Global Water Partnership South Asia
India Water Partnership

FINAL PROJECT REPORT

March — November 2013

safe water network India

Preface

Activities of Safe Water Network India supports environmental and resource sustainability and ensures that its drinking water program does not lead to any overexploitation of ground water resources. This requires adopting state-of-the-art techniques that help in fully internalizing environmental externalities, conducting studies for understanding ground water dynamics in local settings and applying principles of micro-watershed for the assessment of utilization pattern. The study demands periodic data collection, analysis and drawing insights for communication to primary stakeholders so that right decisions are taken for utilization of water resources.

Assessment of quality of water is equality important while deciding water treatment solutions. The water quality monitoring is an important part of the government programme. Since 2000, water quality monitoring has been accorded a high priority and institutional mechanisms have been developed at national, state, district, block and panchayat levels. The government has also outlined requisite mechanisms to monitor the quality of drinking water and devise effective Information, Education and Communication (IEC) interventions to disseminate information and educate people on health and hygiene.

India Water Partnership promotes the concept and approaches that support Integrated Water Resources Management. Under the support of IWP grant SWNI has focused on monitoring of water resources and quality assessment in yearlong program. This report details the activities completed in line with the grant received from the India Water Partnership. The report delineates the work plan activities established as per the grant letter and their outcomes during the period March – November 2013, as submission to the India Water Partnership.

Section One outlines the assessment study of water resources, water quality monitoring and cropping patterns in the micro-shed villages, agriculture practices and application of chemical fertilizers and pesticides. Section Two demonstrates the consumer activation programs conducted to generate awareness on water quality challenges and the benefits associated with safe water consumption during the grant period. Section Three relates to the workshop/training conducted for the plant operators for optimum plant performance and daily consumer tracking.

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Executive Summary

India has 16 per cent of the world's population and four per cent of its fresh water resources. Estimates indicate that surface and ground water availability is around 1,869 billion cubic metres (BCM). Of this, 40 per cent is not available for use due to geological and topographical reasons. There can be little doubt that water is a basic necessity for the survival of humans. There is interplay of various factors that govern access and utilisation of water resources and in light of the increasing demand for water it becomes important to look for holistic and people-centered approaches for water management.

With support from the India Water Partnership, Safe Water Network India undertook activities to supplement our safe drinking water provision in the Andhra Pradesh cluster, including awareness program, setting observation wells, periodically recording water level and dissemination of information among community and health & hygiene education program activities.

This report attempts to present the activities conducted during the grant period and how this initiative has helped the community in project villages and organization in its progress.

There may be some scope for improvement but serious efforts have been put into to get the best results.

WORK PLAN

Activity 1: Awareness program on water quality challenges & associated issues and undertaking Water Quality Monitoring

Activity 2: Setting observation wells in cluster (15 Safe Water Stations)

Activity 3: Dissemination of information among community

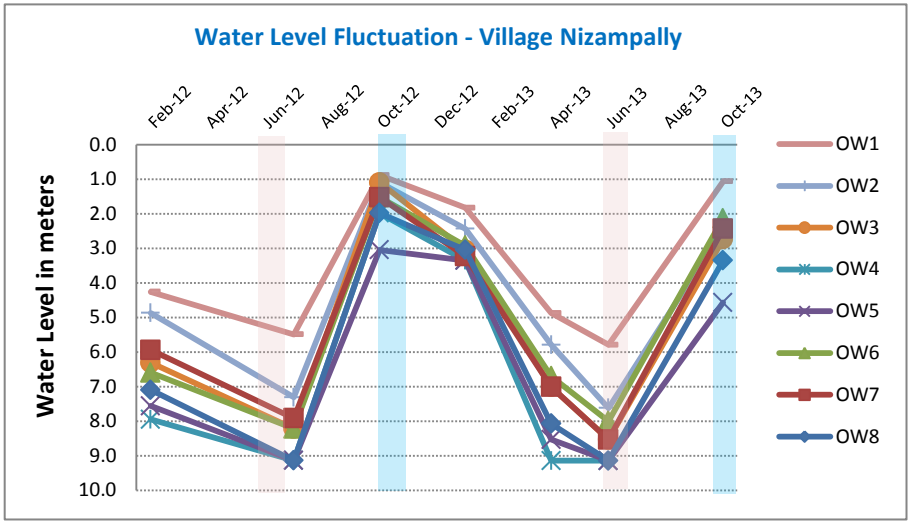
SECTION ONE

Setting Observation Wells in Cluster

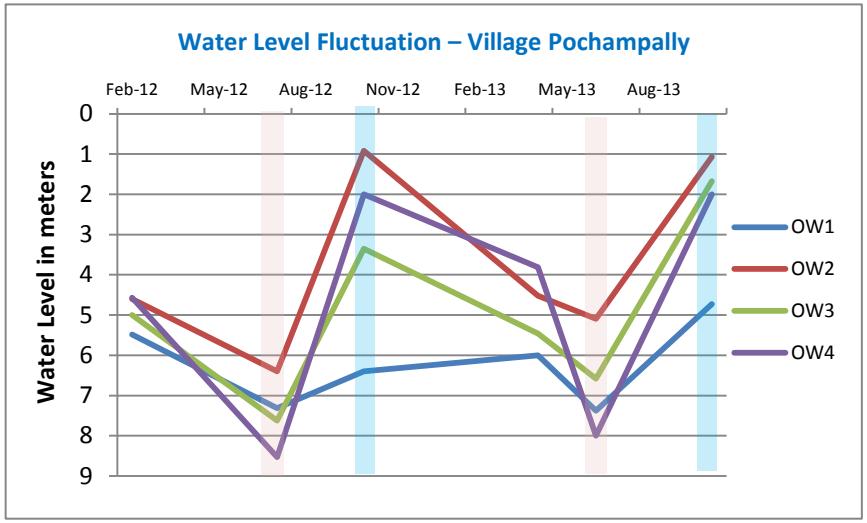
Safe Water Network India set up observation wells in 15 villages during the quarter April – June 2013, with the objective of recording water level fluctuations, and levels of Total Dissolved Solids and pH. This helped us in understand the efficacy of our work on overall water resources in the project villages. The information will also be shared with local communities to create awareness on utilization pattern of water resources for different purposes. Given below is the list of villages and number of observation wells set up for data collection along with a range of TDS and pH values recorded from these wells:

No.	Village Name	District/State	Observation Wells	TDS range (mg/L)	pH range
1	Nizampally	Warangal, AP	8	425 – 750	6.5 – 7.6
2	Pochampally	Warangal, AP	4	1630 – 2000	6.2 – 7.0
3	Katrapalle	Warangal, AP	6	755 – 1580	5.9 – 6.6
4	Wadlakonda	Warangal, AP	3	289 – 1460	6.5 – 7.3
5	Gangirenigudem	Warangal, AP	6	513 – 1760	7.5 – 8.0
6	Pathipaka	Warangal, AP	5	610 – 1950	7.5 – 8.0
7	Gorikothapally	Warangal, AP	6	377 – 11190	7.0
8	Rangapuram	Warangal, AP	5	749 – 1760	7.0 – 7.5
9	Pasargonda	Warangal, AP	7	388 – 1520	7.0 – 8.0
10	Jookal	Warangal, AP	6	614 – 1670	7.0 – 8.0
11	Rajavaram	Warangal, AP	3	610 – 645	NA
12	Parkal	Warangal, AP	5	876 – 18000	NA
13	Vellampally	Warangal, AP	6	423 – 1480	7.0 – 8.0
14	Shayampet	Warangal, AP	5	893 – 3550	6.0 – 9.0
15	Kothapally	Karimnagar, AP	2	950 – 955	7.0 – 8.0

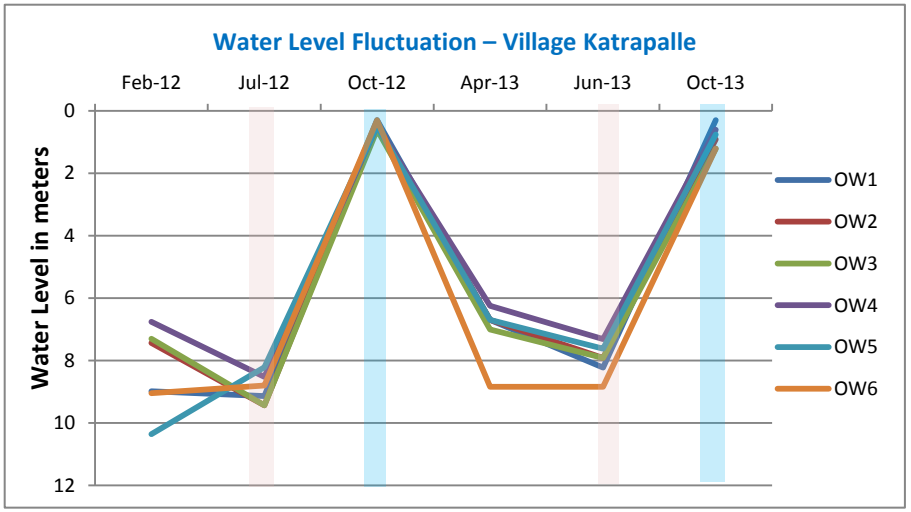
Color	Rock formation	Geomorphic condition	Depth of Water level	Water quality range (Nzm – Gangi – Gori)	Aquifer condition	Water Sources & Depth range	Yield range	Remark
Green	Granite & Magmatite	Moderately weathered	5 – 9m	TDS – 646 pH – 8 F – 1.7	Moderate Weathered rock	DW: 12-18m BW: 40-60m	30-60 lpm 100-150 lpm	Most of the area suitable for dug wells except selective location where aquifer exists at a deeper level
Yellow		Shallow Weathered	6 – 14.5m	TDS - 2660 pH – 6 – 7.4 F – 1.6	Moderate Weathered rock	DW: 12-18m BW: 30-60m	30-50 lpm 50-100 lpm	Most of the area suitable for dug wells except selective location where aquifer exists at a deeper level



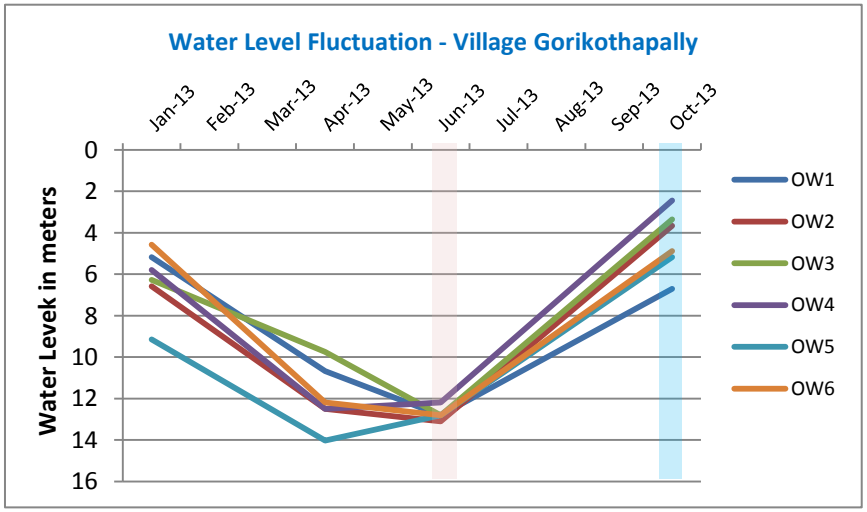
Water level fluctuations recorded in village Nizampally, Warangal



Water level fluctuations recorded in village Pochampally, Warangal



Water level fluctuations recorded in village Katrapalle, Warangal



Water level fluctuations recorded in village Gorikothapally, Warangal

Pre-Monsoon **Post-Monsoon**

The grant support of India Water Partnership has played a significant role in setting up observation wells in 15 villages nearby to the Safe Water Stations. The purpose of these observation wells is to periodically collect well inventory data and analyze the fluctuation trend in water level and changes in chemical contamination specially Total Dissolve Solids. It is noticed that there is no significant variation in pH value of water in different season, whereas TDS figures change seasonally. The TDS value slightly goes higher post monsoon season, as compared to winter and summer months.

The static water level data were collected four times during the year – the first set of data was collected during winter season, followed by April 2013 for summer months, and thereafter for pre-monsoon and post monsoons trend in June and October respectively. It can be seen from the above four graphs that water level fluctuates from 6 to 8 meters annually. This also indicates that the area is covered with thick soil cover and weathered formation, which provides good condition for shallow aquifer. Based on this limited data set, it is difficult to draw any conclusive remarks; however, it is clearly established that in all the project villages, water availability is ensured due to presence of shallow aquifers which recharge annually.

Assessment of Water Resources and Cropping Pattern

As part of our study to assess the water resource status in the micro-watershed, consisting of three villages, viz. Nizampally, Gorikothapally and Gangirenigudem, information about the cropping pattern, water resources and soil condition were collected by adopting participatory exercise of data collection. For this purpose, focus group discussions were held in each village with group of farmers by adopting standard checklist of information. In each village, a group of 18 – 20 farmers participated in sharing the information.



The information would help to work out the estimated quantity of water use for different crops and also to work out the quantity of chemical fertilizer used in the areas for different crops. Given below is the village wise status of water resources in the micro-watershed area.

Nizampally

There are around 100 functional bore wells in the village for irrigation purpose. Out of these, 40% bore wells are fitted with 3 HP pumps, 60% bore wells are with 5 HP pumps. These bore wells are being used for irrigating paddy fields and that they operate on an average of 4 hours / day for almost 120 days, whereas, irrigation to cotton crops is given once in 20 days for 3 months. Running hours depends on power availability, normally pump run for 6 to 7 hours. There are more than 150 open wells being used for irrigation purpose. The water is available for six months in these wells. People have installed 5 HP pumps in most of the wells and average running hours three hours per day as per the crop requirement.

Gorikothapally

There are around 110 functional bore wells in the village for irrigation purpose. Out of these, 10% are fitted with 3HP pumps and 90% with 5 HP pumps. The bore wells are irrigating paddy fields and operate on an average of 5hrs/day for almost 120 to 150 days whereas irrigation to cotton crops is given once in 20 days for 3 months. Irrigation is regulated through power supply; normally 6-7 hours three phase power is available for irrigation purpose. There are more than 300 open wells for irrigation purpose in the village. Out of these 70% are fitted with 3HP pumps and 30% with 5HP pumps. Running hours for open wells are less in comparison to bore wells. These run for 2-3 hours per day for 3 months.

Gangirenigudem

This village is edged with weathered and hard rock formation with limited potential for ground water management and development point of view. There is no functional bore well in the village for irrigation purpose. Main source of irrigation is from open wells. There are 100 wells, all of which are fitted with 3 HP pumps that run 3-4 hours for six months.

Agriculture practices and application of chemical fertilizer and pesticide

Table 1.1 presents the area covered in each village for different crops. It reflects from the data collected from farmers that the cash crop like cotton and paddy are given priority by the people in the area. The quantity of application of different chemical fertilizers and pesticides clearly indicates the alarming situation in the areas, whereas, the quantity of reject water generated from treatment plant is miniscule.

Table 1.1 Cropping pattern and application of fertilizer and pesticide in micro-watershed villages

First crop	Nizampally	Gorikothapally	Gangirenigudem	Total	Application of fertilizers (Tons)	Pesticides (Liters)
	Area in acres	**Area in acres**	**Area in acres**			
Cotton	1000	3500	150	4650	1860	28985
Banana	600	140	30	770	1271	1155
Chilly	1000	700	50	1750	1298	8896
Paddy	500	2100	200	2800	747	7187
Maize	500	560	100	1160	0	0
Sub-total	**3600**	**7000**	**530**	**11130**	**5175**	**46223**
Second crop						
Maize	150	2670	100	2920	0	
Total crop area	**3750**	**9670**	**630**	**14050**	**0.5**	**4.2**

The total groundwater extracted for treatment by the three safe water stations is around 5,000 cubic meters annually. This quantum is less than 0.04% of the annual precipitation within the micro watershed. The majority of water is used in irrigating the 11,000 acres used for agriculture by the three villages. The design of the treatment plant ensures the reject water quantity less than 50% of water extracted. This quantity is, therefore, negligible in comparison to both agriculture water use as well as water used for livestock and other domestic applications. However, the reject water is disposed in the village waste water disposal drains, which also has a large catchment area to collect household waste water that eventually dilutes the reject water. We have also adopted direct recharge measures to harvest rain water nearby the source water wells to offset the effect, if any.

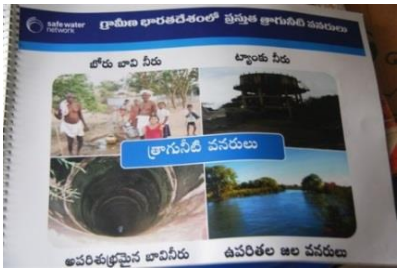
As part of this study, we have also worked out estimated quantity of chemical fertilizers and pesticides applied for different crops in the micro-watershed area. The estimated average quantity of chemical fertilizers used is 0.5 tons per acre and around 4.2 liters different pesticides are used for crops (Paddy, Cotton, Chilly and Banana) annually, whereas, the quantity of reject water generated from water treatment has the dissolved solid load which is only 0.1% of the total fertilizer input in the areas through agriculture activities. This study determined the trend of fertilizer and pesticide application in agriculture activities based on interaction with farmers in the micro-watershed villages. However, further scientific research could be helpful to establish empirical evidences.

The need is to therefore educate the community in improving water use efficiency, especially in irrigation. This can be achieved even through means such as soil and water conservation measures, direct seeding in the paddy crops to achieve approximately 30 % water use efficiency.

SECTION TWO

Awareness Program

Awareness generation activities were carried out in the project villages in the form of use of Flipcharts to spread education among village communities as well as Electrolyser Tests by testing fluoride and conductivity in water samples given by the rural households. The results were individually informed to the participants in order to create awareness about the water quality challenges in the area. Further, special education was provided to children by Anganwadi workers and Asha workers to highlight the relation between safe drinking water and good health.



IEC activities carried out in project villages on water quality challenges

World Water Day Program

On the occasion of World Water Day, broadly two major activities were conducted by the team, viz. Sales Campaign and event at Jookal village in Warangal district. A sales campaign was organized to increase user base through subsidized can distribution and 20 days' free sampling of water. This resulted in 715 new enrollments in the villages of Nizampally (42), Pochampally (40), Katrapalle (30), Wadlakonda (7), Gangirenigudem (74), Pathipaka (86), Gorikothapally (41), Rangapuram (40), Pasargonda (9), Kothapally (18), Rajavaram (39), Mannegudem (45), Parkal (45), Mahabubabad (6), Thodellagudem (134) and Kampalli (59).

Besides, an event was organized at the Jookal safe water station (Warangal, AP) on March 25, 2013 with operators and safe water committee members from 18 other villages to talk about local ownership and partnership for sustainability of operations. The gathering of over 150 people was addressed by officials from the state administration and rural water supply departments. The event provided visibility to Safe Water Network India while providing a sense of pride and greater ownership among project communities as partners in a larger, shared mission. The event was co-sponsored by the Global Water Partnership and enrolled 205 new households at Jookal.

Independence Day Program

On Independence Day (Aug 15), the 'Freedom from Waterborne Diseases' program was organized from 12-14 August' 13 at village schools to generate awareness about the role of safe drinking water in good health, using children as the 'agents of change'. Special permission from the school authorities was taken before initiating the program, to avoid any clashes with their routine activities.

Activities such as Village Wall Painting Competition with stencils being cut into metal frames in local regional languages, iJal jingle singing, and prize distribution were the main attractions organized in all schools in project villages of Warangal district.
In Andhra Pradesh cluster both in Warangal and Mahaboobnagar districts, the program was conducted at all schools in 23 villages. With local NGO support MARI and ECO-CLUB, as well as project team; we received active participation from the local village leaders, such as Sarpanch, etc., apart from school teachers, village committee members, parents and children. Children were elated to receive school bags as prizes.






SECTION THREE

Operator Training Workshop

An Operator Training Workshop was conducted in Pathipaka village of Warangal district, with Operators from 30 stations participating in the programme. The Pathipaka iJal Station Operator, who has been a star performer for the past two years, led the on-the-job (practical) training for rest of the station operators to understand every stage of reverse osmosis water treatment process, as well as on the proper use of the Remote Monitoring System to track consumers on daily basis, and alarms & alerts on the plant performance. Further, Safe Water Network India team felicitated the top performers of the past one year with medals and acknowledgements.