

ARUP



Philip Songa

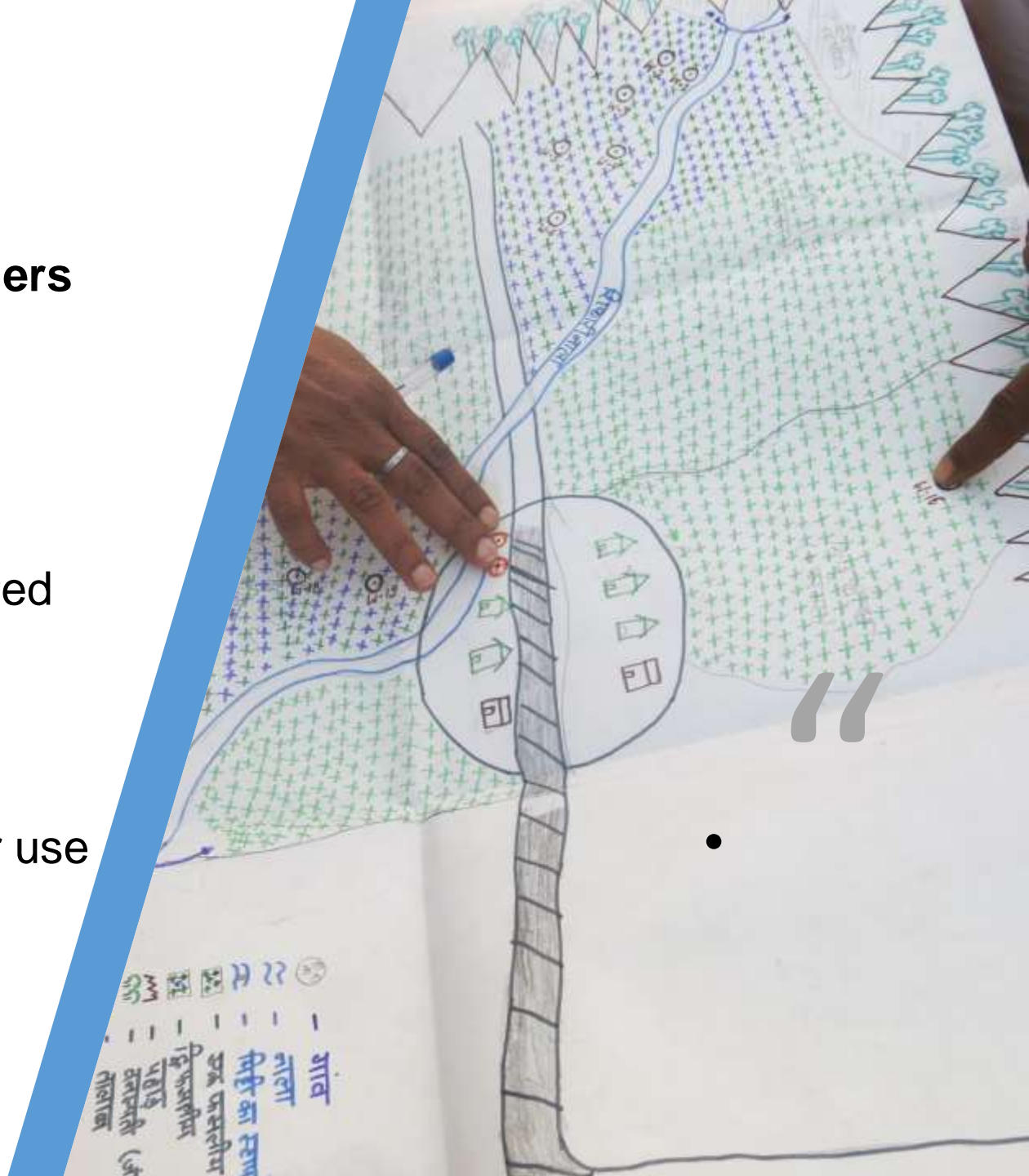
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‘WASH Basins Toolkit’ and ‘WASH Connect IWRM App’: Tools for Integrated Groundwater Management Through WASH Projects

About WASH Basins

1. Working with **FRANK Water** and **two partners** in India to develop **Water Resources Management Plans** for target communities
2. We have **designed and implemented groundwater recharge structures** and developed long-term plans that have attracted government support.
3. Our learning has been used to develop an **integrated water resource management (IWRM) toolkit and mobile application** for use by local government agencies

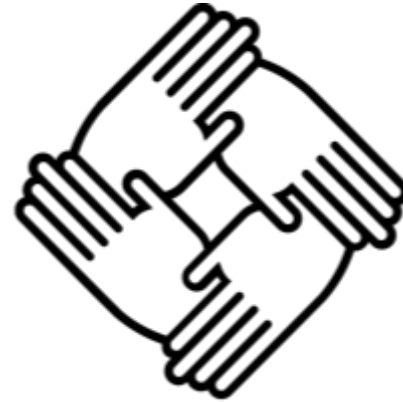
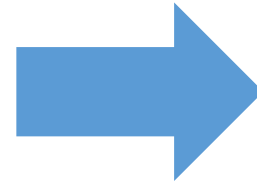
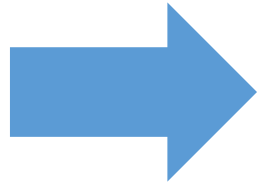
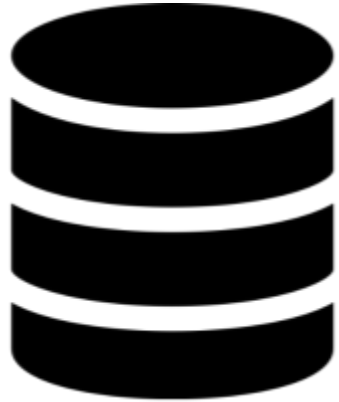


Project Goals

- Equitable and sustainable distribution, and management of water resources and sanitation provision in India.
- Full consideration of the WASH needs of women
- Transition to collaborative planning and management by all water-related ministries in India
- Recognition amongst the international WASH community of IWRM as an effective approach for improving long-term access to safe water and sanitation.



The WASH Basins Toolkit Process



Data collection,
management and analysis
(horizontally and vertically)

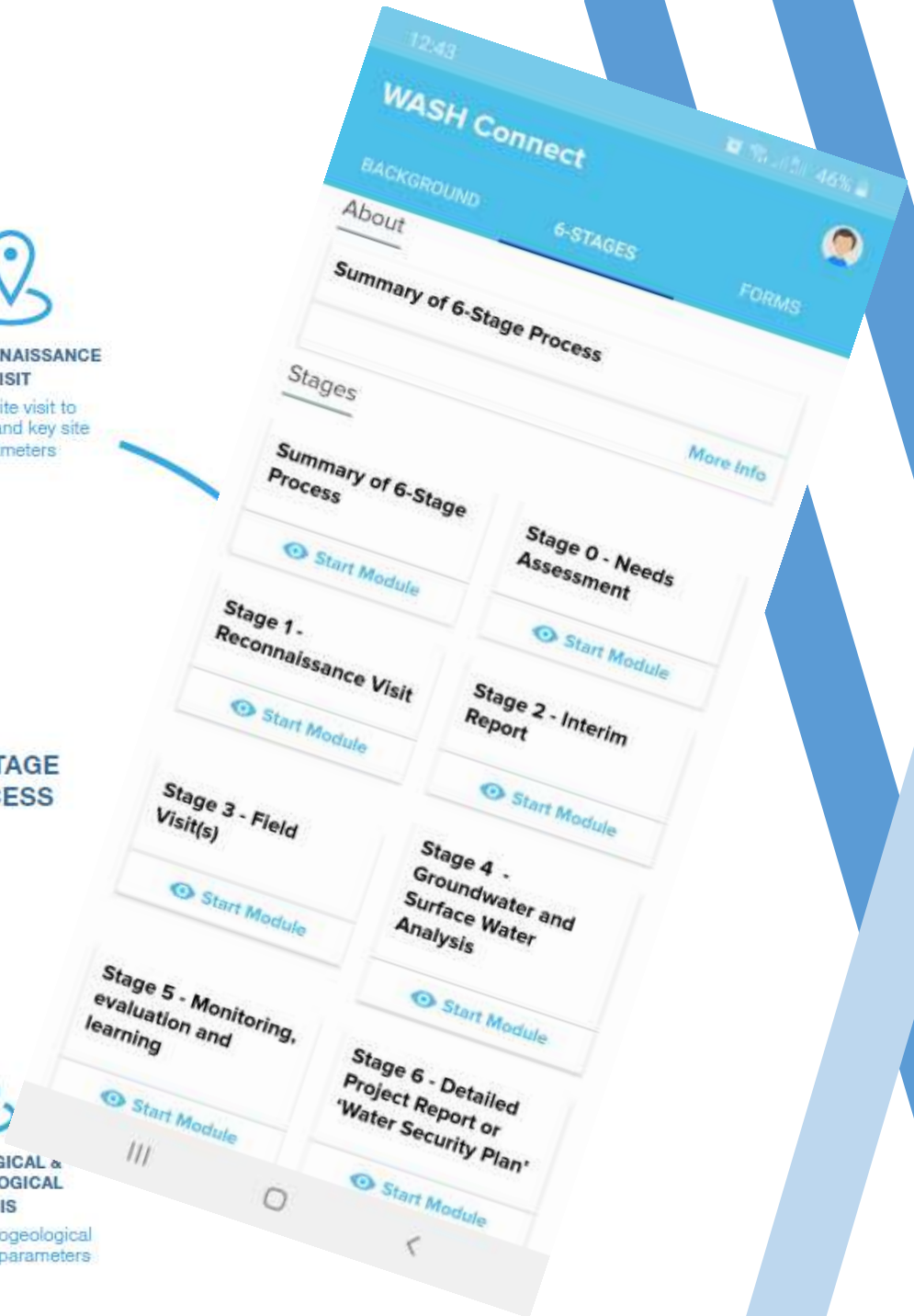
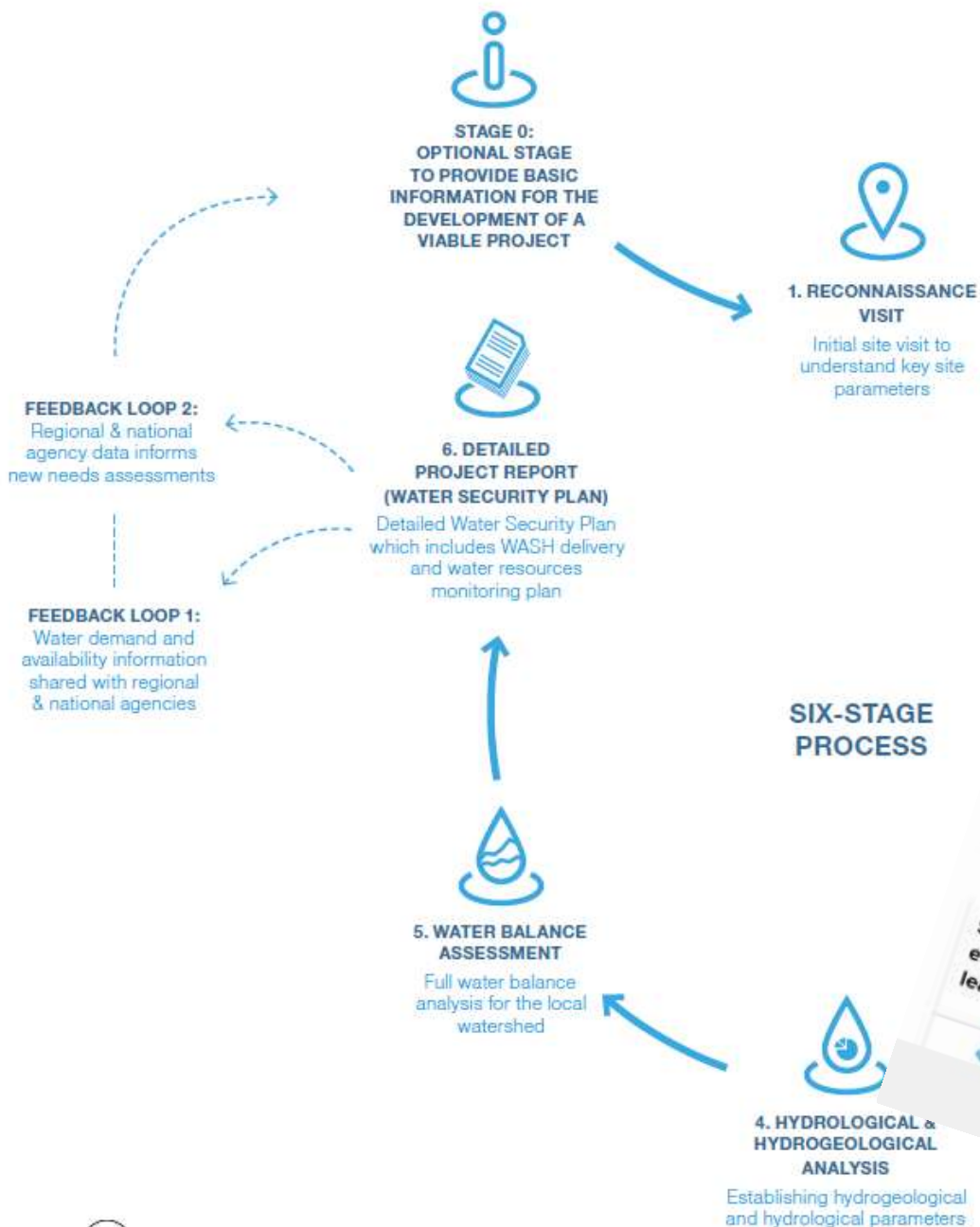
Developing a long-
term WRMP for each
village

Inclusive WASH
management &
provision of data to
support SDG 6 Target
6.5 on IWRM

Interactive PDF and Mobile App

- 🎯 Overview - Six Stage Process
- 🎯 Sample Stage
- 🎯 Sample App Screenshots







STAGE 4 GROUNDWATER & SURFACE WATER ANALYSIS

HOME

BACKGROUND

THE WASH
BASINS PROJECT

ABOUT THE TOOLKIT

INTEGRATING
IWRM INTO WASH

THE PROCESS

SIX STAGE PROCESS

TOOLS AND WORKFLOW

DEVELOPING A
WORKFLOW

REPORTING

WORKING WITH
STAKEHOLDERS

MONITORING,
EVALUATION
AND LEARNING

ANNEXES

ABOUT WASH BASINS

CASE STUDIES

ACKNOWLEDGEMENTS

GLOSSARY

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PURPOSE

Establish hydrogeological (groundwater) and hydrological (surface water) parameters for the watershed or catchment, applying appropriate analysis skills and using simple tools and established methodologies.

OUTPUTS

- Hydrogeological parameters: transmissivity, hydraulic conductivity, storativity
- Watershed delineation and flow characteristics: average, low and high flows; seasonality
- Water quality parameters

TYPE OF INFORMATION COLLECTED (STEEP FRAMEWORK)

- S - Social
- T - Technical
- E - Environmental
- E - Economic
- P - Political

TOOLS & WAYS OF WORKING

- Water quality testing kit
- Analysis software
- KoBo survey data analysis
- GIS software and mapping tools such as Google Earth (or Bhuvan in India)
- Excel-based analysis
- Hydrological and hydrogeological maps

DATA INPUTS

- National or state groundwater datasets: aquifer types, boundaries, characteristics
- National or state surface water datasets: Catchments and watershed boundaries, surface water flow and storage data
- Field data

DATA SOURCES

- Geological maps 1:50,000
- Topographical maps 1:50,000
- Local (or central) government reports and data
- Field information
- KoBo or other field survey forms
- National or state groundwater and surface water databases



Figure 13 : A Water Testing Kit





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TASKS

Groundwater

- Pump test data analysis
- Borehole or deep well lithology analysis
- Determine which geology (rock types) are water bearing
- Determine best drilling locations
- Determine potential recharge locations

Surface water

- Collate river or stream flow time series data (10+ years, ideally)
- Low flow analysis to establish Q95
- Flow frequency analysis using flow duration curves
- Determine sustainable abstraction and storage amounts

SKILLS REQUIRED

This is a technical stage that requires the following specialist skills, or staff with training in some or all of the required skills.

- Hydrology skills
- Hydrogeology skills
- Civil or mechanical engineering skills
- Water resources assessment skills

SURVEY AND WORKSHEET TEMPLATES

Annual Water Level Monitoring Form V1

[Kobo account link](#)

[Printable copy](#)

[MyWell app](#)

[Water Level Monitoring Worksheet - Excel](#)

[Pump Test Analysis Worksheet - Excel](#)

LINKS TO ANALYSIS SOFTWARE

[Bhuvan GIS \(India\)](#)

[QGIS \(free\)](#)

[GRASS GIS \(free\)](#)

[Manifold GIS \(cost\)](#)

[SAGA GIS \(free\)](#)

[Groundwater analysis software help document](#)

RESOURCES AND FURTHER INFORMATION

[About KoBo Toolbox](#)

[KoBo Toolbox Help Centre](#)

[India Meteorological Department](#)

[National Institute of Hydrology](#)

[Central Groundwater Board](#)

[Water Resources Information System](#)

[India Water Tool](#)



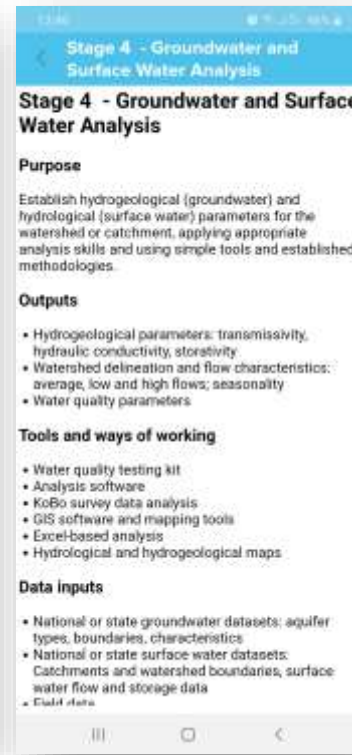
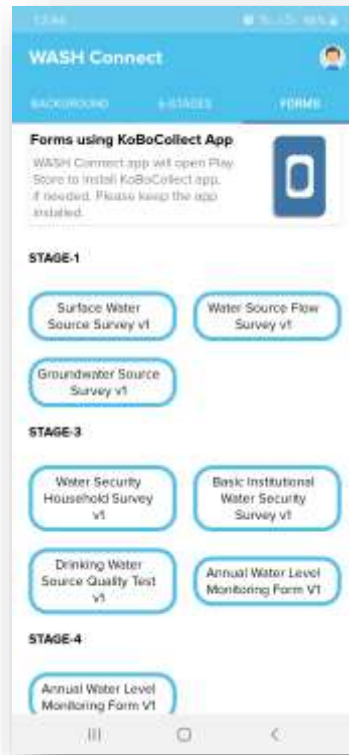
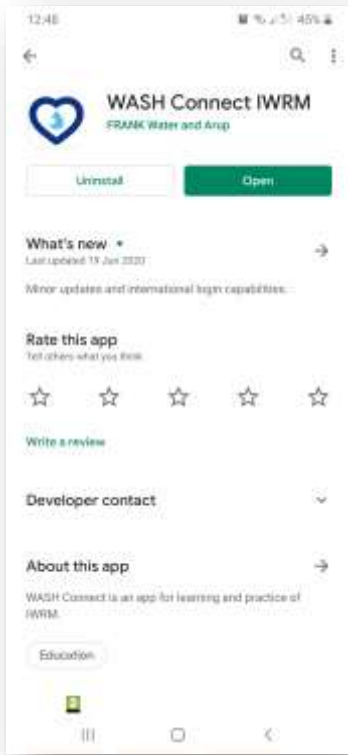
CASE STUDY
SAMERTH CHARITABLE TRUST, INDIA

As a main socially-based organisation, Samerth relied on limited technical skills when working in communities in Chhattisgarh State. Typical workflow involved development of paper-based maps to delineate watersheds and identify key water features. The maps were developed in discussion with communities and typically took up to two weeks to complete. Basic hydrogeological analysis was carried out based on paper geological maps in order to determine the most appropriate locations for boreholes and wells. This was achieved by training Samerth staff in basic hydrogeology skills.

During the WASH Basins project, a needs assessment was carried out which identified the requirements for a greater breadth in skills including: GIS, hydrogeology and engineering. Following a technical support visit by Arup staff in 2018, Samerth began to develop a digital-based workflow, which included the use of Bhuvan web-based GIS for mapping and hydrological and geological analysis, with training from the State Government-run 'Mega Watershed Project' in Chhattisgarh. This reduced the amount of time and effort required to bring together key technical information to support the development of water security plans.

Figure 14 : Paper-based mapping







Thank You!

Download toolkit: <https://www.frankwater.com/wash-basins>

About the Project: www.arup.com/projects/wash-basins-india

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