regime, data management, exploring a range of safe water options including processes, O&M protocols, costs and respective pros and cons, selection of one or multiple safe water options aligning with government programmes, designing QCs, M&E systems etc.
	Opportunity provided to stakeholders to raise concerns on different issues through oral and written submissions.	Facilitator(s) set the ground rules of conduct during the meeting and explained how one could raise concerns. Facilitators also kept a strong vigil on the proceedings to ensure all concerned/dissenting voices were heard and recorded. If time did not permit any of the concerned voices to be heard, his/her name was noted in the meeting minutes and s/he was helped to register concerns later.

Key Activities	Core Process Mapping	
	High-level process map	Low-level details
Preparation of a draft plan	Secured and documented commitment and support from local service providers (PHED, PRED, ZP, GP etc.) for implementation of particular actions.	Minutes of the meeting were documented. The minutes were shared with the attendees for their formal approval (through signatures). The minutes were then formalised into a draft plan/resolution at the GP/*Gram Sabha* meetings in presence of local government authorities, and a formal approval/ endorsement from the service providers would follow.
Finalising the plan	Draft plan was documented and widely disseminated so that all stakeholders were informed about the detailed contents of the plan.	Written in a simple language, the draft plan contained proposed vision, priorities, targets, strategies, implications, outcomes, M&E, and an explanation of the process to give feedback. The draft was usually made available at the GP office. A summary of the draft plan was displayed at strategic locations (schools, community halls, locations near temples and water sources etc.). People were also informed during informal interactions, door-to-door campaigns etc. about the draft plan and where it can be obtained.
	Adequate feedback provided to people who raised concerns on elements of the plan and made written/oral submissions.	People raising concerns on the draft plan were either called for FGDs or one-to-one meetings depending on the nature of concerns, and their views were accommodated to the extent possible. Key discussion points during the feedback session were documented. At the end of the feedback session, attendees were requested to read these key points and formally approve them by signing on the document. In case no breakthrough was achieved during the feedback session, another public meeting was called to discuss the moot points in detail and arrive at a consensus.

Key Activities	Core Process Mapping	
	High-level process map	Low-level details
Finalising the plan	After a stipulated time-frame, the draft plan was finalised and the overall plan was unpacked into actionable annual plans.	Copies of the draft plan were made freely available and accessible to all residing in, or with an interest in, the project/project location, for a minimum of six working weeks. Annual plans were developed based on the overall plan. Annual plans included clear-cut targets, individual and institutional roles and responsibilities, available funds and systems for reporting and tracking the progress of the project.

2.1.2
Community action

Focused IEC campaigns on WQ formed a broad category of community action during this phase. The campaign built around the community interaction during Phase 1 gathered further momentum during this phase. Broadly, campaign methods used during this phase were quite similar to Phase 1. i.e. door-to-door campaigns, informal and formal meetings with all sections of the community, distribution of leaflets/pamphlets during meetings, interpersonal interactions and display of pictorial messages (mostly posters) at strategic locations.

Specifically, there was one important difference in the campaign approach and the messaging during this phase as compared to Phase 1. The approach and messaging was more focused; while remaining informal and personalised. Stress was mainly on interpersonal interactions (door-to-door campaigns) and informal gatherings, which allowed for internalisation of the key campaign messages. A logical sequencing of these key messages also led to a coherent flow of ideas. The messages began with some elementary questions related to WQ. For example - what are the different sources of contaminant(s), how do people get exposed to it, what are its health impacts and how does it affect economic productivity. The messages then went on to highlight the importance of source protection, good sanitary behaviour and hygiene practices at the households.

Once a case for improving WQ was established, the last part of the messages focused on the importance of WQ monitoring and the available safe water options. This helped the community to gain an insight into WQM prior to the planning meetings. It also paved the way for more informed discussions and deeper deliberations during these meetings.

2.1.3
Institutional activities

Institutional activities during this phase varied from exploring possibilities of institutional convergence to assigning institutional roles and responsibilities for subsequent phases of WQM. Different VLIs (e.g VWSC and VHSC etc.), were invited to a meeting prior to the planning meetings. At the same meeting, SHGs (if any) were also invited to listen to other

institutions and express their views. This meeting helped to initiate a conversation between existing VLIs and developed a sense of mutual trust.

Planning meetings took this idea of institutional cooperation forward and translated them into actionable items. Specifically the actionable items were - overseeing the subsequent phases of WQM, identifying vendors for supplying WQ testing kits, establishing supply chain linkages, planning the training on WQ monitoring and data management, identifying labourers for physical works (in case local labour was not available) and assigning responsibilities for post-implementation O&M. A series of meetings followed to clearly delineate roles and responsibilities of the institutions/individuals for different phases of WQM. These meetings were also used to plan the mobilisation and release of funds.

Some of the respondent NGOs used social audits to monitor the use of funds during the implementation phase. They used this opportunity of institutional convergence to discuss the audit process, training and tentative selection of team members, which was fine-tuned and ratified later by the *Gram Sabha*. Grassroots level government functionaries (e.g., ASHA, ANM, school teachers) were involved in the institutional convergence meetings and important decisions.

2. 2
Resource estimates

As mentioned in the introductory chapter, the resource figures during this phase were affected by a common factor ('State of development') and a few phase-specific factors:

- Geographical spread of habitations in the project location
- Seasonal factors

Impacts of the common and phase-specific factors on the resources required for Phase 2 are described in the following sections.

2.2.1
Time

The time taken to complete Phase 2 varied between 3-12 months across different respondent NGOs. NGOs working in low 'State of development' locations usually spent a longer time (8-12 months). This could be due to the fact that basic developmental needs (food, shelter, health, employment and education) of people residing in these locations were not fully met and people ascribed very little importance to WQ. Hence, some NGOs (for e.g. VASUDHA, DA, MPA and IRRAD) had to spend more time on IEC campaigns - building community awareness, developing/strengthening village level institutions and planning meetings.

VASUDHA worked in the tribal villages of Dhar district (Madhya Pradesh), DA worked in drought-affected villages of Jhansi (Uttar Pradesh) and Tikamgarh (Madhya Pradesh) districts, MPA worked in villages spread over five flood-prone districts of North Bihar and IRRAD worked in religious minority dominated backward villages of Mewat district (Haryana). Considering the lack of community awareness, IRRAD had to spend a substantial time on IEC campaigns and had to also carry out field-level demonstrations to help the community understand the different safe water options. In fact, among all the respondent NGOs, IRRAD spent the maximum time (12 months) during Phase 2. It is also important to mention that DA spent less time (8 months) during this phase compared to VASUDHA and MPA (both spent around 12 months). This could be attributed to the fact that DA had a strong NRM programme running in its project villages and was able to build up substantial social capital prior to the WQM project.

On the other hand, NGOs working in high 'State of development' locations spent relatively less time (3-6 months) during Phase 2. Examples include- HSS, SAMERTH and SVYM. HSS worked in the mountain villages of Tehri district (Uttarakhand), SAMERTH worked in coastal villages of Kutch district (Gujarat) and SVYM worked in rural areas of Mysore district (Karnataka). HSS spent a relatively longer time (6 months) as compared to the other two NGOs (which spent around 3 months). This could be attributed to the wider spread (scattered) of habitations in mountain villages and the HSS staff had to put in additional effort (greater time, higher frequency of travel to project locations etc.) to organise the community for the planning meetings.

There were also instances when seasonal factors played a major role in affecting the time spent during Phase 2. GUS, working in villages of Mahoba district (Uttar Pradesh), spent about 10 months during this phase since their planning meetings coincided with the peak

harvesting season. Some of the NGOs (e.g. BIRD-K) also reported problems in organising planning meetings due to an impending festive season.

Planning accounted for the maximum time during Phase 2. The time required for planning varied between 75-90% across different projects. Community action and institutional activities accounted for about 10-25% of time.

2.2.2
Human resources

The number of staff involved during Phase 2 varied between 4-12 persons. Depending on their profile (see Table 5), some staff had a more rigourous engagement than others. Since planning accounted for most of the time spent during this phase, most NGOs carefully chose their staff for this phase in order to ensure a diverse planning team and good quality of facilitation.

The variation in number of staff could be attributed to local factors. A wider spread of habitations in project villages required more number of staff. The number of staff was also more in projects with low 'State of development'. For example – IRRAD (Mewat district, Haryana) involved more staff during this phase than SAMERTH (Kutch district, Gujarat). It is important to understand that funding available for this phase and the modus operandi of a particular organisation also influenced the staff numbers (see Table 5).

The following table provides a profile of different project staff involved during Phase 2. The staff profile remained the same as Phase 1 but they assumed different responsibilities during this phase.

Table 5: Profile of staff and their responsibilities during Phase 2

Staff Profile	Responsibilities
PC/PM Project Coordinator/ Project Manager	The PC/PM – was overall in-charge of the phase, periodically reviewed the progress with CC/DC, WQS, TA, assigned particular responsibilities to the project staff and met the FS as and when required.
FS (CO, HE/HP, VC) Field Staff (community organiser, hygiene educator/hygiene promoter, village champion)	FS – played an important role in conducting the focused IEC campaigns. They were also involved in organising community interactions, building/strengthening VLIs, village/GP level planning meetings or FGDs.

Staff Profile	Responsibilities
TA (P/T) Technical Advisor	The TA (part-time) – was responsible for providing substance to the planning by incorporating technical aspects and improving the quality of facilitation, advised the PC/PM from time to time and guided WQS to prepare a manual for WQ testing, sanitary risk assessment and safe water interventions.
WQS Water Quality Specialist	The WQS – was responsible for shortlisting of vendors and identification of WQ testing kits, reviewing the technical manual for WQ testing, sanitary risk assessment and safe water options, which was later approved by the TA and PC/PM.
CC/DC Cluster/District Coordinator	The CC/DC – coordinated all activities during this phase. S/he supervised the FS and reported directly to the PC/PM.
Doc. coord. (P/T) Documentation Coordinator	The Doc. coord. (part-time) – some organisations involved a documentation coordinator on a part-time basis for recording minutes of the planning meetings. The Doc coord. also prepared a dissemination plan for WQ test results along with the WQS and the PC/PM.
Volunteers	Volunteers – facilitated participatory planning, community actions and assigned roles and responsibilities to VLIs.

2. 2. 3
Finances

The amount of money spent during Phase 2 varied between Rs.0.2-9 lakhs. The amount spent on salaries during Phase 2 varied between 40-50%. About 20-40 % of the amount was spent on software and about 10-20 % was spent on hardware activities. Projects with low 'State of development' spent more money. One of the respondent NGOs (IRRAD) spent close to 20% of the amount on hardware activities (mainly for on-field demonstrations of possible mitigation options). One of the NGOs (DA), working in villages in backward districts of Bundelkhand, took more time to complete the phase as compared to others. It also involved more staff during IEC campaigns and organising the community for planning meetings, which led to increased spending on salaries.

2. 3
Quality Checks (QCs)

Most NGOs used a set of QCs to ensure whether the activities undertaken during Phase 2 were in accordance with the plan and whether they conformed to certain quality benchmarks set for this phase. These QCs are discussed in Table 6.

Table 6: QCs during Phase 2

Broad Areas	Activity Details
Efficacy of IEC activities	Random spot checks by project coordinators to check the efficacy of IEC efforts; checking the location of wall-paintings/posters, interviewing beneficiaries about their usefulness etc.
WQ monitoring—procuring testing kits, and planning data dissemination	WQ monitoring options and vendors were identified; costs were estimated and put forward in public domain. Selection and procurement was based on whether the kit was validated by an accredited laboratory, cost, its ease of use and supply chain logistics. A WQ monitoring data reporting template was designed and a dissemination plan was made available to the project staff.
Financial planning	Village/GP level meetings were convened to discuss the activities and cost estimates for different phases of the WQM programme. Discussions also included sourcing and leveraging government funds and mobilising funds from donor agencies. During this meeting, the extent of community contribution was also decided. Annual budgetary provisions were made based on the funds available.
Social audits - selection and orientation of team members	Team members for leading the social audit were drawn from the community (persons with impeccable integrity) and approved by all the stakeholders at a *Gram Sabha* meeting. They were briefed and oriented in a workshop by social audit experts. A summary format was created to highlight the key findings and to submit the action taken report.

Key messages from Phase 2

Activities

⬧ Participatory planning, identifying and prioritising WQ monitoring, mitigation and O&M options

⬧ Roles and responsibilities assigned, social audit systems developed, focussed IEC efforts

⬧ Tapping funding sources, government schemes, exploring supply-chain linkages

Resource estimates

⬧ 3–12 months

⬧ 4–12 staff persons

⬧ Rs.0.2–9 lakhs

Phase-specific influencing factors

⬧ Geographical spread of habitations in the project location

⬧ Seasonal factors

DISTINCTIVE FEATURES

Participatory planning sets the tone for the subsequent phases of a WQM project. Planning usually happens over a series of meetings, allowing for internalisation. These meetings involve fairly detailed discussions covering the widest variety of stakeholders. Long-term sustainability of the WQM project depends on depth and quality of discussions, how well the plans are formulated and to what extent the community participates in this exercise.

3

WQ monitoring:
training & data management

3.0
Background

Chapter 3 describes Phase 3 of the WQM framework. Main activities during this phase are:

1. Training
2. WQ data generation, management and dissemination
3. Community action
4. Institutional activities

Training on WQ monitoring and the subsequent testing of WQ are the key activities during this phase. It is important to understand that most of the activities during this phase are ongoing and should be carried out periodically beyond the project duration. The activities mentioned in this phase correspond to the first round of WQ monitoring within the project duration. Each of these activities is defined below followed by a detailed description.

1. Training
   This refers to the training of selected community representatives on WQ monitoring by the project staff. It also refers to training and orientation sessions on data generation, management and dissemination.

2. WQ data generation, management and dissemination
   It refers to generation of WQ data through monitoring, data management and dissemination of data through various channels of communication.

3. Community action
   This refers to sustained IEC campaigns on WQ, focused primarily on monitoring. It also involves practical on-field demonstrations and uses different tools to share the WQ test results with the community.

4. Institutional activities
   This refers to active involvement of PRIs/VLIs to monitor activities during Phase 3 and mobilise funds for them. It also refers to institutional responsibility to identify focus group of para-professionals for implementing safe water options during the next phase.

3.1
Activities

3.1.1
Training

All the respondent NGOs organised training programmes on WQ monitoring for selected community representatives. Selection of community representatives (VWSC member, SHG/MMD/Youth club member, school teacher and ASHA) was based on planning meetings during Phase 2 and a series of follow-up meetings between different VLIs involved in WQM (see Chapter 2 for details). The duration of training programmes varied among the respondent NGOs. Some NGOs had longer and more extensive training programmes (DA, PARHIT etc.), which lasted for about 3-4 days. Other NGOs had shorter training programmes (BIRD-K, MPA etc.) and covered only the key aspects of WQ monitoring and data management in about 2-3 hours. This section attempts to capture the minimum common denominators of these training programmes and highlights the general topics (see Figure 6) and the common pedagogy followed.

Figure 6: General topics covered during training programmes on WQM

Monitoring goal
Explaining the importance of efficient and effective data generation to serve management decision needs, with reference to the overall WQM project.

Monitoring objectives
Identifying key contaminants, establishing causes and sources of contamination – temporal and spatial patterns, identifying problem areas and suggesting priority action, checking efficiency of safe water options periodically.

Monitoring strategy
Strategy included a long-term monitoring plan and a timeline (usually a year). It also included the scope of monitoring (parameters and the area to be covered), sorting out technical difficulties related to use of field testing kits, streamlining logistical requirements (kits and chemical refills) and resource needs (personnel and the cost of monitoring).

Monitoring design
Discussing the approach and rationale for selection of a particular monitoring design and sample sites that best serve the monitoring objectives. It also included designing a sampling frequency for chemical and bacteriological parameters and a protocol for sanitary risk assessment of water sources.

Reporting and data analysis
Explaining the WQ and sanitary risk assessment reports. It also included training on analysing the data, interpreting major data trends and presenting it in a simple and comprehensible form.

Data management & dissemination
Discussing a draft data management template (manual/online) and finalising it based on the feedback received from the participants and deciding on a dissemination strategy with clearly defined responsibilities.

The training pedagogy followed an interactive format in order to generate interest among the participants and create a basic scientific understanding of WQM. The respondent NGOs used the following tools as part of their training pedagogy:

- Discussions
- Brainstorming/experience sharing sessions
- Field demonstrations
- Training support and IEC materials

3.1.2
WQ data generation, management and dissemination

These are the fundamental set of activities in the WQ monitoring phase. After the training, NGOs supported the trainees to test the quality of their water sources. In most cases, blanket testing of sources was conducted using a field-testing kit. When the trainees tested the WQ, project staff from the NGOs played the role of observers. Along with WQ testing, trainees also assessed the sanitary risk to the water sources. Most NGOs encouraged the VWSC members and ASHAs to carry out the hands-on testing, while the other trainees provided back-up support as and when required. In the case of villages where VWSCs were not fully mature, other PRI members were engaged in hands-on WQ testing and sanitary risk assessment. Data was reported in a pre-defined format and recorded manually in a register or uploaded to a computer. Data was analysed, major trends identified and interpreted in simple terms. A summary of the data was then displayed (pictorially or symbolically) either near the water sources or on GP/school building walls. Copies of the summary and original report were kept at the GP office for public viewing. The data was also shared during public meetings or interpersonal interactions (see Sec. 3.1.3 for details).

3.1.3
Community action

Community action during this phase had two objectives. The first objective was to get the larger beneficiary community in the villages interested in WQ monitoring. So an effort was made to pre-publicise the WQ testing schedules. Field staff from respondent NGOs went around the villages and announced when exactly the WQ testing team would arrive in the village. This generated interest among the community and built a sense of expectation. During testing, a large crowd would gather around the testing team and the team members were encouraged to explain the tests to them. The very nature of the tests (e.g., colour change) also kept the onlookers attentive.

The second objective was to share results with the community and help them understand the quality of their water sources. As part of the sustained IEC campaign, NGO staff conducted public meetings and held door-to-door campaigns to sensitise the community about the WQ test results. During these interactions, people were shown a fact sheet/simple poster summarising the WQ test results. At the same time, if any drinking water source was found to be contaminated it was painted (usually red colour was used for unsafe sources) to avoid public consumption.

3.1.4
Institutional activities

The institutional activities included involving the PRIs/VLIs to monitor the activities during this phase. As mentioned earlier, some of their members were part of the training programme, on WQ monitoring. Others were involved in receiving feedback from the trainees, conducting random spot-checks during WQ testing and talking to the community to ensure that activities were in line with the plan. These institutions were also involved in mobilising contributions from the community and other sources. Importantly, the institutions were actively involved in selecting the local para-professionals—plumbers, masons, handpump (HP) mechanics etc.— for implementation of safe water options during the next phase.

3.2
Resource estimates

Resource figures during this phase were affected by a couple of phase-specific factors and the 'State of development'. The phase-specific factors were:

- ▶ Training pedagogy
- ▶ Number of water sources and their geographical distribution

Impact of the common and phase-specific factors on the resources required for Phase 3 are described in the following sections.

3.2.1
Time

The time spent to carry out the activities under Phase 3 varied between 5-10 months. Time spent on training varied between 3-5% across different projects. Time spent on data dissemination and management varied between 20-25%. About 35-45% of time was spent on community actions and the rest 30-35% was spent on institutional activities.

These numbers suggest that community action and institutional activities were the two most time-consuming activities during this phase. This could be attributed to lack of community perceptions on the importance of WQ monitoring in low 'State of development' locations. NGOs working in these locations had to spend more time on community and institutional activities. For example, MPA, VASUDHA, and PARHIT (Datia, MP) spent close to 10 months during this phase. Some NGOs reaped the benefits of their earlier development interventions (mainly NRM) in their project locations, e.g. DA (Jhansi and Tikamgarh , Bundelkhand), HSS (Tehri, Uttarakhand) and SAMERTH (Kutch, Gujarat). All these NGOs spent only around 5-6 months during this phase due to the headstart provided by the 'State of development'. On the other hand, Some organisations like GUS (Mahoba, UP) spent nearly 8 months during this phase although the organisation had been working in that particular location for quite some time. This discrepancy could be attributed to higher number of sources tested and their wider distribution across project villages.

3.2.2
Human resources

Number of staff involved across all projects during Phase 3 varied between 4-12 persons. As mentioned in Chapter 2 (see Sec. 2.2.2), the number of staff involved in this phase depends on the mode of functioning of an organisation and available finances. But it was mainly training pedagogy, which led to the substantial differences in staff numbers. Organisations like DA (Jhansi and Tikamgarh, Bundelkhand), PARHIT (Datia, MP) followed a long and rigourous training programme on WQ monitoring. The training programme was followed by field visits and demonstration exercises, which required greater staff involvement. On the other hand, organisations like BIRD-K (Tumkur, Karnataka) had fairly simple and short training sessions, which required lesser staff involvement.

'State of development' also had an influence on the staff figures for this phase. As mentioned earlier, organisations working in locations with a relatively low 'State of development' spent more time in completing the activities under Phase 3. This demanded greater staff involvement and additional effort from the project staff to mobilise the local community. Number of water sources and their geographical distribution also had an influence on the staff figures. For instance, GUS (Mahoba, UP) and SVYM (Mysore, Karnataka) tested a large number of widely distributed water sources within their project location and involved more staff during this phase. Table 7 describes the profile of the different project staff involved during Phase 3 and their respective responsibilities.

Table 7: Profile of staff and their responsibilities during phase 3

Staff Profile	Responsibilities
PC/PM Project Coordinator/ Project Manager	The PC/PM – was overall in-charge of this phase, periodically reviewed the progress with CC/DC, WQS, TA and met the FS as and when required.
FS (CO, HE/HP, VC) Field Staff (community organiser, hygiene educator/ hygiene promoter, village champion)	FS – were responsible for WQ monitoring, data management and dissemination, sustained IEC campaigns, organising community interactions, mobilising community contributions etc.
TA (P/T) Technical Advisor	The TA (part-time) – advised the PC/PM on various technical aspects of WQ monitoring during the phase, helped the WQS prepare the training pedagogy and the CC/DC to formulate a data archiving, dissemination and management strategy.
WQS Water Quality Specialist	The WQS – was involved in the training on WQ monitoring including sampling, analysis, data recording and interpretation and dissemination. S/he was also responsible for sorting out technical difficulties related to the use of WQ testing kits.

Staff Profile	Responsibilities
CC/DC Cluster/District Coordinator	The CC/DC – supervised the FS, was responsible for data management and dissemination, anchored the community interactions. S/he was also responsible for assigning institutional roles and responsibilities and putting in checks and balances following discussions with PC/PM, TA and WQS etc.
Volunteers	Volunteers – were the interface between the FS and the local community. They supported the FS to organise meetings and got the local community involved during this phase

Note: Documentation coordinators did not have a particular responsibility in this phase.

3.2.3
Finances

The amount of money spent during Phase 3 varied between Rs.1.45- 6.74 lakhs. A substantial portion of the money spent during Phase 3 went into salaries, which ranged between 55-60% across different projects. Spending on software ranged between 25-30% of the total amount and around 10-20% was spent on hardware. Salaries mainly contributed to the differences in the overall amount spent by the different respondent NGOs in this phase. Some organisations (DA and PARHIT) used regular staff to conduct a majority of the training and field activities and had to pay more for salaries. While other organisations (BIRD-K and SAMERTH) employed local volunteers for a majority of mobilisation and coordination activities and paid less for salaries.

3.3
Quality Checks (QCs)

Following (see Table 8) are the set of QCs that the NGOs used to ascertain whether the activities undertaken during Phase 3 were in accordance with the plan and whether they conformed to quality benchmarks set for this phase.

Table 8: QCs during Phase 3

Broad Areas	Activity Details
Efficacy of training and retention	Received written feedback from the participants trained on WQM, tested recall after 6 months through spot-checks.
Data recording and dissemination	WQ data is recorded/documented in a register and shared with all the stakeholders during village meetings/FGDs.
Transparency and voluntary disclosure	Community contributions (cash/voluntary labour) and financial contributions from different sources are collected, updated in the project financial summary and shared with all the stakeholders during *Gram Sabha* meetings.

Broad Areas	Activity Details
Finalising a team of para-professionals	Prepared a list of local para-professionals (for training on safe water options) in consultation with the GP members and shared it with all the stakeholders for finalisation during village meetings.

DISTINCTIVE FEATURES

Phase 3 of the WQM framework is mostly activity-based and serves as an ideal platform to engage the community in WQ monitoring. It is important to understand that training and generating WQ data is an on-going process, as WQ is dynamic in nature and tends to vary over time. Hence, periodically updated WQ data is essential to make key management decisions and ensure long-term project sustainability.

Key messages from Phase 3

Activities

- WQ monitoring – Training, data generation, management and dissemination
- IEC campaigns on the importance of WQ monitoring, mobilising community contributions
- Identification of local para-professionals (masons, plumbers and HP mechanics) for training on safe water options

Resource estimates

- 5-10 months
- 4-12 staff persons
- Rs.1.45-6.74 lakhs

Phase-specific influencing factors

- Training pedagogy
- Number of sources and their geographical distribution

4

Implementation of
safe water options

4.0
Background

Chapter 4 describes the implementation of safe water options in the project locations of respondent NGOs. This phase predominantly involves the hardware activities. Software activities (training, IEC and audit) are carried out to supplement the hardware activities. The major activities during this phase are:

1. Training
2. Implementation
3. Social audit

A definition of these activities and a detailed description are as follows.

1. Training

   Mainly refers to training a group of local para-professionals selected during Phase 3 on how to implement the chosen safe water options (including O&M). It also refers to training a selected group of community representatives on how to conduct a social audit.

2. Implementation

   It refers to on-field implementation of safe water options. It also includes procurement of material and labour and monitoring the quality of physical works.

3. Social audit

   It refers to tracking financial expenditure against the progress in physical works. The information is shared with a larger community through a public platform. It allows the community representatives to enforce accountability and transparency and provides the end-users an opportunity to scrutinise the implementation.

4.1
Activities

4.1.1
Training

This phase had two different training components. The first one dealt with training the local para-professionals (masons, plumbers, HP mechanics etc.) on implementing the safe water options chosen by the community. As the reader would remember, these options were identified during Phase 2 following the planning meetings with the community. Usually these

training programmes were 3-5 days long. Rich with hands-on exercises, these trainings provided an ideal platform for the para-professionals to hone their skills on different safe water options and learn to fix the O&M problems.

At the end of the training, simple instruction manuals (in the local language) were handed out to the para-professionals, which helped them to recall the lessons learnt during the training and apply them on the ground. Most of the respondent NGOs also got some of the GP/VWSC members to attend this training. This helped the GP/VWSC members to gain a first-hand understanding of the processes and to monitor the implementation and O&M at a later stage.

The second training was for building capabilities of the local community on social audits. It involved explaining the objectives of the audit to the social audit team/committee, clearly delineating the steps involved and discussing the expected outputs from this exercise.

4.1.2
Implementation

Trained local labour/para-professionals carried out the implementation of physical works. Project staff from the respondent NGOs and GP/VWSC members supervised this process and provided critical feedback as and when necessary. Generally, the implementation was focused towards providing community level solutions (dug well, check dams etc., see the different implementation options in Table 9).

3

Sachetna Model

Sachetna is a fluorosis mitigation project implemented by BIRD-K in partnership with the Rural Development & Panchayati Raj (RDPR) Department, Government of Karnataka and Arghyam. In this project, individual rainwater harvesting (RWH) structures were promoted as one of the key fluorosis mitigation interventions. Cost of a 5000 litre RWH structure was about Rs.22,000 (see Table 9 for details). The beneficiaries paid the money upfront and built the structures. Based on the approval of the quality of construction, a part of the amount was reimbursed as subsidy. Overall, APL households contributed 30% and BPL households contributed 20% of the total amount. Households with a physically vulnerable person contributed 10% of the overall amount. For poor households, which were unable to pay the money upfront, a revolving fund was created and disbursed as loans through SHGs.

Domestic bio-sand filter

Slow sand filter

Earthen check dam

Household RWH

Open well

In the case of providing safe water options at the household level (RWH structures, domestic water treatment units etc.), most of the NGOs attempted to cover three main areas of inclusion, following the principles discussed during the planning phase.

Economic status: APL and BPL families

Caste Groups: SC, ST, OBC and General groups

Geographic location: Remote households, which were isolated and distant from the main cluster of habitations

Nearly all the respondent NGOs encouraged the community to use local material and labour. The implementation was usually initiated following a community contracting[20] process. It is important to note that community contracts emerged from a participatory planning process, in which communities identified their needs, prioritised their problems and agreed upon plans for their solutions (see Phase 2 for details).

The NGOs facilitated the implementation along with the GP/VWSC members, monitored construction and approved the quality of construction before releasing the next instalment. For the construction of individual RWH structures, beneficiaries bore the entire expenditure. Once the NGO staff approved the quality of construction, a substantial part of this expenditure was reimbursed as subsidy (see Box 3: Sachetna model).

Fluoride, salinity, iron and microbial contamination were found to be the major WQ problems among the projects showcased in this document. Broadly, the various safe water options/ interventions implemented by the respondent NGOs across all projects can be classified as:

1. development of alternative sources/rejuvenation of existing sources

2. low-cost water treatment options.

Tables 9 and 10 present a summary of these interventions, their purpose, technical details, capital and O&M expenditure[21] and O&M protocols.

20
Community contract is a contract awarded to a community organisation by a government agency or NGO to carry out physical works that have been identified in the community action plan. In most cases the community organisation represents the community of a particular settlement/ habitation.

21
Tables present a ballpark estimate of capital and O&M expenditure using a particular project as example. Costs will vary from one location to another

Table 9: Development of alternative sources/rejuvenation of existing sources*

All costs in Indian Rupees

S. N.	Safe Water Interventions	Purpose of use	Dimensions/ Capacity	Capital cost	Major O&M components	O&M cost	O&M as % of capital costs	Frequency of O&M requirements**
1	Roof-top water harvesting	Alternative source of safe water	5000 litres	20,000 to 25,000	Cleaning of rooftops, application of lime in artificial mud catchments	750 - 1000	3.7-4	Once a year
2	Earthen check dam	To increase groundwater recharge and dilute chemical contamination	Water retention capacity: 1.5 - 2 lakh litres	80,000 to 100,000	Desilting, transportation of silt	2000-2200	2.2-2.5	Once in 3-5 years
3	Dug wells	Alternative source of safe water, especially to deal with salinity and iron	Diameter: 5-10 feet, Depth: 20-40 feet	25,000 to 120,000	Desilting, pumping out water, cleaning	1000 - 1500	2-4	Once in 3-5 years depending upon the depth and the amount of water to be pumped out and extent of cleaning required
4	Sanitary wells	Open wells converted to sanitary wells to deal with chemical contamination (F, As, Fe etc.)	Diameter: 3-5 feet, Depth: 35-50 feet	100,000 to 120,000	Desilting, pump repair, repairing pipeline leakages	8000 - 12000	8-10	2-3 times in a year

All costs in Indian Rupees

Table 10: Low-cost water treatment options*

S. N.	Safe Water Interventions	Purpose of use	Capacity	Capital cost	Major O&M components	O&M cost	O&M as % of capital costs	Frequency of O&M requirements**
1	Activated Alumina filter (Household)	To reduce the fluoride concentration to the level of safe consumption	5-7 L/hour	2000-2200	Regeneration and/ or proper disposal of discharged alumina – using it for construction of bricks	30 - 50	1.5 - 2	Once in 2-3 months
2	Slow Sand filters	Removes cysts, coliforms and ova of disease causing microbes	2-2.5 L/minute	20,000-25,000	Backwashing of filters and scraping off the top layer of filter, cleaning of filters to prevent choking	1000 - 1500	5 - 6	Once in 2-3 years
3	Matka filter	Removes iron and microbial contamination	15-20 L/hour	300-350	Cleaning of filter media to prevent choking	25 - 35	8 - 10	2-3 times in a year
4	Bio-sand filter (community level)	Removes bacteria, turbidity, viruses	2500-3000L/d	75,000-90,000	Simple wet harrowing	500-800	0.6 - 0.8	1-2 times in a year
5	Bio-sand filter (Household level)	Removes bacteria, turbidity, viruses	20-25 L/hour	700-750	Simple wet harrowing	60 - 70	8 - 9	Once a year

Note:
* It will be important to note that this is not an exhaustive list of safe water options available for improving WQ. The focus of this document is more on a framework approach rather than options themselves.

** Frequency of O&M will depend upon the pollutant concentration and the volume of water treated.

4.1.3
Social audit

Some of the respondent NGOs trained local community/project beneficiaries to conduct social audits to track financial expenditure of the project against the progress in physical works. As per the powers vested by the Panchayati Raj Act, the *Gram Sabha* was decided as the appropriate institutional level for conducting social audits.

In order to take this work forward, the *Gram Sabha* formed a social audit committee during the planning phase. The committee members were drawn from the project beneficiaries. The respondent NGOs trained the committee members on various elements of social audit. The audit committee used a variety of tools (social accounting, stakeholder consultation, interviewing NGO staff and beneficiaries, or anyone directly/indirectly affected by the project) to capture both quantitative and qualitative information about the WQM project.

This social audit enabled the respondent NGOs to measure their own performance according to people's perception. The respondent NGOs also used this opportunity to acquaint the community about social audits and sensitise them about the regular nature of the audit. This helped the local community to understand the importance of social audits for any WQM project and beyond. Figure 7 mentions the six key steps involved in the social audit.

Figure 7: Key steps in social audit

Step 1 **Preparatory activities**	Listing down the key objectives Matching activities with the objectives Fixing the responsibility of team members Preparing a budget
Step 2 **Defining scope and identifying stakeholders**	Identifying key stakeholders for consultation (beneficiary households including BPL, socio-economically vulnerable households etc.) Forging consensus among the team on the scope of the audit (time, geographical scale, issues to be covered, audit frequency etc.)
Step 3 **Evaluating accounting and book-keeping records**	Using existing records (budget allocations, beneficiary lists, muster rolls, bills, vouchers, accounts) to evaluate financial performance of the project Identifying and procuring any additional data to be used
Step 4 **Field observations and stakeholder consultations**	Stakeholder interviews (FGDs, informal/formal questionnaire -based, personal) Field observations on the progress of physical works and the quality of construction

| Step 5 | Preparing a consolidated report based on social audit findings |
| **Report preparation and dissemination** | Presenting a summary of the social audit findings to the stakeholders through meetings and public display |

Step 6	Feedback for fine-tuning the project to help reach its goals
Feedback and institutionalising the process	Suggesting a concrete set of follow-up actions and highlighting the need for an 'action taken' report
	Institutionalising social audit

4.2
Resource estimates

Resource figures during this phase were affected by the 'State of development'. In addition, the phase-specific factors were:

- WQ problems and type of interventions
- Topography and hydrogeology
- Local availability of material and human resources

Impacts of the common and phase-specific factors on the resources required for Phase 4 are described below.

4.2.1
Time

The time taken to complete Phase 4 varied between 20-24 months across all projects. As this was predominantly a solution implementation phase, most of the staff time was spent on hardware activities. Time spent on hardware activities ranged between 70-80% (Figure 8).

Figure 8: Percentage distribution of time spent in implementation

15%
5%
80%

● Hardware
● Training
● Social Audit
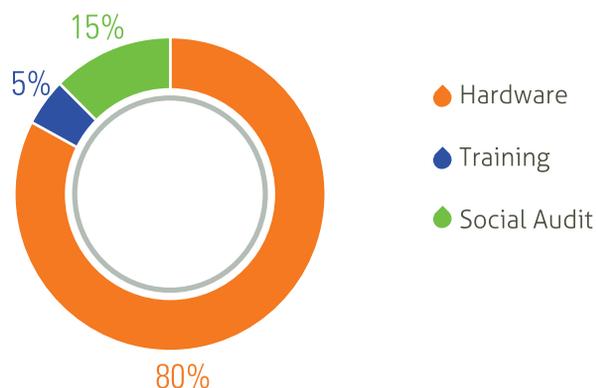
Depending on the type of WQ problem in a particular location, the nature of interventions varied and so did the time taken to implement these interventions. Some interventions were less labour and time-intensive than the others. Sometimes, even with the same type of WQ problem, the nature of intervention varied. For instance, BIRD-K in Tumkur, Karnataka and VASUDHA in Dhar, Madhya Pradesh, were dealing with fluoride as the key WQ problem in their project locations but had implemented different types of interventions. While BIRD-K's implementation focused more on RWH structures at the household level (see Box. 3: Sachetna model, earlier in this chapter), VASUDHA focused on sanitary well based community level in-village water supply schemes. Hence, BIRD-K took longer to complete this phase as compared to VASUDHA.

The topography of a project location also influenced the time taken to complete the activities under this phase. Organisations working in hilly terrains/undulating topography (e.g. HSS in Uttarakhand) had to spend more time transporting the materials to the project location and put in greater effort completing the physical works. Similarly, suitable hydrogeology provided an advantage for the development of alternative sources and consumed less implementation time. For instance, SAMERTH (Kutch, Gujarat) and IRRAD (Mewat, Haryana) were able to develop/renovate relatively less time-consuming community level safe water options (e.g earthen check dams and dug wells etc.) in their project locations.

In addition to the above, it is important to remember that the time taken to complete this phase was also dependent on the quality of labour involved and how closely the implementation activities were monitored.

4.2.2
Human resources

Number of staff involved in this phase varied between 4-10 persons across various projects. Human resource requirements in this phase were also dependent on the type of WQ problems and the nature of interventions implemented thereof. But it would be important to note that the NGO staff did not implement these interventions, they only supported the local community to implement these interventions. Depending on the type of interventions, whether they were implemented at household/community level, the nature of support (either in terms of supervision or technical advisory) provided by the NGOs also varied. For instance: MPA in North Bihar was implementing household level safe water options (e.g. *Matka* filter) hence more staff were involved in supervision and technical support. On the other hand, lesser staff were engaged in the implementation phase at GUS (Mahoba, Uttar Pradesh) since the focus was more on developing alternative sources at the community level.

The number of staff involved in a Phase 4 was also dependent on the modus operandi of a particular organisation and the amount of funding available.

Table 11 provides the profile of staff involved in Phase 4 and their respective responsibilities.

Table 11: Profile of staff and their responsibilities during Phase 4

Staff Profile	Responsibilities
PC/PM Project Coordinator/ Project Manager	The PC/PM - was overall in-charge of the phase, periodically reviewed the progress with CC/DC, WQS, TA and met the FS as and when required. S/he trained the project staff on the management aspects of various safe water interventions.
FS (CO, HE/HP, VC) Field Staff (community organiser, hygiene educator/hygiene promoter, village champion)	FS - were responsible for training the local masons/labourers and GP/VWSC members on various safe water interventions, O&M requirements and waste disposal. They had to regularly monitor the implementation and ensure the quality of construction along with the GP/VWSC members, continue WQ monitoring, data management and dissemination activities, sustain IEC campaigns, organise community interactions and support the social audit team as and when required.
TA (P/T) Technical Advisor	The TA (part-time) – advised the WQS to prepare the implementation and O&M manuals, decided the training pedagogy for local masons/labourers and the GP/VWSC members. S/he trained the project staff along with PC/PM on the technical aspects of safe water interventions and also supported the Civil Engineer to prepare the engineering designs, list of materials and labourers, financial estimates and process descriptions.
WQS Water Quality Specialist	The WQS - was responsible for planning a long-term WQ monitoring schedule and training the project staff on the technical aspects of safe water options.
CC/DC Cluster/District Coordinator	The CC/DC - was responsible for supervising the FS, planning and coordinating the training programmes, anchoring community interactions, supporting the field staff to source material and labour, coordinating the monitoring of physical works, initiating social audits and putting the checks and balances in place following discussions with PM/PC, TA and WQS etc.
Civil Engineer (P/T)	The Civil Engineer (part-time) - was responsible for preparing the engineering designs, list of materials and labourers, financial estimates and process descriptions. S/he was also responsible for random spot-checks of physical works or as requested by the FS.

Note: Documentation coordinator and volunteers did not have a particular responsibility during this phase. On the other hand, for the first time in the project, a civil engineer was involved on a part-time basis during this phase.

4.2.3
Finances

Due to the nature of activities involved, Phase 4 was by far the most resource-intensive phase. Amounts spent in this phase varied between Rs.45-160 lakhs across different projects. While discussing the time and human resources required to complete Phase 4 (see Sections 4.2.1 & 4.2.2) it was mentioned that a number of factors were responsible for causing the difference in numbers. But the differences become more prominent while comparing the amount of money spent across different projects.

Of all the respondent NGOs, only BIRD-K (Tumkur, Karnataka) and SAMERTH (Kutch, Gujarat) were able to leverage a substantial amount of government funding available for rural water supply. Close to 75% of the funds spent in implementing the interventions came from State and Central Government funds. While BIRD-K mainly utilised funds available with the Karnataka Rural Development & Panchayati Raj Department (RDPR), SAMERTH utilised MGNREGA funds for carrying out the physical works. In comparison, rest of the projects leveraged only about 15-25% of the government funds. This contributed to substantial differences in the overall amount spent across different projects in Phase 4.

It is important to understand how this difference in spending impacts the overall project outcomes. Not leveraging the government funds does not mean lack of optimal solutions. But leveraging funds would have opened up wider choices of solutions for NGOs. The interventions/solutions across the projects were mainly focused towards low-cost solutions. But one cannot rule out the possibility of expensive solutions and hence the importance of leveraging government funds.

A substantial portion of the money spent in this phase went into the hardware activities. In fact, it ranged between 55-75% across different projects. BIRD-K's project accounted for the highest percentage of spending on hardware activities (75%), followed by SAMERTH (70%). Rest of the projects spent between 63-68% on hardware. Spending on software activities ranged between 10-20% across different projects. GUS (Mahoba, UP) and VASUDHA (Dhar, MP) accounted for the highest spending on software (20%), which could be attributed to the amount spent on the social audits. Salary paid to the project staff accounted for 15-25% of the total amount spent in this phase.

4.3
Quality Checks (QC)

The respondent NGOs used the following (see Table 12) QCs to ascertain that the activities undertaken during Phase 4 were in accordance with the plan and they conformed to certain quality benchmarks set for this phase.

Table 12: QCs during Phase 4

Broad Areas	Activity Details
Efficacy of training	Received written feedback from the trained masons/para-professionals, checked recall after six months, conducted random spot checks to ensure that training was put to use during on-field implementation.
Transparency	Financial summary of the project (with a break-up of costs and fund utilisation certificate) was available. The summary was presented at the *Gram Sabha* along with the key social audit findings. Budget allocations, beneficiary lists, muster rolls, bills, vouchers, accounts, etc. were available for public scrutiny.
Efficiency and inclusion	The social audit and the action taken report suggested measures for improving efficiency and ensuring an opportunity for rural poor to voice their concerns.

Key messages from Phase 4

Activities

- Training of local para-professionals on implementation and O&M
- Implementation of physical works
- Social audits

Resource estimates

- 20-24 months
- 4-10 staff persons
- Rs.45-160 lakhs

Phase-specific influencing factors

- WQ problems and type of interventions
- Topography and hydrogeology of the project location
- Local availability of material and human resources

Distinctive features

This is the phase when real implementation of solutions takes place. Careful implementation of the safe water options and a close monitoring of the overall process allows for efficient and transparent functioning. A social audit mechanism reinforces transparency of the process and holds the service provider accountable. It also helps the beneficiaries to examine the overall process and ask critical questions to the service provider.

5
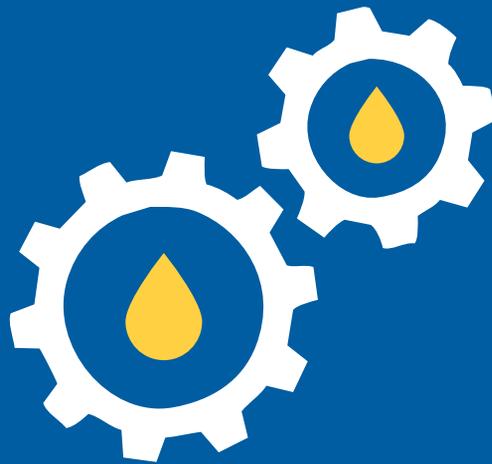
Operation & maintenance
(O&M)

5.0
Background

Phase 5 of the WQM project involves first round of operation and maintenance (O&M) of the implemented interventions. It also involves preparing the community to take charge of the project and hence ensuring long-term sustainability. These activities can be broadly categorised as:

1. Regular O&M activities

    Ensuring proactive maintenance and responding to maintenance requirements constitute the two most important aspects of regular O&M activities.

2. Activities linked to long-term project sustainability

    This refers to activities institutionalising O&M at the project level, providing post-project support and fundraising to meet the future requirements.

    The details are described in the following section.

5.1
Activities

5.1.1
Regular O&M activities

Proactive and reactive maintenance of the interventions were carried out during this phase. This was supported by refresher trainings on WQ monitoring, data upgradation and sustained IEC campaigns. The regular O&M activities under this phase represent first-round of O&M activities. The activities continue beyond the project tenure. Most of the respondent NGOs were dependent on donor funding and acknowledged that more could have been done in this phase if more funds were available for O&M.

5.2.2
Activities linked to long-term sustainability

The respondent NGOs carried out a few key activities for long-term sustainability of their WQM projects. The key activities were:

- Formation of user groups and institutionalising O&M at the project level

- Continued post-project engagement

- Raising funds for subsequent O&M after project completion

The following paragraphs describe these key activities with specific examples:

Organisations like BIRD-K (Tumkur, Karnataka) developed a *Gram Vikas Samiti* (GVS) for periodic monitoring of project outcomes. The *samiti* members were also responsible for monitoring the physical works along with GP members. GVS was allocated a specific amount annually for carrying out its activities. About 5% of that amount was used for managing community assets.

PARHIT (Datia, MP) established *Pani Samitis* at the village level. These *samitis* were responsible for post-project engagement with the community. They monitored sustainability of safe water interventions and sought regular feedback from the community. They were also responsible for collecting O&M charges under GP's supervision.

VASUDHA (Dhar, MP) also established similar VLIs under GP's supervision. The VLIs were involved in O&M, collection of O&M charges and paying operator fees etc. VASUDHA's staff met the beneficiary community regularly to understand O&M requirements and redress related grievances. VASUDHA also held monthly meetings to discuss progress of the project.

SVYM (Mysore, Karnataka) involved PRIs for sustained IEC campaigns at the community level. Refresher trainings on WQ monitoring, implementation and O&M also continued at a periodic frequency. Following the project, SVYM staff visited the project location frequently and checked whether any corrective measures were required.

Organisations like HSS involved *Mahila Mangal Dals* (MMDs) for maintaining the physical assets created under the project. Each MMD raised about Rs.70,000 through community contribution, GP funds and donor contributions. Community contribution varied between Rs.10-20/HH.

5.2
Resource estimates

The estimates provided in this chapter correspond to the resources spent for O&M within a WQM project of 3-5 years. Activities continue beyond the project tenure and so the resource estimates provided in the following sections only correspond to the first round of O&M activities. Most of the NGOs were constrained by limited donor funding available for this phase. They acknowledged that more could have been done if additional resources were available for O&M. Resource figures during Phase 5 were affected by the 'State of development' and other phase-specific factors such as

◗ Type of interventions
◗ Frequency of extreme weather events
◗ Quality of construction

Impacts of the common and phase-specific factors on the resources required for Phase 5 are described below.

5.2.1
Time

Average time required for Phase 5 varied between 1.5-2 months across different projects. O&M activities usually began after the first couple of years into the project. Annual maintenance time for all the WQM projects varied between 15-20 days/year.

The WQM project in North Bihar (MPA) took more maintenance time than others because it was based in flood-prone locations. Similarly, the project in Bundelkhand (DA) required higher preventive and reactive maintenance time as they were prone to extreme weather events. The type of intervention also influenced the time required for the O&M phase. For instance, dug wells/RWH structures in general required less frequent maintenance as compared to sanitary wells or activated alumina kits or bio-sand filters (see Tables 9 and 10 in Chapter 4). The quality of construction could also impact the maintenance time substantially. Poor quality of construction would lead to maintenance problems, warranting frequent repairs. In case of the projects showcased in this document, all the respondent NGOs were extremely careful about the quality of construction during the implementation (see Phase 4 for details) and hence it did not impact the resource figures significantly.

5.2.2
Human resources

The number of staff involved in this phase varied between 4-10 persons across different projects. All the staff involved in implementation were also involved in the O&M phase but on a part-time basis (15-30 days over a year). The type of intervention influenced the number of staff involved during this phase. Structures requiring frequent maintenance required greater staff involvement. Hence, BIRD-K & MPA needed more staff to sort out the maintenance problems as their interventions (RWH & *Matka* filter) were predominantly household-centric.

4

Resource Centres-
The GUS model

GUS, a Mahoba (UP) based NGO, developed block level resource centres for O&M of safe water interventions implemented during Phase 4. Local para-professionals (semi-skilled labourers, HP mechanics etc.) were hired as resource persons in these centres. Each centre consisted of 10 resource persons. Resource persons were paid a monthly salary of Rs.2500. As an added incentive, all of them were encouraged to take on preventive and reactive maintenance assignments. Flat service charges were set for these assignments: handpumps- Rs.200, submersible pumps- Rs. 800-1000. In some cases, resource persons were also paid to test WQ (Rs.10 for a bacteriological test, Rs.50 for a chemical test).

Frequency of extreme weather events also influenced the staff figures. Organisations (MPA & DA) located in extreme weather zones had to engage more staff during this phase than others.

Since this was the last activity phase in the WQM framework, all the respondent NGOs attempted to develop village/GP/block level formal or informal institutions to look after the O&M arrangements following the completion of the project (see Sec. 5.1). While VASUDHA and HSS formed user groups/committees at the village level to look after O&M, GUS formed resource centres at the block level (see Box 4: The GUS model on the previous page). Formation of user committees required a significant amount of staff involvement from the respondent NGOs. This also led to differences in staff figures for the O&M phase. Table 13 provides the profile of the staff involved in Phase 5 and their respective responsibilities.

Table 13: Profile of staff and their responsibilities during Phase 5

Staff Profile	Responsibilities
PC/PM Project Coordinator/ Project Manager	The PC/PM – was overall in-charge of the phase, periodically reviewed the progress with CC/DC, WQS, TA and met the FS as and when required. S/he devised the long term sustainability strategy with the TA.
FS (CO, HE/HP, VC) Field Staff (community organiser, hygiene educator/hygiene promoter, village champion)	FS – were responsible for supporting the community to fix their O&M problems and monitoring the long-term sustainability of interventions along with GP/VWSC members.They also supported the VLIs on WQ monitoring and data management and helped them to sustain the IEC campaigns.
TA (P/T) Technical Advisor	The TA (part-time) – advised the PC/PM on the sustainability strategy and monitoring the interventions.
WQS Water Quality Specialist	The WQS – was responsible for supervising the refresher training programmes on WQ monitoring, data management and dissemination.
CC/DC Cluster/District Coordinator	The CC/DC – supervised the FS, and was responsible for planning and coordinating the refresher training programmes, anchored the IEC campaigns and supported the FS for fixing O&M problems. They maintained fund utilisation records and put in checks and balances following discussions with PM/ PC, TA and WQS etc.
Civil Engineer (P/T)	The Civil Engineer (part time) – was responsible for fixing major O&M problems. S/he was also responsible for random spot-checks of the O&M work or as requested by the FS.

Note: Documentation coordinator and volunteers did not have a particular responsibility in this phase.

5.2.3
Finances

The amount spent in this phase varied between Rs.2-4.5 lakhs. About 53-67% of the overall amount was spent on hardware activities. Spending on software varied between 11-17% during this phase. About 22-30% of the overall amount was spent on salaries. IRRAD spent the most (17%) on software, probably due to the rigorous and sustained nature of IEC efforts required in its project location which kept the community engaged to the WQM project. On the other hand, MPA and DA spent the most on salaries (30%), probably because of the greater annual time involvement of the project staff.

MPA and DA spent the maximum amount during this phase. This could be attributed to greater maintenance required in these project locations due to higher frequency of extreme weather events. HSS (Tehri, Uttarakhand) also spent a relatively high amount (Rs.2.9 lakhs) in this phase probably due to the higher cost of labour, material and transportation in the mountain regions.

In most of these projects, O&M began 1.5-2 years after initiation of the project. It should be noted that the O&M cost was spread over 2-3 years (considering an average project life of 3-5 years). Although, annual O&M cost figures were available presenting them as-is could have been misleading since the frequency and intensity of O&M requirements varied on a yearly basis. Hence, overall O&M cost figures have been presented.

5.3
Quality Checks (QCs)

Following (see Table 14) QCs were used by the respondent NGOs to ensure whether the activities undertaken during Phase 5 were in accordance with the plan and whether they conformed to certain quality benchmarks set for this phase.

Table 14: QCs during Phase 5

Broad Areas	Activity Details
WQ data upgradation and dissemination	WQ monitoring data was updated periodically, either manually or online. Updated data was displayed at strategic locations for public viewing. The data was disseminated to all sections of the community through sustained IEC efforts.
Financial transparency	Updated project financial summary, fund utilisation certificates were easily accessible. They were shared with the community during *Gram Sabha* meetings and displayed at public places (e.g. GP building walls).

Broad Areas	Activity Details
Efficacy of O&M responses	Para-professionals in charge of O&M maintained an inventory of hardware spares to repair minor system breakdowns. The time lag between reporting a breakdown and receiving a response was usually less than 3 days. Mid-term project evaluations, random spot-checks were conducted to corroborate these observations.
Sustainability issues- ownership, inclusion, equity	Ownership of the project was transferred to the community, inclusion and equity issues were addressed and a well-defined withdrawal strategy was put in place.

Experiences around the country have shown how poor O&M of water sources/supply systems have frequently resulted in slippages leading to source contamination, defunct supply and distribution systems and deterioration in WQ. Hence this phase assumes critical importance for ensuring long-term sustainability of a WQM project.

Key messages from Phase 5

Activities

- Proactive maintenance – ensuring smooth day-to-day functioning
- Reactive maintenance - addressing system breakdowns
- Activities linking to long-term sustainability
- Sustained IEC campaigns

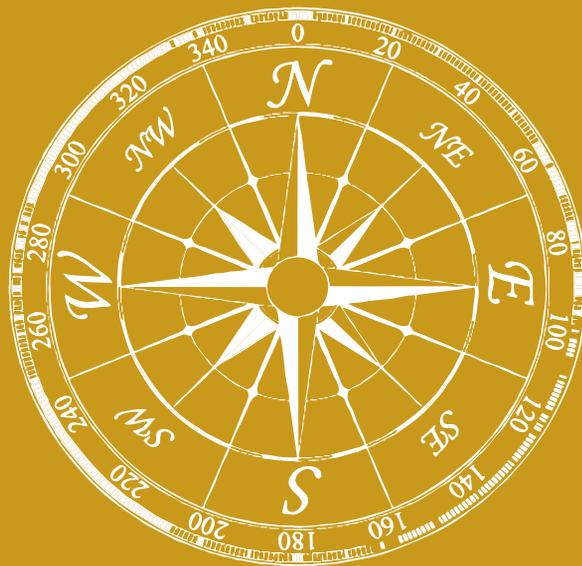### Resource estimates

- 1.5-2 months
- 4-10 staff persons
- Rs.2-4.5 lakhs

Phase-specific influencing factors

- Type of interventions
- Frequency of extreme weather events
- Quality of construction

6

Conclusions and
ways forward

This chapter of the document summarises the resources required for all phases of the WQM framework. It looks at the strengths that the NGOs brought into the field-level processes and also the different challenges they faced. It suggests the areas for improvements and explores ways forward for the framework approach. The chapter ends with a set of concluding remarks which aligns the framework with the current thinking in the sector.

6.1
Resource summary

To complete the WQM projects in 20 villages (each village with 200 HHs), on an average the respondent NGOs took about 3-5 years, about 6-12 staff persons were involved and Rs.50-190 lakh were spent (see Figure 9).

In qualitative terms, Phase 4 (implementation) was the most resource (time, HR, finances) intensive. The other phases (Phases 1-3 & 5) were more or less comparable in terms of resource use intensity. A list of activities in each phase of the WQM framework and the corresponding resource summary is presented in Table 15 (see overleaf). An analysis of the resource figures is also presented in the following sections.
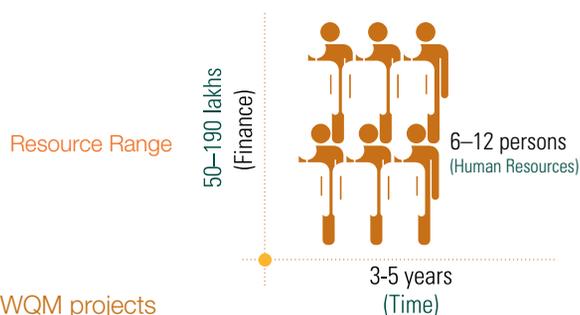
Figure 9: Resource summary of WQM projects

6.1.1
Time
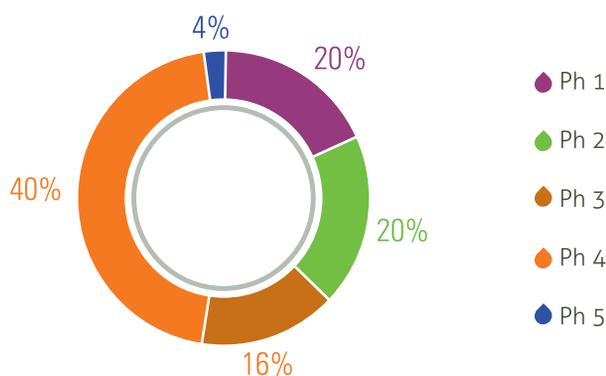
Figure 10: Percentage time spent on different phases of the WQM framework

Figure 10 presents the percentage of time involved in different phases across all projects. For the sake of simplicity, a 5 year long WQM project has been considered to arrive at the percentage break-up of time.

The implementation phase (Phase 4) took the maximum time among all the phases of the framework. The respondent NGOs spent the same percentage of overall time for assessment of baseline situation (Phase 1) and participatory planning (Phase 2). The O&M (Phase 5) accounted for the minimum percentage of overall time.

Phase 1 Assessment of baseline situation	Phase 2 Participatory planning	
Resource summary 3-12 months, 4-12 staff, Rs. 0.85-8.27 lakh	Resource summary 3-12 months, 4-12 staff, Rs. 0.2-9 lakh	

a c t i v i t i e s

Sourcing/generating baseline data Reviewing WQ literature and secondary data, PRA based mapping of water sources, stakeholder mapping, generating primary data – lab based screening of WQ parameters, baseline WASH (Water, sanitation, health & hygiene) survey at the households **Community interaction** General awareness raising and demand creation – FGDs and village meetings **Institutional activities** Assessing technical capabilities of existing institutions, assessing training and IEC needs, preliminary techno–economic feasibility of safe water options and O&M requirements, mapping of HR requirements and training of project staff by the NGO	**Participatory planning** Early expression of intent, preparation of draft plan and finalising the plan; topics covered in the plan – identification of WQ monitoring and safe water options in light of the baseline data, exploring funding sources to ensure smooth implementation, deciding on the extent of community contribution, designing checks and balances for the next phases, addressing the issues of inclusion and equity **Community action** Focused IEC campaigns on WQ contaminants linking it with health impacts and productivity, importance of sanitation and hygiene with reference to WQ, importance of WQ monitoring and the different safe water options to manage WQ **Institutional activities** Setting up systems for WQ monitoring, exploring convergence with NRHM, MGNREGA, assigning instutional roles and responsibilities for the next phases, setting up systems for social audits	

Phase 3 WQ monitoring: training & data management	Phase 4 Implementation	Phase 5 O&M
Resource summary 5-10 months, 4-12 staff, Rs. 1.45-6.74 lakh	**Resource summary** 20-24 months, 4-10 staff, Rs. 45-160 lakh	**Resource summary** 1.5-2 months, 4-10 staff, Rs. 2-4.5 lakh

a c t i v i t i e s

Training

Community representatives trained on WQ monitoring, sorting out technical difficulties; pedagogy – theoretical training, practical exposure, instruction manuals

WQ data generation, management, dissemination

Recording and interpretation of WQ and sanitary risk data, archiving and public display of data

Community action

Sustained IEC campaigns on WQ monitoring, mobilising community contribution

Institutional activities

Delineation of institutional roles and responsibilities for periodic WQ monitoring beyond the project tenure, identification of local para-professionals for training on safe water options and O&M

Training

Local para-professionals trained on safe water options and O&M, building community capability on social audits; pedagogy – both theory and praxis, instruction manuals

Implementation

Sourcing material/labour, implementing safe water options, monitoring physical works

Social audits

Initiating social audits, tracking expenditure against the progress in physical works

Regular O&M activities

Proactive and reactive maintenance, refresher trainings on WQ monitoring, WQ data upgradation and dissemination, sustained IEC campaigns

Activities linked to long-term project sustainability

Formation of user groups and institutionalising O&M at the project level, continued post-project engagement, raising funds for subsequent O&M after the project completion

6.1.2
Human resources

Table 16 presents a summary of staff profile, skills and average salary paid to the project staff across all WQM projects. The different roles played by the staff, during the tenure of the project, is summarised as follows:

Project Coordinator/Project Manager (PC/PM)
> S/he was overall in-charge of the project and periodically reviewed the progress with CC/DC, WQS, TA. S/he also met the field-staff as and when required and trained the project staff on the management aspects of various safe water interventions.

Field Staff (FS)
> They were involved in conducting focused IEC campaigns, organising community interactions, building/strengthening VLIs, WQ monitoring and mobilising community contributions. They were responsible for training the local masons/labourers and GP/VWSC members on various safe water interventions, O&M requirements and waste disposal. They regularly monitored the implementation and ensured the quality of construction along with the GP/VWSC members.

Technical Advisor (TA, part-time)
> S/he advised the PC/PM on various technical aspects during the project. S/he supported the WQS to prepare training manuals on WQM and worked with the CC/DC to formulate a data archiving, dissemination and management strategy.

Water Quality Specialist (WQS)
> S/he was involved in planning and training of project staff on WQ monitoring - including sampling, analysis, data recording, interpretation and dissemination, preparation of technical manuals and sorting out technical difficulties related to use of field kits.

Cluster/District Coordinator (CC/DC)
> S/he supervised the field staff and was responsible for WQ data generation, dissemination and management. S/he also anchored the community interactions and was responsible for assigning institutional roles and responsibilities. S/he initiated social audits and put checks and balances in place following discussions with PM/PC, TA and WQS.

Documentation Coordinator (part-time)
> S/he was involved in documenting the entire process along with the PC/PM. S/he also supported the PC/PM in preparing other forms of advocacy materials (reports, case studies etc).

Civil Engineer (part-time)
> S/he was responsible for preparing the engineering designs, list of materials and labourers, financial estimates and process descriptions. S/he randomly spot-checked the physical works on their own or as requested by the FS.

Volunteers
> They were not part of the NGO staff roster and were selected from the beneficiary community. They facilitated the social mobilisation and acted as the interface between the community and the NGO staff.

Table 16: Summary of staff profile, skills, and average salary/honorarium paid across all WQM projects

Staff Profile	Skills	Average salary/honorarium range in Rs./pm
PC/PM	Post Graduate with 10-15 years of sector experience.	25,000-30,000
FS (CO, HE/HP, VC)	Field-staff had a strong understanding of the local context - fresh graduates or 12th pass with at least 2-3 years experience.	5,000-8,000
TA (part-time)	Post Graduate/PhD with 15-20 years of sector experience.	30,000-40,000
WQS	A sector specialist, post graduate with more than 5 years of experience.	20,000-25,000
CC/DC	Graduate with 10-15 years of sector experience.	10,000-15,000
Doc. coord. (part-time)	Graduate/Post Graduate with at least 2-3 years of experience. S/he should possess writing skills, either in local or vernacular language.	8,000-12,000
Civil Engineer (part-time)	A civil engineering graduate with 5-10 years of experience in NRM.	20,000-25,000
Volunteers	Educated youth (10th std.) selected from the local community – with an understanding of the VLIs.	1,500-3,000

6.1.3
Finances

The amount of money spent in different phases of the WQM framework varied from one project to another depending on a number of factors ('State of development' and other phase-specific factors; see foregoing chapters for details). Figure 11 presents a percentage break-up of amounts spent during different phases of the framework across all projects.
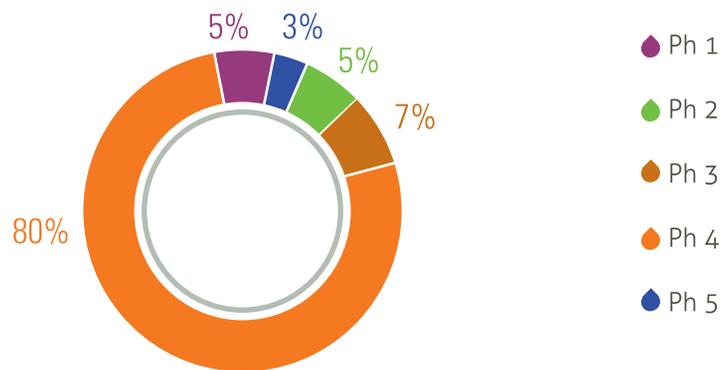
Figure 11: Percentage break-up of amounts spent on different phases of the WQM framework

As the above figures suggests, the respondent NGOs spent the most (about 80% of the overall budget) during the implementation phase. Rest of the 4 phases accounted for about 20% of the overall budget. Across all the projects, about 45-55% of the total funds were spent on hardware expenses, around 12-20% was spent on software and about 25-40% was spent on salary and administrative expenses. Cost per beneficiary for the overall WQM project varied between Rs.500-1000.

Funds for the WQM projects were procured from mainly three sources — community, government (both Central and State Governments) and donors. In most projects, funds were mainly given by donors. Across projects, contribution of donor funds varied between 20-60%. Government funds constituted a substantial portion of the overall budgets in the BIRD-K (Tumkur, Karnataka) and SAMERTH (Kutch, Gujarat) projects. Across projects, contribution of government funds varied between 20-70%. Community contribution across all projects varied between 10-15% of the overall budget.

6.2
Areas for improvements

The WQM framework document is based on a few simple assumptions in order to facilitate analysis of resource requirements. This document maps various activity phases within a WQM framework and provides broad directions on resource requirements within each of these phases using practical experiences of NGOs across the country. Further research and experience sharing will improve/build upon the existing body of work. Following paragraphs identify and explain the key areas for improvements in the WQM framework:

Small sample size

After screening responses from about 40 NGOs across the country, responses from 12 NGOs were used to develop the final WQM framework and prepare this document. This is a limited sample size based on which only broad conclusions can be drawn about resource requirements in each phase. At the same time it is also important to note that only a limited number of NGOs in India follow a structured process to WQM. Having acknowledged that, this document only provides a starting point for building a

body of WQM experiences around the country. The WQM framework can be refined further and used to draw concrete conclusions.

Only guiding values

This WQM framework provides a broad direction of resource requirements (in terms of time, cost and HR) for each activity phase. But one should remember that these figures are suggestive and not prescriptive. The ground reality will vary from one location to another. Hence, these resource figures should be used as guiding values instead of extrapolating to a specific project location.

Extraction of numbers

In some cases, WQM was part of a larger NRM programme of the respondent NGOs and it was difficult to extract numbers only for WQM. Some of the activities under NRM and WQM overlapped and the resources (time, cost and HR) were also shared between them as per requirements. Arghyam held a series of dialogues with all such NGOs and approximated some of the numbers for WQM as close to the physical reality as possible.

Differences among respondents

Most of the respondents to the WQM framework were reputed NGOs with decades of experience. In general, there was not much of a difference in the work culture and the quality of staff of these NGOs. But some differences were obvious and such differences might have influenced the resource figures within individual phases to a certain extent. This document does not account for such differences in order to avoid introducing additional elements in the analysis of resource figures.

6.3
Strengths brought in by the NGOs

The NGOs responding to the WQM framework have been working on WQ issues for over a decade. Over the years, they have developed certain areas of strength which have led to successful and sustainable models of WQM in diverse conditions across the country. Following paragraphs describe the key strengths brought in by the NGOs to the WQM framework.

Community involvement

The framework approach to WQM is fundamentally dependent on effective community engagement. Respondent NGOs used a variety of methods to engage the beneficiary community in all the phases of a WQM project. The community was involved in information provision, planning, training, WQ monitoring, serving the committees, participating in consultations, implementation and O&M – a full spectrum of participation right from information to empowerment.

Skilled and committed staff

All the respondent NGOs had deeply committed staff persons in their ranks. They were also skilled to handle a WQM project. During Phase 1 of the WQM framework, most of the NGOs assessed the existing capability of their staff. They arranged staff capacity building sessions on the finer nuances of WQM. The field staff of these respondent

NGOs were also local residents. They understood the local context and spoke the local language, which helped to connect with the local community, inculcate a sense of ownership and ramp up the software component of the project. A majority of the respondent NGOs contributing to this WQM framework employed local youth as volunteers during the community interactions. Albeit temporary, the WQM project also created livelihood opportunities for these local volunteers.

Low-cost solutions and local resources

Most of the safe water interventions implemented by the respondent NGOs during the implementation phase (Phase 4) were either development of alternative safe sources/rejuvenation of existing sources or low-cost water treatment options (see Chapter 4 for details). The MDWS strategic plan for 2011–2022 suggests moving away from "high-cost treatment technologies to rainwater harvesting and dilution of aquifers through rainwater harvesting." So the implementation models adopted by the NGOs across different projects were in sync with the MDWS strategic plan.

Another important aspect of the implementation phase was 'community contracting'– instead of engaging contractors to complete the physical works, local communities directly procured materials and employed trained local workers to construct the safe water options. For all the safe water options – construction of check dams, recharge of dug wells or construction of *Matka*/bio-sand filters – the beneficiary community was in charge. This approach ensured quality of construction and promoted transparency. It also helped in mobilising local resources and actively involved the beneficiaries in the entire process, thus increasing the ownership and sustainability of the interventions.

Social audits

Both NRDWP implementation framework and the MDWS strategic plan highlight the importance of *Gram Sabhas* for conducting social audits and promoting financial transparency in the context of rural water supply. Some of the respondent NGOs (VASUDHA, GUS etc.) used social audits as an effective oversight mechanism to track expenditure during the implementation phase (Phase 4). *Gram Sabhas* played an important role in this exercise. They selected the team members for social audit and supervised the process.

Quality checks (QCs)

QCs played an important role in all the projects. Respondent NGOs used the QCs as critical control points for each of the activity phases under the WQM framework. They were used to check whether the activities in a particular phase conformed to plans and how well they were executed adhering to the core values of sustainability — equity, inclusion, transparency and accountability. Some examples of QCs linking with core sustainability values are presented in the following diagram.
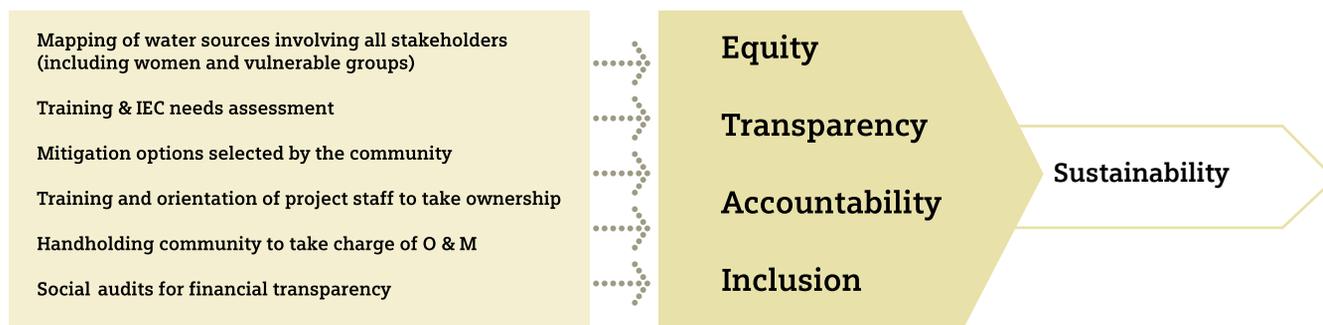
Quality Checks

Quality Checks		Core values	Outcome
Mapping of water sources involving all stakeholders (including women and vulnerable groups)		Equity	Sustainability
Training & IEC needs assessment		Transparency	
Mitigation options selected by the community		Accountability	
Training and orientation of project staff to take ownership		Inclusion	
Handholding community to take charge of O & M			
Social audits for financial transparency			

Figure 12: Linking QCs with core sustainability values

6.4
Challenges faced by the NGOs

The respondent NGOs faced a number of social, institutional, governance challenges while working on WQM projects. Some of the key challenges are described in the following paragraphs:

Quality of village institutions

Strong village/GP level institutions were critical for long-term sustainability of the WQM project — a challenge that was faced by all the respondent NGOs, the nature and extent of which varied from one location to another depending on the 'State of development'. A case in point would be the IRRAD (Mewat, Haryana) and MPA (North Bihar) projects, which took longer time, involved more staff and were most expensive during the first three phases of the WQM framework due to unstable village institutions.

Convergence between various government departments

Various government policies, plans and programmes have been seeking to formulate a convergence mechanism for all programmes related to provision of safe drinking water (NRDWP, TSC, NRHM and MGNREGS etc.). All the respondent NGOs attempted to catalyse this programmatic convergence with varying degrees of success. The most successful example were – BIRD-K (Tumkur, Karnataka) and SAMERTH (Kutch, Gujarat). They were able to work with the state and district administrations and formulate a convergence mechanism for their respective projects.

Low priority and lack of awareness

WQ features low in the list of developmental priorities for many backward rural communities across India – especially in locations where the basic developmental needs of food, shelter, livelihood, health and education have not been fully met. NGOs working in low 'State of development' locations had to make an extra effort to generate awareness about WQ issues and sustain their IEC efforts over a longer period of time.

6.5
Ways forward

The WQM framework should help readers understand the different phases of a WQM project and get a broad, directional sense of the time, human and financial resource requirements within each phase. This document serves three main constituencies of readers/sector players - donors, government agencies, and NGOs. The framework will help donors to screen proposals of prospective organisations and work with them to improve the project design. NGOs can use it as a planning and budgeting tool for their future work on WQM. Government agencies will find it helpful to understand and adopt the best practices in WQM from the NGOs.

The framework also provides a replication and scaling-up opportunity through collaboration between government agencies and NGOs. Government agencies can learn from NGO experiences and modify their schemes/projects accordingly. NGOs should also seek to partner with government agencies, leverage the financial opportunities and build scalable models. These ideas are discussed further in the following paragraphs.

Replication and scaling up

The WQM framework is based on context-specific models of 12 prominent NGOs. Hence, the wider water community (including the NGOs and the government agencies) needs to enrich the WQM framework by building a critical mass of WQM experiences. This will require replication of the framework in different contexts – finally leading to scalable models. Replicating and scaling up the WQM framework, however, will be a challenging task. Customising this framework to a locally suitable variant will be essential. But while developing the locally suitable variant or scaling up, one should not compromise on any of the phases of the WQM framework or its key activities. Short-circuiting the framework may affect the long-term sustainability of the interventions.

Incorporating NGO experiences in Water Safety Planning (WSP)

WSP in India is still in a formative stage, and much remains to be done to have clear policy and institutional arrangements. WSP needs to be pilot-tested in a wide variety of field situations. In the meantime, community capacity in WQM needs to be built, different institutional stakeholders need to be identified and their current ability to meet the demands of new roles and responsibilities under WSP needs to be assessed. For agencies involved in operationalising WSPs in rural areas, it will be useful to understand this WQM framework. This will help to identify the prominent NGOs working in WQM and look at their existing modes of engagement with the community. It will also help government agencies to understand the key challenges (institutional, social, financial and technical) faced by NGOs and how far they were able to address them. Accordingly, the MDWS and the state governments may seek to incorporate these NGO experiences and pilot-test the framework or its variant before operationalising the WSPs on a large-scale.

Leveraging government funds

Leveraging government funds impacts the WQM project outputs (see Sec. 4.2.3 for details). Leveraging opens up wider choices of solutions for the NGOs. Experiences from BIRD-K in Karnataka and SAMERTH in Gujarat seem to underscore this argument. Hence, NGOs planning to build scalable WQM models or mulling the possibility of implementing an expensive solution (due to lack of easy access to low-cost solutions for WQ problems) should learn about the funding opportunities available with the government. The following table (Table 17) presents the key funding needs related to WQM and the corresponding funds available with the Central and State governments.

Table 17: Key WQM funding needs vis-à-vis available government funds [22]

Key funding needs related to WQM	Main funds available with the government
Source sustainability (rainwater harvesting, groundwater recharge, development of traditional structures)	NRDWP - sustainability MGNREGS, Watershed Development Programmes, MPLADS, MLALADS
Operation and Maintenance (including minor repairs)	NRDWP – O&M Central and State Finance Commission grants User charges, *Gram Panchayat* revenues, State Plan and non-Plan grants/subsidies
Replacements	NRDWP – Coverage, VWSC corpus fund which can include funds from BRGF, Central and State Finance Commission grants, and user charges
Potable water in WQ affected areas (treatment technologies, new sources to address arsenic, fluoride, iron, nitrate, salinity, etc.)	NRDWP - WQ State Plan, BRGF, Donor funds and Externally Aided Projects, Ministry of Minority Affairs
WQ monitoring and surveillance	NRDWP – support
Training and IEC	NRDWP – support BRGF, TSC

6.6
Concluding remarks

The WQM framework uses the NGO examples of developing sustainable village institutions, looks at the institutional collaboration mechanisms and lists the resource requirements (time, cost, human resources) during different activity phases. It also looks at various checks and balances (quality checks) to mark successful completion of an activity phase. Taking a step ahead, it suggests areas for improvements. There is also a set of reading references (see bibliography) for the interested reader.

This framework could be considered a 'starting point' for structured rural domestic water quality management. It builds on the work done by NGOs and anticipates that additional refinements and advances will follow in the future. While there are immediate uses and audiences for this document, the bigger vision is to incorporate elements of the framework, or a variant, within the mainstream government initiatives (e.g. WSP) and explore possibilities of replication and scaling-up. This could set the basic premise for WQM in India and support the future programmatic thinking.

This framework document on WQM hopes to trigger informed discussions and debates leading to a convergence of ideas and approaches among all the key sector players. Finally, the convergence of ideas and approaches should effectively engage the community from the very beginning of a WQM initiative and support them to manage their quality of water sustainably. Hopefully, this document will contribute to an incremental change in that direction.

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ANNEXURE

Phase-wise resource estimates for individual respondents

PHASE 1

Water Quality Management Project

Organisations	Project Location	Time (months)	Human Resources (No. of project staff)	Cost (in Rs. Lakhs)
Himalaya Seva Sansthan (HSS)	Tehri, Uttarakhand	6	4	1
Institute for Rural Research & Development (IRRAD)	Mewat, Haryana	10	11	7.2
Gramonnati Sansthan (GUS)	Mahoba, Uttar Pradesh	12	4	8.3
People's Science Institute (PSI)	Sonebhadra, Uttar Pradesh & Dhar, Madhya Pradesh	11	4	8.2
Development Alternatives (DA)	Jhansi (Uttar Pradesh) & Tikamgarh (Madhya Pradesh), Bundelkhand	10	12	8.3
Parhit Samaj Sevi Sanstha (PSS)	Datia, Madhya Pradesh	9	10	9
Vashudha Vikas Sansthan (VASUDHA)	Dhar, Madhya Pradesh	12	10	9
BAIF Institute for Rural Development-Karnataka (BIRD-K)	Tumkur, Karnataka	6	6	4.3
Swami Vivekananda Youth Movement (SVYM)	Mysore, Karnataka	10	8	3
Megh Pyne Abhiyan (MPA)	North Bihar	11	5	2
SATHEE	Godda, Jharkhand	6	10	6.7
Samerth Trust (SAMERTH)	Kutch, Gujarat	3	4	0.85

Note:
Time, human resources and cost numbers are normalised over 20 villages and 200 households per village for every phase of the project

2 Water Quality Management Project

Organisations	Project Location	Time (months)	Human Resources (No. of project staff)	Cost (in Rs. Lakhs)
Himalaya Seva Sansthan (HSS)	Tehri, Uttarakhand	6	4	2
Institute for Rural Research & Development (IRRAD)	Mewat, Haryana	12	11	8.3
Gramonnati Sansthan (GUS)	Mahoba, Uttar Pradesh	10	4	7.8
People's Science Institute (PSI)	Sonebhadra, Uttar Pradesh & Dhar, Madhya Pradesh	9	5	8.7
Development Alternatives (DA)	Jhansi (Uttar Pradesh) & Tikamgarh (Madhya Pradesh), Bundelkhand	8	12	8.5
Parhit Samaj Sevi Sanstha (PSS)	Datia, Madhya Pradesh	8	10	4.5
Vashudha Vikas Sansthan (VASUDHA)	Dhar, Madhya Pradesh	12	11	9
BAIF Institute for Rural Development-Karnataka (BIRD-K)	Tumkur, Karnataka	9	6	2
Swami Vivekananda Youth Movement (SVYM)	Mysore, Karnataka	3	8	2.5
Megh Pyne Abhiyan (MPA)	North Bihar	11	5	0.45
SATHEE	Godda, Jharkhand	6	10	1.8
Samerth Trust (SAMERTH)	Kutch, Gujarat	3	4	0.2

PHASE **3** Water Quality Management Project

Organisations	Project Location	Time (months)	Human Resources (No. of project staff)	Cost (in Rs. Lakhs)
Himalaya Seva Sansthan (HSS)	Tehri, Uttarakhand	6	4	2.4
Institute for Rural Research & Development (IRRAD)	Mewat, Haryana	6	5	2.3
Gramonnati Sansthan (GUS)	Mahoba, Uttar Pradesh	8	4	5.5
People's Science Institute (PSI)	Sonebhadra, Uttar Pradesh & Dhar, Madhya Pradesh	6	10	1.5
Development Alternatives (DA)	Jhansi (Uttar Pradesh) & Tikamgarh (Madhya Pradesh), Bundelkhand	6	12	5.8
Parhit Samaj Sevi Sanstha (PSS)	Datia, Madhya Pradesh	10	10	6.74
Vashudha Vikas Sansthan (VASUDHA)	Dhar, Madhya Pradesh	10	4	2.5
BAIF Institute for Rural Development-Karnataka (BIRD-K)	Tumkur, Karnataka	7	6	2.25
Swami Vivekananda Youth Movement (SVYM)	Mysore, Karnataka	6	8	4
Megh Pyne Abhiyan (MPA)	North Bihar	10	12	6.5
SATHEE	Godda, Jharkhand	5	8	3.8
Samerth Trust (SAMERTH)	Kutch, Gujarat	5	5	1.45

PHASE 4 Water Quality Management Project

Organisations	Project Location	Time (months)	Human Resources (No. of project staff)	Cost (in Rs. Lakhs)
Himalaya Seva Sansthan (HSS)	Tehri, Uttarakhand	24	4	48
Institute for Rural Research & Development (IRRAD)	Mewat, Haryana	20	5	60
Gramonnati Sansthan (GUS)	Mahoba, Uttar Pradesh	24	4	56
People's Science Institute (PSI)	Sonebhadra, Uttar Pradesh & Dhar, Madhya Pradesh	20	5	45
Development Alternatives (DA)	Jhansi (Uttar Pradesh) & Tikamgarh (Madhya Pradesh), Bundelkhand	21	12	60
Parhit Samaj Sevi Sanstha (PSS)	Datia, Madhya Pradesh	20	10	45
Vashudha Vikas Sansthan (VASUDHA)	Dhar, Madhya Pradesh	20	4	58
BAIF Institute for Rural Development-Karnataka (BIRD-K)	Tumkur, Karnataka	24	6	160
Swami Vivekananda Youth Movement (SVYM)	Mysore, Karnataka	20	8	62
Megh Pyne Abhiyan (MPA)	North Bihar	22	10	46
SATHEE	Godda, Jharkhand	24	8	63
Samerth Trust (SAMERTH)	Kutch, Gujarat	20	10	103

PHASE 5 Water Quality Management Project

Organisations	Project Location	Time (months)	Human Resources (No. of project staff)	Cost (in Rs. Lakhs)
Himalaya Seva Sansthan (HSS)	Tehri, Uttarakhand	1.5	4	2.9
Institute for Rural Research & Development (IRRAD)	Mewat, Haryana	1.5	5	3.5
Gramonnati Sansthan (GUS)	Mahoba, Uttar Pradesh	2	4	4
People's Science Institute (PSI)	Sonebhadra, Uttar Pradesh & Dhar, Madhya Pradesh	2	7	4.5
Development Alternatives (DA)	Jhansi (Uttar Pradesh) & Tikamgarh (Madhya Pradesh), Bundelkhand	2	12	4.2
Parhit Samaj Sevi Sanstha (PSS)	Datia, Madhya Pradesh	2	10	3.6
Vashudha Vikas Sansthan (VASUDHA)	Dhar, Madhya Pradesh	2	4	2.5
BAIF Institute for Rural Development-Karnataka (BIRD-K)	Tumkur, Karnataka	1.5	6	2
Swami Vivekananda Youth Movement (SVYM)	Mysore, Karnataka	1.5	8	2.6
Megh Pyne Abhiyan (MPA)	North Bihar	2	10	4.5
SATHEE	Godda, Jharkhand	2	8	3
Samerth Trust (SAMERTH)	Kutch, Gujarat	1.5	10	2

Notes

About Arghyam

Arghyam is an Indian public charitable foundation setup with an endowment from Rohini Nilekani, and working in the water and sanitation sector since 2005. 'Arghyam' is a Sanskrit word meaning 'offering'. Our vision is "safe, sustainable water for all".

As a funding agency, Arghyam works primarily through partnerships – with government, NGOs and various types of institutions – for impact and scale. The emphasis of all of Arghyam's work is on equity and sustainability. Addressing the issues of the poor and vulnerable in accessing water for their basic daily needs is a priority for us. If the outcome of any intervention is to be effective over time, environmental sustainability is important. We believe that the key to achieving this is in better water management which requires effective governance.

Specifically, projects supported by Arghyam strive to understand and address issues of quantity, quality and access to domestic water in communities across the country. Some of the key principles which guide these efforts include community participation and ownership, an integrated approach to managing water from source to sink, an emphasis on subsidiarity (which means managing water locally) and effective use of technology as an enabler.

We work through a combination of project grants to grassroots organisations, knowledge building and sharing through the India Water Portal, promoting new models of water science, technology and system design, participatory action research and advocacy.

Arghyam has collaborated with a diverse range of actors across 20 states in India through 90 projects. Rigorous engagement with people and institutions has helped in deepening the internal debate and keeping Arghyam closely connected to the ground.

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