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mPMIS: An intelligent mobile based WASH monitoring system of Payment by Result (PbR) approach.

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A mobile device has become an inseparable part of our daily life which can integrate WASH monitoring seamlessly to our everyday working life. It enables the delivery of accurate WASH information anytime anywhere by means of mobile devices. Recent technological advances and wireless communication have enabled the low-cost, miniature, lightweight and intelligent monitoring system for the DFID South Asia WASH results programme of WaterAid Bangladesh. This smart monitoring system is a mobile based MIS application. This mobile based monitoring system includes data collection, visualization and analysis in different mode. This paper highlights the unique mobile based monitoring system, its implication and learning on payment by result project.

Background

Over 115 Bangladeshis live in rural areas. To most of those people, running water and sanitary latrines are luxury items. Among the poorest families, almost one in three people defecates in the open. While government has demonstrated real commitment to improving rural sanitation and open defecation rates have been dropped as low as 5%, the country remains off-track towards meeting the sanitation related MDG target and only 55% of rural households use improved latrines according to the JMP data. The country faces many challenges that hinder progress in WASH, not least its high vulnerability to flooding, arsenic contamination of groundwater supplies and high levels of poverty, with 31.5% of the population in 2010 reported as living below the national poverty line. Poor sanitation practices have dire health impacts especially in rural areas. Diarrhoea, typhoid and other diseases are spread by bacteria in feaces. Diarrhoea and respiratory disease, the combined leading causes of childhood mortality globally and in Bangladesh, are common amongst rural children.

According to the DFID 2012 portfolio review at current rates of progress, the global MDG sanitation target will be missed with a shortfall of over one billion people, and may not be met for another three decades or more. Of all the MDG targets, sanitation is one of the most off-track and more than one billion people still practice open defecation. Nearly two-thirds of these live in South Asia and over 80% live in just 10 countries worldwide. To help address the MDG target, The DFID South Asia WASH results programme in Bangladesh is being implemented by WaterAid Bangladesh (WAB) with local partners. The objective of this project is to promote and enable the sustained use of hygienic household toilets and the practice of hand washing with soap. WaterAid Bangladesh is addressing this project with local implementing partners in poor rural communities in five sub-districts in four districts in northern Bangladesh.

The South Asia WASH Results Programme (SAWRP) is unique for its innovative 100% **payment by results (PbR)** approach which guides the payment modality and the amount to be paid to the implementing partners. Under the PbR approach the implementing partners are paid based on delivery of verified results against assigned outputs and outcomes within the time allowed. The programme has been designed into two phase: Output Phase (April, 2014-December, 2015) and Outcome Phase (January, 2016- March, 2018). For WaterAid Bangladesh, a total number of 597,000 beneficiaries (250,000 for Sanitation, 2500,00 for Hygiene and 97,000 for Water) have to achieve within the output phase. Plan UK lead the consortium of implementing partners comprising Plan International, WaterAid, Unilever and Water and Sanitation for the

Urban Poor (WSUP). Monitoring and learning support is provided by WEDC and Ipsos MORI. The programme comprises two principal streams of work:

1. WaterAid Bangladesh and Plan Bangladesh, via local implementing partners, promotes household sanitation, safe water access and hand washing with soap in poor and marginalized rural communities using CLTS and sanitation marketing approaches
2. Unilever delivers their 'School of 5' hand washing campaign in primary schools with WSUP providing additional in school hygiene facility and water supply sustainability.

   This contracting approach requires an extremely robust monitoring and reporting system able to rapidly generate evidence for verification and audit. In order to reduce paper work and to generate real time and authentic data, a mobile based MIS application has been developed for this project. The system includes data collection, visualization and analysis.

Process of mobile based monitoring system

WaterAid Bangladesh has a well established mobile based management information system (mPMIS) which has been piloted and refined over several years. All reporting is based on data generated from this system.

Planning – the PNGO uses the system for planning. The M&E officer enters the original plan and any revised plans to the application by using a web browser and data will be stored in the server. If any changes are made to the plan, the M&E staff of WaterAid Bangladesh and relevant project manager of the partners will receive an email notification. Each partner NGO (PNGO) has one project manager, one M&E officer, three CDO Community Development Officers (CDOs), thirty union facilitators (three facilitator per union) and numerous WASH volunteers.

Data entry - in this system, the Union Facilitator (front line staff) of the partners enters achievements, related activities, water quality test data, photos of facilities and its GPS (global positioning system) location into an Android device based mobile application (smart phone). The entered data will be sent immediately to the central server by using mobile internet connectivity to report instantly. If there is no internet connectivity at that moment, the data will be stored in the device and sent once there is internet connection. The M&E officer of the partners reviews the data to check if it is correct or not. If the M&E officer finds anomalies they will discuss with the respective front line staff and delete the data from the system. If the data is found to be authentic then the M&E officer verifies it and it is automatically submitted to the PNGO project manager for their approval. Once data is approved by the PNGO manager, it automatically comes to the WaterAid Bangladesh main mPMIS system.

Data analysis and reporting - The system provides for the generation of reports and visualization like graphs, charts and demand based reports. The entire data set can be exported to MS Excel and other statistical software such as SPSS. The web application has a google Maps plugin with similar functionality. This google map provides the exact location of the particular activities against output. To mitigate the risk of data loss all data is held on a server which has scheduled backups. The mPMIS system is shown by a flow chart in Figure 1.
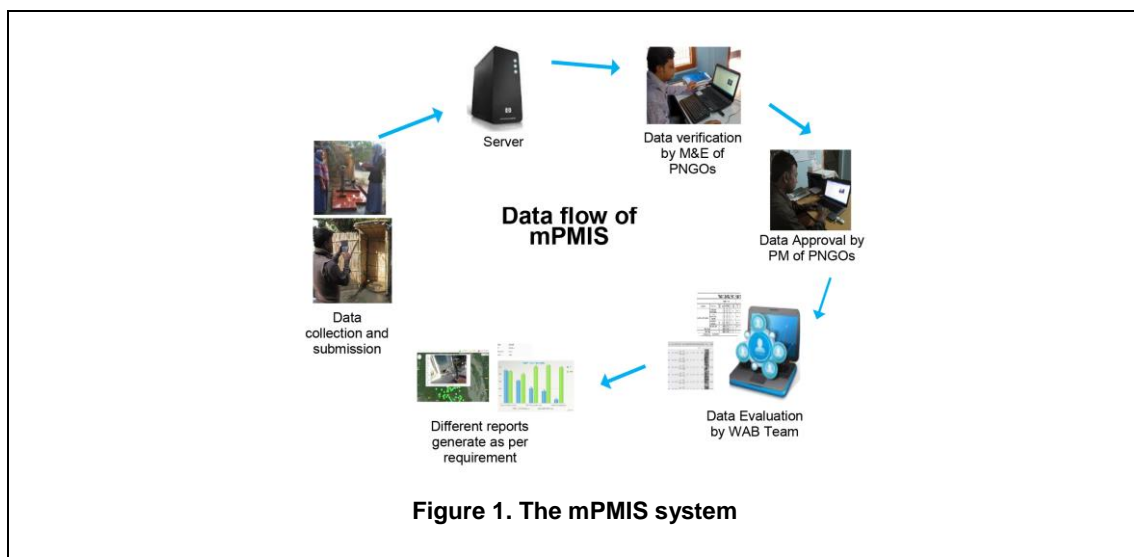

Figure 1. The mPMIS system

Data verification

This mPMIS has been designed with strong organizational dimension to control quality of the data management and monitoring system. At the PNGO level, there is a full time M&E officer to control the overall M&E system and data management.. The M&E officer of PNGO checks all data entered for inconsistency immediately by reviewing the data. Any unusual data is queried and relevant documentary evidence is requested for review. The M&E staff at WaterAid Bangladesh also reviews data sets and validates data on sample basis by field visits and checking relevant documents/evidence. Beneficiary phone numbers are entered so data can even be validated through phone calls from the desk.

Quality assurance: spot and back checks

To further ensure quality control of data entry and the quality of work on the ground SAWRP has designed a spot and back check system for each quarter.

- Spot checking field work as it happens - at least 3% of the interventions (water, sanitation and hygiene) are randomly selected for spot checking. Planned field work is randomly selected for field monitoring. Documents are reviewed, discussions held with partners, beneficiaries and the community. Findings are shared and agreed key action points agreed. PNGO M&E staff and programme staff of WAB Zonal office will be involved in spot checking and a report will be generated at the end of respective quarter.
- Back checking - The other data validation method is to randomly sample reported results for quality and correct quantity (data entry). At least 2% of the reported data (water, sanitation and hygiene) is randomly selected for back-checking.

External verification and payment triggering

Payment is made against verified outputs delivered (water, sanitation and hygiene) to agreed standards. The quality of the outputs needs to be supported by primary (database) and secondary (photos and field report) evidence. To ensure quality of respective output deliveries to support payment triggering, WaterAid's implementing partners will maintain primary and secondary evidences like - all primary information will be available in the WaterAid M&E data base which is based on mPMIS and the secondary evidences; photos, social maps, water quality test report, water point hand over note and hygiene campaign reports will be available in the mPMIS and the hard copies will be kept in the field offices.

The payment for all deliverables depends on demanding external verification. This verification is based on a sample of beneficiaries reported as reached; therefore verification needs to provide quantitative conclusions rather than a yes/no verification. An individual verification team **(ePact)** has been selected by DFID for verifying the results in every quarter. There are very large numbers being targeted and a quarterly ePact verification process can only ever examine a small sample. Through this system the auditors ePact can be provided with their own ID and password for mPMIS so that they can access the system and verify results at any time.

Training resources and skills

Familiarity with smart phones makes the handset acceptable to field staff but familiarity with smartphones is not enough to ensure that the mPMIS system is well used. A three day learning and discussion session on various aspects of mPMIS was provided for partners and WAB M&E staff. Each group of trainees had different kind of works and displayed a good understanding and internalization of the complexity of issues attached to mPMIS including the role and responsibilities of each participant which makes the system smoother.

The training session was essential for ensuring that the system was well understood by all the responsible staff. There are also refresher training courses every quarter to learn lessons and improve performance.

Benefits

WaterAid and its partners have found that anyone can easily access and analyze the data set. WAB has given ID and Password of this unique mPMIS system to different consortium members, so that they can also have access and analysis our data from the web.

- Real time data collection
- Substantially less errors compared to traditional paper based systems with data entry into a database
- An appropriate system which introduce and reduce paperless work

- Monitoring and supervision is possible in anytime from anywhere
- Quality control during any stage of implementation
- Easily identifies GPS location
- Data authenticity can be assured whenever submitted, verified and approved
- Data reporting and presentation make life easier
- Monitor progress whenever needed
- Filed staffs are increasing their capacity by using the monitoring device
- One can easily prepare a report by using the web system
- Field staff supervision and activity planning
- Evidence for verification and audit, including photographs, can be generated from the electronic system without the need to gather evidence from remote field offices which can be technically difficult and time-consuming

Lessons learned

- The substantial risks of payment disallowance from PbR contracts can be better mitigated with a robust mPMIS with active internal quality assurance.
- The electronic mPMIS system reduces data entry errors and facilitates the timely and accurate provision of evidence.

Recommendations

For even better performance and smooth operation of mPMIS in this project, we may consider below the recommendations:

- Introduce a mechanism in mPMIS to prevent multiple submissions of data for a single activity with same ID, unless the previous submitted data not been cancelled.
- Develop a mechanism which will ensure the approved Water Quality data during the verification process of water achievement with the same ID. Thus no water achievements should be considered without approved water quality data for a water option.
- Network frequency should be increased in particular working areas.

Conclusion

In the past, WASH related data collection and paper management for large and geographically disperse programmes was difficult. The ability to manage and evidence every single beneficiary reached would have been extremely challenging. As this payment by result project is so high risk, this particular smart system provides great reassurance that WaterAid can deliver quality data and information according to the donor requirements.

In addition, considering the time bound nature of the project the mPMIS facilitates live verification and analysis at any time from the desk enabling rapid changes to be made if required.

Photograph 1. Water point with GPS Location

Photograph 2. Front line staff collecting and submitting data from field

Photograph 3. Water quality test report

References

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