Republic of India
Supporting Impact Evaluation Studies in Water Supply and Sanitation in India

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This synthesis report details the outputs and the intermediate outcomes of the above technical assistance (TA) which is aimed at supporting impact evaluation studies in water supply and sanitation in India by (i) supporting the design and implementation of impact evaluation and data driven analytical work, and (ii) improving capacity among the project implementing agencies, government and other sector counterparts to undertake impact evaluations.
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Executive Summary

1. This synthesis report details the process, outputs and intermediate outcomes Technical Assistance (TA) “Supporting Impact Evaluation Studies in Water Supply and Sanitation in India (P144956)” implemented by the World Bank’s Water and Sanitation Program (WSP). The TA supported the design and implementation of impact evaluations in water and sanitation projects in India and also facilitated data driven analytical work and capacity building. Specific contributions of the TA are the following:

- Enabling Monitoring and Evaluation: The TA enabled the development of monitoring and impact evaluation in water supply and sanitation projects in Kerala\(^1\) and Punjab\(^2\) and assisted in the design of a sophisticated but simple-to-use-monitoring information system in Kerala.

- Enabling policy: As part of the TA analytical work on assessing the functionality of small rural water schemes in Kerala was undertaken. Besides, econometric analysis of the association between lack of sanitation and stunting as well as sanitation spill overs were conducted using Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Survey (DHS) data from Cambodia, Vietnam and several Sub Saharan African countries. These upstream analytical works could unravel some of the important policy questions facing the sector.

- Enabling Institutions: By facilitating close collaboration with the project implementing agencies and local academics in the design and implementation of impact evaluations, the TA strengthened local capacity. Further, study instruments, such as social, technical and financial audit instruments and rapid assessment survey instruments, were developed which can be easily adapted to similar studies in future.

2. In the context of the significant challenges India is facing in water and sanitation access and the extreme complexity of the institutional systems for the provision of water supply and sanitation, the access to flexible yet practical analytical assistance at the point of need is highly valued by government counterparts.

3. This TA on supporting water supply and sanitation has identified the need for a larger regional or global activity that can carry forward impact evaluations in the sector and produce global knowledge that will serve as a public good for the client countries. The TA also underscored the importance of upstream analytical work and replication of results in different contexts as well as the need to develop customizable tools and instruments for faster implementation of data collection efforts. Above all, the TA emphasized the need to invest in expanding local capacity in designing and implementing rigorous impact evaluations so that more evidence could emerge in the coming years for better policy formulation in the water and sanitation sector.

\(^1\) Kerala Rural Water Supply and Sanitation Project (Jalanidhi II- P121774)
\(^2\) Punjab Rural Water Sector Improvement Project (P150520)
Background

4. Impact evaluations are undertaken to establish the causal impact of an intervention on outcomes of interest. Despite substantive investment by both the Government of India as well as development partners such as the World Bank over the past decades, infrastructure sectors in India, particularly the water and sanitation sector, have very limited exposure to the methods of impact evaluation and no systematic effort has been made thus far to increase the appetite for seeking rigorous evidence for policy interventions. This TA, through proactive engagement with the project implementing agencies and government counterparts, was thus initiated in part due to the increased emphasis towards evidence-based policy making in the sector and also in part due to the significant knowledge gaps towards improving the access to water and sanitation services in India. The TA hence provided opportunities for them to have increased exposure to impact evaluation through seminars, presentation at the local national and international levels as well as through active engagement in the design and implementation of impact evaluations in specific projects.

5. Reviews and studies in the sector repeatedly note that rigorous evidence and quantification of benefits of water, sanitation and hygiene (WASH) interventions are scarce and of variable quality. Since 2008/9, WSP is extensively advancing an evidence-based agenda and monitoring and impact evaluation work in these areas. Particularly, in partnership with the Bill and Melinda Gates Foundation, WSP has supported randomized control trials (RCTs) of rural sanitation programs in India, Indonesia and Tanzania; and of hand-washing behavior in Peru, Senegal, Tanzania and Vietnam. These impact evaluations, among others, measured a wide range of behavioral, health and welfare impacts of sanitation interventions, hand-washing with soap campaigns and community-led total sanitation marketing.

6. In India, the TA opened up opportunities to support analytical work on policy questions on how to improve access, quality, effectiveness, and sustainability of water, sanitation and hygiene interventions and to measure the impact of such interventions on health and welfare outcomes. Various activities undertaken under the TA also facilitated capacity building within the government and project implementing agencies by actively partnering with experts in impact evaluation design and implementation as well as through several workshops and presentations. The TA, thus facilitated global learning on the impact of water and sanitation interventions on human development and welfare outcomes.

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3 For example, Department for International Development (DFID), Water, Sanitation and Hygiene Evidence Paper, May 2013.
Overview of Technical Assistance

7. This TA has sought to support the creation and consolidation of rigorous evidence base in India on the causal impact of water and sanitation interventions on welfare outcomes as well as those on health, cognitive and education outcomes, time allocation, savings and the creation of social capital and empowerment of women.

8. The TA provided technical expertise and limited support to data collection efforts but did not endeavor to undertake the entire impact evaluation activities in the selected projects. In most cases, as will be described in the following sections, with the support of the TA, the projects could generate matching resources from within the project funds or external sources like Strategic Impact Evaluation Fund (SIEF) to carry forward the impact evaluations. By supporting analytical work and impact evaluations in the water and sanitation sector, the TA promoted the following intermediate outcomes such as: (i) enabling monitoring and evaluation, (ii) enabling policy, and (iii) enabling institutions.

Results Framework

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9. It needs to be noted that the outputs produced as part of the TA cannot be mapped exclusively to a given intermediate outcome as it is typically the case since most of the outputs directly or indirectly contributed to achieving several of the outcomes mentioned above and hence have a cumulative effect on their achievement. The outputs mapped to intermediate outcomes and relevant indicators hence should be considered more as indicative. Since this TA is the first of its kind in identifying and supporting impact evaluations in the water sector, many of the projects identified were based on demand from
World Bank project teams who expressed an interest in exploring impact evaluations within their projects. Due to budgetary and staff limitations, wider calls for expressions of interests could not be initiated.

**Scope, Methodology and Process**

10. Regarding the methods employed in impact evaluations, the policy questions to be addressed, and the availability of existing data and available time determined the technique that was adopted. Hence, whenever time and context permitted, randomized control trials (RCT) were used. Quasi experimental approaches such as those using matching and regression discontinuity methods were used in other contexts. In all cases, local partners and projects teams were involved in the development of the study design and instruments. As indicated earlier, the selection of projects were largely on demand based and very selective in nature.

11. In order to achieve the above outcomes and given the very limited capacity among the government and sector counterparts, the TA facilitated technical support by actively supporting project teams in project preparation and implementation. The nature of technical support implemented included, analytical briefs and studies, scoping assessments for implementing rigorous impact evaluations, survey instruments for data collection, presentations, workshops and training programs. In order to deliver greater impact, most of these have been undertaken in partnership with existing and proposed Bank projects in several states.

**Intermediate Outcomes**

12. *Informed the development of monitoring and evaluation:* The TA extensively supported monitoring and evaluation activities in Kerala Water Supply and Sanitation Project (P121774) and to a limited extent in Punjab Rural Water Supply and Sanitation Project (P090592). In Kerala, active support was provided for the development of a web-based information monitoring system (Jalanidhi Information Monitoring System-JIMS) and a well-functioning MIS system is currently in place. The design of the next phase of the JIMS with enhanced capabilities such as built in mobile survey system, procurement system and financial system as well as capabilities for instantaneous citizen feedback and complaint redressal are also completed.

13. *Supported analytical work to inform policy:* As part of the TA a concept paper is prepared to serve as a guidance note on defining the functionality of water schemes. The note was finalized after wide ranging consultation among experts in the water sector across the World Bank regions. The various dimension of the functionality index are: a) reliability and adequacy; b) affordability/ cost of Service; c) operation and maintenance; d) environmental sustainability; d) financial sustainability, and e) institutional sustainability.

14. Further, a rigorous application of the functionality concept was undertaken in Kerala where a matched sample of rural water supply schemes built under bottom-up approach (Jalanidhi for example) and top-down approach (schemes built and managed by Kerala Water Authority) were compared based on data collected from financial, technical and social audits. This study could unravel the strengths and weaknesses of each type of scheme under various dimensions of functionality which in turn can inform the government as to when and how to reinforce existing water schemes by focusing on particular areas of strengths and weaknesses.
15. Analytical work undertaken under the TA using existing data from Multi-Indicator Cluster surveys (MICS) and Demographic and Health Surveys (DHS) conducted in Vietnam, Cambodia and several Sub-Saharan African countries show the association between open defecation or unimproved sanitation and stunting among children under the age of five. Further, the studies confirmed the effect of lack of improved sanitation at the community at large on stunting even in the presence of improved sanitation in the child’s household, thus highlighting the importance of the spillover effects of sanitation.

16. **Capacity of relevant institutions at the state level enhanced through workshops/ seminars and training programs**: Collaboration promoted through the TA ensured the active participation of project implementing agencies and other stakeholders in the design and implementation of impact evaluations. Further, opportunities were provided for learning through presentations, workshops, and training programs. Besides, study instruments for social, technical and financial audits, rapid assessment surveys etc. were prepared which are can be easily adapted to different contexts for similar purposes in future.

## Outputs

17. The TA produced a number of outputs which are grouped under two main categories for the purpose of better elucidation. They are: i) design and implementation of impact evaluations and data driven analytical work, and ii) development of management information system and data collection tools.

### I. Design and Implementation of Impact Evaluations and Data Driven Analytical Work

18. Analytical work conducted as part of the TA covered the following outputs:
   
   a) Functionality of water schemes: Concept Paper
   b) Assessing the functionality of small rural water schemes in Kerala
   c) Assessing the functionality of small rural water schemes in Punjab: Scoping Report
   d) Impact Evaluation of WASH interventions: RCT in Punjab
   e) Analytical Work on Sanitation and Stunting

   **(a) Functionality of Water Schemes**

   Outputs: Annexure 1- Functionality of Water Schemes: Concept Paper

19. Since the launch of the Sector Reform Project in 1999, the Government of India (GOI) has launched substantial sector reforms geared towards demand responsive approaches for rural water supply and sanitation service provision. Recognizing continuous slippages of ‘fully covered’ habitations to ‘partial’ or ‘not covered’ status, GOI plans have emphasized decentralized approaches and community participation, while giving flexibility to states to adopt bottom-up schemes.

20. At the same time, a majority of small water schemes in different states have been constructed and maintained through the traditional top-down approach with state run utilities in charge of construction of the schemes and their operation and maintenance.
21. A systematic assessment of the performance of water supply schemes implemented under both bottom-up and top-down approaches necessitated a definition of functionality of water supply schemes that could be used to evaluate these projects built and maintained under different institutional environments. To that end, a list of indicators was developed to capture the multi-dimensional nature of ‘functionality’ of water schemes. The choice of indicators is informed by the World Bank Study on “Review of Effectiveness of Rural Water Supply Schemes in India (2008)"\textsuperscript{10} as well as water sector studies conducted in India, Sri Lanka, and Latin America.

22. Indicators of different dimensions of functionality such as: a) reliability and adequacy; b) affordability/ cost of service; c) operation and maintenance; d) environmental sustainability; d) financial sustainability, and e) institutional sustainability were developed in the concept paper. The concept paper was widely circulated among water sector specialists across the World Bank for comments and feedback.

23. Such functionality assessments can be used to evaluate and compare water schemes built and maintained under different institutional arrangements. Further, even within each type of water supply provision mechanism, governments can learn when to go back to the field and reinforce such systems considering their inherent strengths and weaknesses.

(b) Assessing Functionality of Small Rural Water Schemes in Kerala

Annexure 3- Impact Evaluation Case Studies-Jalanidhi I  
Annexure 4- Impact Evaluation Inception Workshop Jalanidhi I  
Annexure 5- Bottom up or Top-down Investment- Jalanidhi I Paper

24. Based on the multi-dimensional functionality indicators, a comprehensive study was undertaken about rural small water schemes in Kerala, built under bottom-up and top-down institutional arrangements, employing data collection tools such as social, financial and technical audits. These audits were to assess the performance of rural water supply and sanitation interventions by various providers including Kerala Water Authority (KWA) and Kerala Rural Water Supply and Sanitation Agency (KRWSA). In addition, the roles played by local self-governments were looked into.

25. Since the study compared various water schemes built under top down (Kerala Water Authority) and bottom up (Jalanidhi, Swajaldhara etc.) institutional arrangements, a total sample of 200 schemes were chosen using matching techniques based on water source, location, age, size of the scheme and other characteristics.

26. The study reviewed different rural water supply schemes and provided insights on the current status of these systems, especially as far as operation and maintenance, cost-recovery from users and appropriateness of the design, and thus informed about the technical, institutional and financial sustainability of these systems. Five case studies were also undertaken to highlight the typical features of success and failures of schemes under top down and bottom up approaches.

\textsuperscript{10} Misra, S. (2008); “Review of Effectiveness of Rural Water Supply Schemes in India.”, World Bank, Washington DC.
27. In order to ensure active involvement of the relevant stakeholders in the design and implementation of the study, workshops were held at various stages of the process in which participants from the Kerala Water Authority, Kerala Rural Water Supply Agency (KRWSA), local governments, beneficiary groups and the World Bank participated.

28. Using the data collected through the social, financial and technical audits, the study team developed indexes to showing various dimensions of functionality and sustainability of water schemes. They include indexes for accessibility and reliability, household satisfaction, operation and maintenance, household cost of service, cost recovery and institutional sustainability of the water schemes. Using this indexes, it was found that, the Jalanidhi-I overall performance were 0.65 standard deviations better compared to the top-down delivery systems belonging to the Kerala Water Authority built and managed schemes. Moreover, when comparing Jalanidhi-I with other hybrid and bottom up schemes in the surveyed sample, the study finds that the Jalanidhi-I performance were 0.33 SDs more satisfactory than the other hybrid/bottom up schemes in the sample.

(c) Assessing Functionality of Small Rural Water Schemes: Punjab Scoping Report


29. At the request of the World Bank Project team in Punjab, a scoping exercise was conducted regarding the feasibility to undertake data driven analytical work and rigorous impact evaluations as part of Punjab Rural Water Supply and Sanitation Project (P090592). Based on a series of consultations with the project implementing agency and other stakeholders, and a systematic review of existing data collected as part of project implementation, the scoping paper suggested three specific activities involving varying extent of data collection efforts.

30. First, based on the multi-dimensional concept of functionality, it was suggested to undertake social, technical and financial audits to collect data to compare small rural water schemes constructed under the World Bank project (IDA schemes) as well as those under other government programs. This study is expected to inform when to go back to the field to reinforce the schemes on the one hand and on the specific characteristics of World Bank funded schemes over others- thus informing the World Bank water sector, regarding where to pay specific attention to improve the sustainability of schemes conducted under the World Bank projects.

31. Second, since Punjab Rural Water Supply and Sanitation Agency is pursuing to expand 24X7 water supplies, it is useful to understand the physical and socio economic benefits of such an expansion as well as its cost effectiveness. The paper provided methodology and data needs for this analytical exercise. Third, the scoping paper also suggested the methodology for conducting a systematic analysis of the impact of sanitation in addition to piped water schemes. This is particularly relevant since the Government of Punjab has requested the World Bank to design and finance a follow-on project in the current fiscal year (FY15).

(d) Impact Evaluation of WASH Interventions: RCT in Punjab

32. Under the World Bank financed PRWSSIP-I, small bore sewers and sewerage schemes were successfully piloted in 98 Gram Panchayats (GP) in Punjab. The project is now being scaled up (PRWSSIP-II) to cover 450 GPs with sanitation solutions. This provides an opportunity to carry out a rigorous impact evaluation of the sanitation interventions under PRWSSIP-II. The Government of Punjab is prioritizing sanitation and is likely to scale up the sanitation interventions to cover all villages in Punjab. Accordingly, the findings from this IE could drive future sanitation policy towards greater efficiency, sustainability, and equity of access.

33. Poor sanitation is associated with a wide range of diseases including diarrhea\(^\text{11}\) and soil transmitted helminth (STH) infections.\(^\text{12}\) The main focus of the evaluation would be to assess the impact of the community level sanitation interventions on health and education outcomes in the beneficiary communities. There exists some evidence base on the impact of poor sanitation on nutritional outcomes among children in India (Spears, 2013).\(^\text{13}\) However, there are few rigorous impact evaluations to date that demonstrate the impact of sanitation interventions on child nutritional and educational outcomes. Most WASH interventions address (quality of) water supply and sanitation together, which makes it impossible to isolate the impact of improved sanitation on child health outcomes. Interventions focused exclusively on sanitation and hygiene in Punjab, as part of the Second Punjab Rural Water Supply and Sanitation Project (P150520) will allow the proposed IE to explore the causal effect of sanitation interventions on child health and nutritional outcomes and contribute towards expanding the knowledge base in this area.

34. The proposed evaluation will use a cluster randomized control trial methodology for this evaluation. The Government of Punjab has expressed its keen interest in collaborating with the World Bank team in undertaking this impact evaluation. Moreover, Strategic Impact Evaluation Facility (SIEF) funding has been secured through a rigorous double blind peer review process which ascertains the technical quality of the proposal. This TA supported the development of the impact evaluation design and the follow up activities will be undertaken as part of another TA with a broader agenda of supporting impact evaluations globally.

(e) Analytical Work on Sanitation and Stunting

Outputs: Annexure 8-Sanitation Spillovers and Stunting: Evidence from Cambodia Paper
Annexure 9- Results on Sanitation and Stunting- Vietnam & SSA countries

35. In the absence of randomization, existing data is often very useful in establishing the association between sanitation and nutritional outcomes such as stunting among children below the age of five. Given sufficient data, causal relationship can also be established in the presence of a well specified identification strategy and quasi-experimental econometric techniques. Such evidence generated from other countries such as Cambodia, Vietnam and Sub-Saharan African prove to be useful in comparing the Indian context with countries in different stages of water supply and sanitation provision.


\(^\text{13}\) Spears D, A Ghosh, and O. Cumming (2013) Open Defecation and Childhood Stunting in India: An Ecological Analysis of New Data from 112 Districts. PLOS One 8(9): e73784
36. The primary contribution of “Sanitation Spillovers and Stunting: Evidence from Cambodia” (Annexure 9) is to econometrically identify an effect of open defecation on child height by studying changes over time within geographic areas of Cambodia, using fixed effects. The paper makes several contributions of relevance in the Indian context. First, in Cambodia open defecation is particularly common and population density is high, two facts which combine to create an unusually threatening disease environment. Second, although the country remains far from eliminating open defecation, Cambodia saw a decline in open defecation from 2005 to 2010, a type of natural experiment that provides the opportunity to study the effects of a change of sanitation. Further, this paper documents sanitation externalities: the open defecation by other households in a child’s open area to which she is exposed matters for her height, beyond her own household’s latrine use. Such externalities are part of what makes sanitation of interest to economists and a public policy priority.

37. The results of the paper show, among others that on average, when the rate of open defecation in a child’s locality increases from 0 to 100 percent, children’s height decreases by between 0.435 to 0.838 standard deviations. Using various decomposition techniques the paper also demonstrates that the decline in exposure to open defecation can statistically account for the entire increase in child height.

38. Analytical work undertaken using data from Multi Indicator Cluster Surveys (MICS) in Vietnam tried to answer whether community level lack of sanitation has an association with child height, particularly in the mountainous areas of Vietnam where lack of sanitation is more pronounced than the rest of the country. The study finds that in the mountainous regions of Vietnam, children below five-year old tend to be 3.7 cm shorter than healthy children living in villages where everybody practices improved sanitation. Further, a child remains at risk of stunting if community members use unimproved sanitation facilities, even when the child’s family uses improved latrines themselves. Therefore, from a policy perspective, universal usage of improved sanitation is needed to adequately address stunting.

39. Similar results have been found using data from Demographic and Health Surveys (DHS) and Multi Indicator Cluster Surveys (MICS) from several countries in Sub Saharan Africa such as Tanzania, Niger, Ethiopia, Kenya, Uganda, Senegal and Nigeria where both open defecation or unimproved sanitation is prevalent. All these evidence suggest that the association between stunting and unimproved sanitation or open defecation is robust across different countries and policies aimed at ensuring improved sanitation for all is required for better health and cognitive outcomes of the next generation.

II. Development of Monitoring & Information System and Data Collection Tools

40. The following activities were taken up under this component:
   a) Development of Monitoring and Information System (MIS)
   b) Development of Data Collection Tools
(a) Development of Monitoring and Information System

Outputs:  
Annexure 10- Monitoring and Information System – Jalanidhi II Presentation  
Annexure 11- Monitoring and Information System- Jalanidhi II Manual Outline  
Annexure 12- Monitoring and Information System Enhancements- Version 2.0

41. As part of the Jalanidhi II project, Kerala Rural Water Supply and Sanitation Agency (KRWSA) developed a state-of-the-art monitoring and evaluation system- Jalanidhi Information Management System (JIMS) for monitoring progress in project implementation. JIMS has a functional design which incorporates the KRWSA working procedures which and based on mandatory activities called milestones. JIMS is capable of managing the funding of multiple projects by specifying more than one funding source at the beneficiary group, panchayats and state level and the system can also define more comprehensive financial data in terms of expenditure incurred.

42. JIMS has a milestone-based activity schedule which is customizable with respect to the activity in the milestone and the number of milestones. The milestone summary ensures the display of timeline of modifications in the activities executed in the project aiding the management in understanding the time of initiation and identifies the trouble stages, which in turn can assist in smarter and efficient decision ensuring timely action and prevention of delays. The system possesses a dynamic project status updation system integrated with the system which represents the progress of the project with respect to each package with the expected date of completion.

43. Apart from a gallery module for uploading photographs, a dedicated document module is also integrated with JIMS where in the system can ensure tagging of relevant and important documents with the module creating a virtual project space. The system also facilitates the upload on plans and schematic diagrams of the concerned project with the indication of packages and completion state, assisting the senior officials to analyze the completion along with all the requisite data at one place.

44. This system has been effective in projecting the progress in new schemes for the public along with a public portal facilitating information through websites and SMS alerts. The concerned members of the public can subscribe to the projects which creates customized alerts of every update with respect to every project.

45. With the successful initial implementation and operation of JIMS, KRWSA now has real-time project progress monitoring and evaluation data with time lines of updating and modifications. The system has also proved advantageous for tracking the delays or impedance in the project. With detailed and comprehensive reporting module the system has also been able to deliver updates in real time, thereby increasing efficiency.

46. As a next step, a more efficient system is being conceived that will be a “briefcase” implementation solution by merging the mandatory procurement processes and other operational guidelines of the World Bank and the Central Public Works Department in India. The enhanced MIS systems JIMS 2.0 will have components ranging from a built-in mobile survey system, procurement system and financial system. JIMS 2.0 will also possess capabilities for instantaneous citizen feedback and tracking complaint redressal. Development and implementation of JIMS version 2.0 will be pursued under a separate TA.
(b) Development of Data Collection Tools

Outputs:
- Annexure 13- Assessment of Functionality of Water Schemes – Survey Instruments
- Annexure 14- Rapid Assessment Survey Instruments- Maharashtra

47. Data collection tools like survey instruments have been developed as part of this TA which can be customized to other contexts, thus saving time on the one hand and allowing comparability across studies on the other. Based on the multi-dimensional indicators of functionality developed as part of the TA, four survey instruments were developed:

- **Instrument for Technical Audit:** The instrument for technical audit was meant primarily to assess the present physical condition of the infrastructure and its maintenance, appropriateness of design, performance assessment of the scheme against design criteria, assessment of the costs and institutional performance.

- **Instrument for Beneficiary Assessment through Household Survey:** Aspects examined include household assessment of water availability, coping strategies in times of water shortage, benefits on health and education of the members and the influence of the scheme on social cohesion and community development.

- **Instrument for Stakeholder Performance Review:** These instruments are intended to assess the quality of inputs from different category of stakeholders such as community leaders, members of beneficiary committees/user groups, elected representatives and staff of Gram Panchayats, staff of other implementing agencies etc.

- **Household and community survey instruments:** These were developed for rapid assessment of the impact of water and sanitation on health and other development outcome of interest. Though these instruments were developed in the context of Maharashtra, they can be easily adapted for any other Indian state.

III. Development of Institutional Capacity

48. This TA also supported analytical work and impact evaluations in projects ensuring active involvement of the government and project counterparts. Several presentations and workshops were organized at the state level to better understand the policy questions of interest to the project implementing partners and government counterparts and to ensure their involvement in developing analytical frameworks and evaluation designs.

49. Several learning events were organized towards knowledge sharing for the sector based on national and international experience sharing. Project implementation agencies from Punjab, Kerala, and three lagging states - Uttar Pradesh, Bihar, and Jharkhand - with whom the TA was actively collaborating participated in the international workshop on impact evaluation in Dhaka organized by the Strategic Impact Evaluation Facility (SIEF) in April 2014.
Lessons Learned and Next Steps

50. Evidence base created through the TA is expected to help improving design and implementation of water and sanitation interventions within and outside India. This TA, through actively engaging with World Bank funded projects in water and sanitation, and facilitating the design and implementation of impact evaluations, could come up with some important lessons which prove to be beneficial for similar undertakings in the sector. They are:

- Importance of replication and upstream analytical work: Data driven analytical work and impact evaluations which were conducted as part of the TA underscored the increasing need of replicating them in different environments and contexts. A robust body of evidence generated will thus help to refine policy lessons and improve the type of interventions in water and sanitation. This is particularly clear in the case of studies on assessment of the functionality of water schemes which will enable the Government to better understand when to reinforce the water schemes and on which dimensions. Further, upstream analytical work using existing data can unravel associations between potential determinants and outcomes of interest such as sanitation spillovers and stunting. Such empirical evidence can prove to generate motivation for the government to undertake rigorous impact evaluations to unravel the causal relationships in several contexts.

- Need to develop a repository of tools and study instruments: Designing impact evaluation and associated data collection activities tend to be rather time consuming. Moreover, in order to undertake studies that are comparable, it is useful to have a readymade set of instruments that can be easily adapted to various contexts. So efforts at creating a repository of terms of references for individual and firm consultants and other study instruments serve a public good role that can eventually enhance the quality of impact evaluations in water supply and sanitation.

- Importance of local capacity: There is also a need to create local capacity to design and implement high quality impact evaluations. This can be done by organizing regular workshops and learning events on impact evaluation for sector practitioners, academics from local academic institutions and other stakeholders. This, in turn, can raise the appetite towards evidence based policy and rigorous techniques for designing impact evaluation. Further, collaborations need to be strengthened with local academic institutions and researchers to anchor impact evaluation activities in the academic and policy debates.

51. Impact evaluations can produce evidence on the efficacy and cost effectiveness of various policy relevant interventions in the water and sanitation sector. However, a critical mass of evidence needs to be generated through replication and refinement across different countries to be acceptable as a scientific practice. Further, a critical mass of impact evaluations is needed to reap the benefits of economies of scale in the preparation of instruments and design techniques. Hence, this TA on supporting impact evaluations in water supply and sanitation has identified the need for a larger regional or global activity that can carry forward impact evaluations in the sector and produce global knowledge that will serve as a public good for the client countries.
## Appendix: Description of the Annexures

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<th>Annexure</th>
<th>Title</th>
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<td>Functionality of Water Schemes: Concept Paper</td>
<td>Developed indicators that can be used to measure the functionality (social, technical and financial) of water schemes</td>
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<td>Annexure 2</td>
<td>Impact Evaluation Report- Jalanidhi I</td>
<td>Report by the firm on the impact evaluation activity of Jalanidhi I (P055454) with details on sample size and field notes</td>
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<td>Annexure 3</td>
<td>Impact Evaluation Case Studies-Jalanidhi I</td>
<td>Report by the firm on qualitative case studies of water schemes highlighting the success and failure of Jalanidhi type intervention</td>
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<td>Impact Evaluation Inception Workshop Jalanidhi I</td>
<td>Non-technical power point presentation on impact evaluation presented to Water sector officials</td>
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<td>Bottom up or Top Down Investment- Jalanidhi I Paper</td>
<td>Econometric paper comparing top down and bottom up approaches in water sector using quasi experimental methods</td>
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<td>Annexure 6</td>
<td>Impact Evaluation of Water Schemes in Punjab- Scoping Report</td>
<td>A sample scoping paper describing possible IE that can be implemented in Punjab as part of the First Punjab Rural Water Supply and Sanitation Project (P090592)</td>
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<td>Punjab RWSS II Impact Evaluation – SIEF Technical Proposal Draft</td>
<td>Technical proposal to rigorously evaluate the impact of water and sanitation interventions in Punjab, as part of the Second Punjab Rural Water Supply and Sanitation Project (P150520), which received SIEF funding</td>
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<td>Annexure 8</td>
<td>Sanitation Spillovers and Stunting: Evidence from Cambodia Paper</td>
<td>Paper that econometrically identifies an effect of open defecation on child height by studying changes over time within geographic areas of Cambodia, using fixed effects</td>
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<td>Annexure 9</td>
<td>Results on Sanitation and Stunting- Vietnam &amp; SSA countries</td>
<td>Study that econometrically identify an effect of open defecation on child height by studying changes over time within geographic areas of Vietnam and Sub Saharan Africa, using fixed effects</td>
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<td>Monitoring and Information System – Jalanidhi II Presentation</td>
<td>Power Point presentation on Jalanidhi Information Management System (JIMS) and possible enhancements (P121774)</td>
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<td>Monitoring and Information System Enhancements- Version 2.0</td>
<td>Jalanidhi Information Management System Technical Manual and possible enhancements (P121774)</td>
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<td>Annexure 13</td>
<td>Assessment of Functionality of Water Schemes – Survey Instruments</td>
<td>Survey Instruments for assessing functionality of water schemes which include household audits, beneficiary group survey instruments, technical and financial audits</td>
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